

Best Management Practices for the Rock County Rural Water Drinking Water Supply Management Area (DWSMA)

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This document is a list of the University of Minnesota nitrogen (N) fertilizer best management practices (BMPs) that apply within the Rock County Rural Water Drinking Water Supply Management Area (DWSMA). The BMPs are from the following University of Minnesota resources:

- Best Management Practices for Nitrogen Use in Southwestern Minnesota,
- Best Management Practices for Nitrogen on Coarse Textured Soils,
- Fertilizing Corn in Minnesota, and
- University of Minnesota Extension webpage [Crop-Specific Nutrient Needs](https://extension.umn.edu/nutrient-management/crop-specific-needs) (<https://extension.umn.edu/nutrient-management/crop-specific-needs>)

Considerations when reading the tables

- The BMPs listed below are either applicable to all soils or specific to coarse or fine textured soils. There are both coarse and fine textured soils across the cropland within the Rock County Rural Water DWSMA.
- The [Rock County Rural Water DWSMA Map](https://tinyurl.com/DWSMARockCoRWS) (<https://tinyurl.com/DWSMARockCoRWS>) identifies where coarse soils exist.
- In situations where a field includes both coarse and fine textured soils, the operator can either manage each area of the field separately or follow the BMPs for the dominant soil texture for the entire field.
- The BMPs on the final list must be implemented on 80% of the cropland (excluding soybean acres) in the DWSMA.
- Nitrogen management records need to be provided to show that a practice was adopted. If a responsible party does not provide or provides insufficient documentation showing a practice has been implemented, it counts as non-implemented during the MDA's evaluation/survey of nitrogen fertilizer BMP implementation.
- Some BMPs may not apply to all cropping systems, such as, incorporation of urea with tillage in no-till systems. If a BMP is agronomically or technically unsuitable for a specific field based on soil type, topography, crop or management system, a suitable BMP or Alternative Management Tool (AMT) can be selected in its place.
- See the companion document "Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs" for definitions of terms related to the BMPs. This document is available on the [Rock County Rural Water System DWSMA](http://www.mda.state.mn.us/rockcountyrw-dwsma) webpage (www.mda.state.mn.us/rockcountyrw-dwsma).

Additional considerations for the Rock County Rural Water DWSMA

- Perennial cover on cropland is highly protective of groundwater and accounts for 33.7% of cropland within the DWSMA. If this perennial cover changes from its current level, review of the appropriate nitrogen fertilizer BMPs for this DWSMA may be needed and a new list of nitrogen fertilizer BMPs approved. Examples that could cause such a change include, but are not limited to, changes in land cover, changes in the cropping rotation, changes to the MDH groundwater vulnerability designations, and changes to the MDH approved DWSMA boundary.

Questions or Comments?

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Best Management Practices (BMPs)

The BMPs numbered 1 – 3 apply to all soil types and are the most important BMPs to reduce nitrate losses.

BMP	Nitrogen Rate BMP on All Soils	Applies to
1	<p>Nitrogen rates are based on nitrogen fertilizer application guidelines from the University of Minnesota¹.</p> <p>Dryland corn following corn: at or below the high end of the 0.075 nitrogen rate range (currently at 220 lbs. N/ac)^{1,2}</p> <p>Dryland corn following soybean: at or below the high end of the 0.075 nitrogen rate range (currently at 170 lbs. N/ac)^{1,2}</p> <p>For other crops grown in the DWSMA, follow the current University of Minnesota guidance applicable to that crop³</p>	All agronomic crops on all soils
2	Include N supplied in a starter, weed and feed program, and contributions from phosphorus fertilizers such as MAP and DAP when calculating total N rate ⁴	All agronomic crops on all soils
3	Take appropriate N credit for previous legume crops and manure used in the crop rotation ⁵	All agronomic crops on all soils

¹ Corn nitrogen rate guidelines from the University of Minnesota, [Fertilizing corn in Minnesota](https://extension.umn.edu/crop-specific-needs/fertilizing-corn-minnesota) (https://extension.umn.edu/crop-specific-needs/fertilizing-corn-minnesota), or its successor.

² The implementation of approved Alternative Management Tools may allow a higher nitrogen rate provided that the field specific data indicates this is appropriate.

³ All crops listed at the University of Minnesota Extension webpage [Crop-Specific Nutrient Needs](https://extension.umn.edu/nutrient-management/crop-specific-needs) (https://extension.umn.edu/nutrient-management/crop-specific-needs) or its successor.

