

**MINNESOTA AMENDMENT MN19 to 180-VI NATIONAL PLANNING PROCEDURES HANDBOOK
PART 600**

- A. BASELINE NUTRIENT MANAGEMENT PLANNING (STRATEGIC)**
- B. COMPREHENSIVE NUTRIENT MANAGEMENT PLANNING (STRATEGIC)**
- C. FIELD SPECIFIC NUTRIENT MANAGEMENT PLANNING (ANNUAL)**

This document augments and emphasizes National Planning Procedures Handbook (NPPH) CNMP guidance available on-line at: http://www.nrcs.usda.gov/programs/af/cnmp_guide_index.html and guidance found in the General Manual Title 190 (Ecological Sciences), Part 402 (Nutrient Management) and NRCS Minnesota Conservation Practice Standards Nutrient Management (code 590) and Waste Utilization (code 633). The general manual policy, standards and other items listed below as on-line are available on-line at: <http://www.mn.nrcs.usda.gov/technical/ecs/nutrient/nutrient.html>.

A. BASELINE NUTRIENT MANAGEMENT PLANNING



Baseline planning is long range strategic planning conducted on farms where NRCS assistance has been requested for nutrient management planning. *Baseline planning examines the entire farm and all operations that currently affect nutrient applications including crop rotations and manure handling practices.* Baseline plans are generally developed once and only updated as necessary. Baseline plans are used to help develop or implement annual crop nutrient plans. Baseline plans recommend practices that address sensitive areas, operation, maintenance and recordkeeping. Additional practices to be implemented over time may also be recommended to improve overall nutrient management. These practices include changes in fields or crops receiving manure over the course of a rotation or practices to reduce the overall volume or nutrient content of manure or wastewater.

Baseline plan components

Baseline plans address all nutrient management plan components described in Minnesota Conservation Practice Standard 590, dtd. May 2001. Consult Conservation Practice Standard 590 and the publication “Components of

a Nutrient Management Plan in Minnesota” for detail. **Both are available on-line.** A sample baseline plan is **available on-line** and can be found in the exhibits section of this handbook as exhibit MN-3 in section 600.5. Baseline plan components are:

‘Description of the operation that recommendations were developed for’

- 1) Planned crops, rotations and realistic yield goals
- 2) Manure storage and handling system, livestock numbers, annual manure production and manure nutrients available for spreading
- 3) An aerial photo or map identifying:
 - a) Fields
 - b) Fields to receive manure during the rotation including season and frequency over the rotation such as every year or once every four years)
- 4) Description and delineation of sensitive areas.

‘Planned practices and applications’

- 5) Acres needed for manure applications
- 6) Sensitive area management practices including soil and water conservation practices (e.g. P based manure applications or manure applications every 4 years)
- 7) Operation and maintenance recommendations including soil and manure sampling, equipment maintenance and calibration, safety and recordkeeping guidance
- 8) Nutrient application recommendations consistent with state rule (chapter 7020). The recommendations are for each crop in the rotation and can be based on published average manure nutrient content values. A schedule should also be provided indicating year(s) when annual field specific nutrient recommendations will be developed.

‘Appendices containing information and calculations used to develop plans’

- 9) Soil Survey Maps and legend and any existing soil test information.
- 10) Results of Field Nitrogen and Phosphorus Loss Assessments as appropriate
- 11) Soil and manure test analyses
- 12) An aerial photo or map identifying special protection or sensitive areas (restrictions that may apply if space allows).
- 13) Records and inventory sheets

Baseline planning procedure

- 1) Determine producer nutrient management **objectives** and concerns and gather information about the producer’s current nutrient management program including:
 - a) existing soil and manure sampling procedures; analyses if any; and lab used for analyses
 - b) records of past manure and commercial fertilizer applications
 - c) existing or planned application equipment and equipment calibration procedures
 - d) labor availability and travel routes to distant fields
 - e) previous years' yield information and procedure used to determine yield goals
 - f) current nutrient rate determination procedures
 - g) livestock types and numbers; and existing manure storage and transfer procedures and equipment

Worksheets to help gather this information **are available on-line** and include forms **MN-CPA 40, 41, 42 and 43** (Farming Practices Inventory; Cropping History and Soil Fertility Information; Manure Information Inventory; and Nutrient Management Practices Inventory respectively)

Much of the information may not be readily available from the producer. In such cases a schedule to gather the information should be inserted into the baseline plan.

- 2) **Inventory** the farm for soil, slope, erosion potential, sensitive features and special protection areas and conditions that could affect recommendations. Consult part D in the Criteria Section and Tables 1, 2 and 3 of Minnesota Conservation Practice Standard 590 (Nutrient Management) and the publication “Applying Manure in Sensitive Areas”. Consult “Sensitive Soil Features for Nutrient Management” in Section II of the

Minn. Field Office Technical Guide (FOTG). Consult the one page summary document “Nutrient Application Restrictions in Sensitive Areas”. All these references are **available on-line**.

- 3) Estimate annual manure production and determine acreage needed to apply this manure at N, P₂O₅ or K₂O based rates. The “minimum acreage calculator” part of “Nutrient Management Planner for Minnesota” software can be used for this determination.
- 4) **Analyze and determine problems and opportunities**
 - a) Potential for off-site movement of Phosphorus (P), Nitrogen (N) and manure. Tables 1, 2 and 3 in the 590 standard can be used to help conduct the analysis. The analysis includes the affect of season of application on movement. The P assessment will be conducted on all fields utilizing manure as a nutrient source and on any field draining towards receiving waters listed as impaired because of P loading. The N assessment will be conducted on fields located within approved Wellhead Protection Areas. Consult the 590 standard for additional areas where N assessments should be completed. **NRCS assessment tools (above referenced tables 1 and 2) are also available on-line** and in the “Nutrient Management Planner for Minnesota” software.
 - b) Other issues affecting nutrient application timing such as labor availability or field accessibility during certain times of year.
 - c) Equipment or operator abilities to apply nutrients over a range of rates
 - d) Compare estimated volume of manure and wastewater produced to producer records. Discrepancies may indicate that excess water, feed wastage or other materials are entering the system or that a percentage of manure is not being land-applied and is being tied-up or lost somewhere in the generation, transfer, storage and transport system.
 - e) Need for commercial fertilizer N on fields receiving manure (Is the producer comfortable relying exclusively on manure as an N source?).
- 6) **Formulate and Evaluate Alternatives.** Use information gathered, analyzed or developed in the above steps to recommend operational changes necessary to adequately implement a nutrient management plan. Those recommendations include:
 - a) acreage needed to apply manure including additional fields needed to receive those applications
 - b) needed soil and water conservation practices
 - c) additional management practices to use in sensitive areas
 - d) increased or decreased manure applications over the rotation on individual fields (application frequency)
 - e) manure applications based on P₂O₅ or K₂O instead of N
 - f) if needed, recommendations to prevent adverse affects of applying manure to growing crops
 - g) operation and maintenance including safety
 - h) calculate strategic nutrient application rates for each crop in the rotation (to use when developing annual crop nutrient plans and for compliance purposes on fields receiving manure). The rates will be crop specific but grouped by fields sharing specific conditions affecting recommendations. For example, fields recommended for infrequent manure applications (from c, d or e above) would be grouped together, or fields with similar soil nutrient content would be grouped together. Actual calculation techniques are similar to those used for field specific crop nutrient planning as discussed below.
- 7) **Select Alternatives** with the producer and prepare the Baseline Plan. Append job and fact sheets to the plan including: NRCS-MN Fact Sheet “MN-NUTR3 Soil Sampling”; UMES bulletin “FO-6423-GO Livestock Manure Sampling”; and UMES fact sheet “Calibrating Manure Spreaders”. Fact sheets describing realistic yield goals and manure and legume nutrient crediting are also a good idea. **Sample fact sheets are available on-line.**
- 8) Provide follow-up assistance by **evaluating plan** after implementation and by developing subsequent annual plans

B. COMPREHENSIVE NUTRIENT MANAGEMENT PLANNING (CNMP)



CNMP planning is strategic long range planning conducted on farms requesting USDA assistance for manure and wastewater runoff storage or handling problems. CNMPs combine baseline plans with feedlot or confinement area plans addressing manure and wastewater (including milkhouse waste) production, collection, storage, treatment, and transfer. Dead animal disposal, silage leachate and safety including site closure plans and emergency action plans are also addressed. CNMPs are subsets of Conservation Plans.