⁴ Total N rate should also include any AMS or other inorganic fertilizers containing nitrogen.

⁵ In addition to legumes and manure, total N rate should also include nitrogen from organic sources with a known nitrogen availability factor (i.e. research-based nitrogen availability table or laboratory analysis, including first and second year credits) such as biosolids and industrial by-products.

BMP	Nitrogen Placement, Timing and Source BMPs on Coarse Textured Soils	Applies to
4A	Use split applications of nitrogen fertilizer ^{6,7,8}	Corn on coarse textured soils
4B	Acceptable, but less effective: Spring preplant application of ESN (polymer coated urea) ^{6,7,9}	Corn on coarse textured soils
4C	Acceptable, but less effective: Spring preplant application with a nitrification inhibitor ^{6,7,10}	Corn on coarse textured soils

⁶ BMPs 4A, 4B, and 4C only apply to corn acres that receive commercial nitrogen fertilizer. If manure is the only source of nitrogen, these BMPs do not apply.

⁷ Nitrogen loss modeling indicates that the application timing practices listed in BMP 4A, 4B, and 4C for coarse textured soils provide a similar groundwater protection benefit. The adoption of at least one of the practices listed in 4A, 4B, or 4C is needed to count as having adopted BMP 4.

⁸The MDA will refer to the definition of split application in the companion document “Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs”. Practices that meet this definition will be considered meeting this BMP.

⁹The MDA will refer to definition of ESN in the companion document “Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs”. This definition includes the allowable urea/ESN ratio.

¹⁰ The MDA will refer to definition of nitrogen stabilizer in the companion document “Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs”. Products that meet this definition will be considered meeting this BMP.

Maintaining records of nitrogen fertilizer use is especially important and enables the MDA to review the rate of adoption within this DWSMA during the MDA’s evaluation of nitrogen fertilizer BMPs. If records are insufficient or not provided, surveyed cropland will be counted as not implementing the published nitrogen fertilizer BMPs. An example record collection form can be found on the [Rock County Rural Water System DWSMA](http://www.mda.state.mn.us/rockcountyrw-dwsma) webpage (www.mda.state.mn.us/rockcountyrw-dwsma).

Record Keeping	Applies to
Keep records of nitrogen use, including rates, crediting of nitrogen sources, timing, placement and source. MDA will provide guidance on record keeping requirements.	All agronomic crops on all soils

Additional Practices and Alternative Management Practices (AMTs)

The tables below are additional practices and Alternative Management Tools (AMTs). Adoption of these practices is not required in a Mitigation Level 2 DWSMA however each of the listed practices could be protective of groundwater. Farmers are encouraged to consider these practices although some may not be appropriate or applicable to every farm.

Use of products delaying nitrification or delaying plant available nitrogen on fine textured soils within the DWSMA were acknowledged by the local advisory team (LAT) as protective of groundwater. While these practices are not currently BMPs for fine textured soils, the MDA computer modeling indicates that they have the potential to reduce nitrogen loss below the crop root zone.

Additional Practices	Applies to
Use products delaying nitrification, approved by the MDA. Potential nitrification inhibitor use with preplant nitrogen applied to corn. 1,119 applicable acres where only urea is applied preplant. 1,937 applicable acres where hog manure and urea is applied preplant.	Corn on all soils
Use products delaying plant available nitrogen, approved by the MDA.	Corn on all soils
Split application of nitrogen applied to corn on all soils 1,387 applicable acres where this practice is not already in place.	Corn on all soils