CNMP plan components

The national NRCS CNMP guidance identified at the start of this document lists CNMP contents. A sample CNMP is **available on-line**. The “**Nutrient Management Planner for Minnesota**” software contains most reports and worksheets needed to develop a CNMP. **Appendix 13E** of the NRCS **Agricultural Waste Management Field Handbook (AWMFH)** provides a sample Ag Waste Management Plan, similar to a CNMP. The AWMFH is available for viewing at local NRCS field offices or on-line at: <ftp://ftp.ftw.nrcs.usda.gov/pub/awmfh/> . CNMP components are:

‘Enterprise information that recommendations were developed for’

1-4) Baseline Plan Elements 1 thru 4

‘Planned Practices and Applications’

5-8) Baseline Plan Elements 5 thru-8

9) General recommendations for improvements to the manure and wastewater collection, storage, treatment and transfer system. This includes recommendations for closure of old systems being replaced by new systems.

10) Emergency action or response plans addressing manure leaks or spills

11) Mortality disposal plans

12) Optional feed management plans if requested

‘Appendices containing information and calculations used to develop plan’

- 13-17) Baseline Plan Elements 9-13
- 18) Results of feedlot and storage system evaluations
- 19) Applicable permits or certifications.

CNMP planning procedure

CNMP planning procedures combine baseline planning procedures discussed earlier with headquarters and livestock production site assessment procedures.

- 1) **Schedule a meeting** with the producer, engineers, nutrient specialists, soil erosion control specialists and other specialists such as animal nutritionists who will be working on the CNMP. Set **objectives** and define roles.

- 2) **Inventory** information needed to evaluate all areas where livestock are housed and manure is generated, stored and/or treated including stockpile areas. This inventory includes any existing feedlot registration or permit information and as-built or engineering design information. Some of the information needed for site evaluation includes:
 - a) Location of wells, surface waters, buildings, surface tile intakes, lakes, rivers and watercourses within 1000 feet of existing or proposed animal holding areas or manure storage areas
 - b) Soil types and texture and depth to saturated soil below existing or proposed systems
 - c) Depth to bedrock for existing or proposed liquid storage systems

A number of **checklists or references** are available to help guide the livestock and production site inventory and analysis process. They include:

 - The complete **AWMFH**
 - **Appendix 13C (Operation, Maintenance, and Safety Inspection Guidelines)** of the AWMFH
 - **Appendix 13D (Agricultural Waste Management System Troubleshooting Guidelines)** of the AWMFH
 - NRCS Minnesota’s “**NRCS Pollution Abatement System Review Checklist**”, available on-line
 - MPCA fact sheets or guide sheets including: “**Technical Guidelines for Stockpiling of Manure**”, **Feedlot construction setbacks from open water and wells**”, **Siting Manure Storage Areas in Minnesota’s Karst Region: State Requirements**”, **Construction Inspection For Liquid Manure Storage Areas**” and “**Proper Storage of Silage**” all available on-line at: , <http://www.pca.state.mn.us/hot/feedlots.html>

- 3) **Analyze** including an analysis of watering and feeding systems to insure that spillage and wastage is minimized.
 - a) Potential for surface and groundwater pollution potential can be evaluated by various means but will include use of the **Fleval** (Feedlot evaluation) model.
 - b) Potential for feedlot odor issues can be evaluated by use of the University of Minnesota’s **Odor From Feedlots Setback Estimation Tool (Offset)** available at: <http://manure.coafes.umn.edu/index.html>.
 - c) Storage sizing adequacy can be determined using various NRCS forms or software. However analysis of storage length adequacy or storage type (liquid or solid) is done in consultation with nutrient management specialists working on the CNMP. Certain seasonal manure application restrictions may dictate system size and time when the structure should be emptied. Need to use distant fields for manure application may dictate if a liquid, solid or composting system should be considered. One of the expressed purposes of CNMP planning is to ensure that storage systems facilitate good manure land application practices.
 - d) Silage leachate issues can be evaluated using AWMFH guidance and the MPCA document referenced above.
 - e) Emergency Response Planning can be evaluated using UMES and MPCA guidance available on-line

- f) Feed management evaluation is not required but important relative to unnecessary feeding expense, loss of P to surface waters and loss of N to surface and groundwater and air. The “Nutrient Management Planner for Minnesota” software contains a producer self-assessment worksheet that can help in feed management analysis.
 - g) Mortality disposal evaluation can be conducted by understanding state law requirements. The “Nutrient Management Planner for Minnesota” software contains producer self-assessment worksheets to determine mortality numbers and contains a fact-sheet on acceptable mortality management options.
- 4) **Formulate alternatives** with the producer.
 - 5) **Select alternatives and develop plan** with the producer and prepare the CNMP.
 - 6) Provide follow-up assistance by **evaluating** the plan after implementation and by developing subsequent annual plans.

C. FIELD SPECIFIC CROP NUTRIENT MANAGEMENT PLANNING



Field specific crop nutrient plans are annual plans that recommend N, P₂O₅ and K₂O applications as appropriate. The recommendations address nutrient form (commercial fertilizer and/or organic) and rate and application timing and method. General information on pH and lime is also presented. The recommendations are based on soil tests, manure analyses, University of Minnesota (UofM) fertilizer recommendations and nutrient budgeting.

Field specific crop nutrient plan components

Field specific crop nutrient plans address nutrient management plan components 8 and 9 as described in Minnesota Conservation Practice Standard 590, dtd. May 2001. Consult Conservation Practice Standard 590 and the publication “Components of a Nutrient Management Plan in Minnesota” for detail. **Both are available on-line.** A sample field specific annual nutrient management plan can be found **on-line** and in the exhibits section of this handbook as exhibit MN-3 in section 600.5. Field specific crop nutrient plan components are:

‘Planned applications’

- 1) Aerial photo or map identifying planning year, crop to be grown on individual fields, and special protection areas. (The type of nutrient to be applied to the field and suggested season of application could also be put on the photo or map dependent on client preference and space).
- 2) Schedule of planned applications to include rates, timing and form of nutrient

‘Appendices containing calculations and information used to develop plan’

- 3) Nutrient budgets and information used to develop budgets

Field specific crop nutrient planning procedure

- 1) Consult the strategic plan for manure application timing, setback , rate and crop restrictions and for crop specific generalized nutrient rate recommendations
- 2) Develop nutrient budgets for respective fields by adjusting generalized rates in the strategic plan to current soil tests and manure analyses, current measured manure volumes and current desired crops. The budgets consider Nitrogen provided by the preceding year's manure applications and the preceding two years' crops. Manure N crediting for the 3rd cropping season after application is encouraged on fields receiving annual manure applications. Retain computations used to determine: a.) amount of manure generated, b.) nutrients available from organic sources, c.) realistic yield goals and d.) manure and commercial fertilizer needs. Also retain soil test results and manure analyses.
- 3) **Formulate alternatives** by combining the crop year field specific nutrient application rate recommendations with timing, nutrient form and setback recommendations found in the strategic plan.
- 4) **Select alternatives** with producer and develop plan
- 5) Provide follow-up assistance by **evaluating plan** after implementation and by developing subsequent plans.

Deviation from University of Minnesota nitrogen (N) and phosphorus (P) recommendations is allowed on a case by case basis in plan recommendations. See the table below:

Deviations			
	Nitrogen	P ₂ O ₅ or K ₂ O	
		Soil Test P and K	
		VL to M	H to VH
Fields with commercial fertilizer only.*	15 lbs. N	20 lbs.	15 lbs. broadcast rec. 10 lbs. row rec.
Fields with manure applied on a N recommendation basis	80 % of manure N credit.	15 lbs for commercial fertilizer Manure applications limited by N.	
Fields with manure applied on a P₂O₅ removal basis		15 lbs starter for single crop removal app.	
		No deviation for rotational removal app	

Commercial P₂O₅ and K₂O fertilizer deviations apply to recommendations for either individual crop years or single applications intended for 2 or more crop years.*

Consult Conservation practice Standard 590 and State Chapter 7020 rules for additional detail on when to recommend P-based rates.