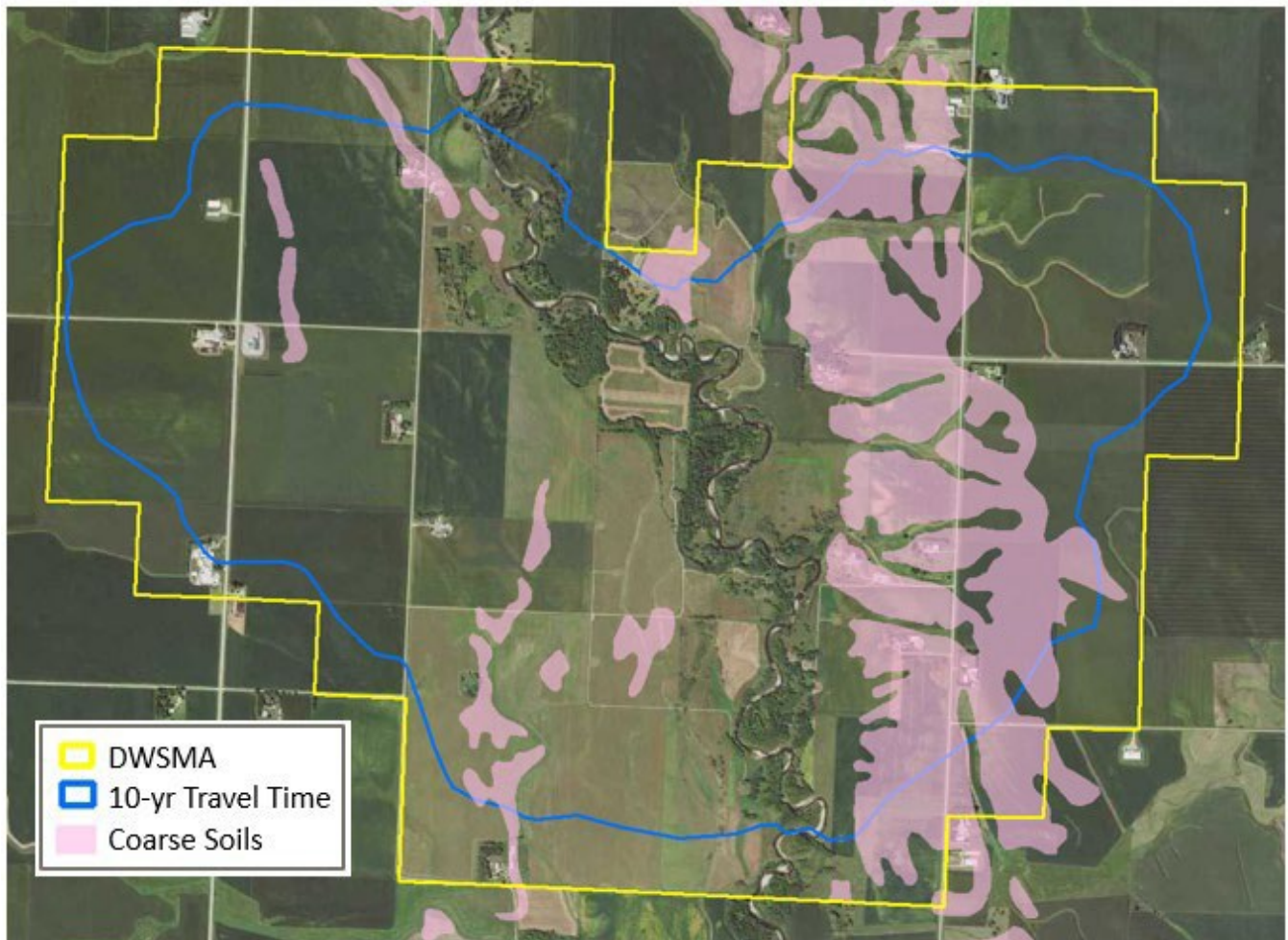
Alternative Management Tools (AMTs)

AMTs provide additional protection from the loss of nitrogen below cropland. The following is a list of AMTs that have been discussed with LAT. The LAT acknowledges the protective potential of these practices. The MDA will work together with the LAT, Rock County Rural Water staff, local Soil and Water Conservation District staff, and other state agencies to seek out funding to support the adoption of these AMTs within the Rock County Rural Water DWSMA.

Producers can voluntarily adopt these AMTs. During the MDA's evaluation of nitrogen fertilizer BMPs in a Mitigation Level 2 DWSMA an AMT can substitute for a BMP. However, AMT adoption is not required to pass the BMP evaluation in a Mitigation Level 2 DWSMA.

Alternative Management Tools (AMTs)	Applies to
Rye cover crop following soybeans in a corn-soybean rotation. 1,920.6 applicable acres where cover crops are not already planted. If 80% of these acres adopt this practice nitrogen loss within the DWSMA can be reduced by 10%. If 20% of the acres adopt this practice the potential reduction is 1.6%.	Corn-Soybean acres on all soils
Planting perennial grass in place of corn-soybean cropland acres. Compared with corn-soybean at 165 lbs. N/ac preplant this land cover change can reduce nitrogen loss below the root zone by 79%. This estimate assumes there is no cutting and zero nitrogen is applied.	Corn-Soybean acres on all soils
Planting perennial grass pasture in place of corn-soybean cropland acres. Compared with corn-soybean at 165 lbs. N/ac preplant this land cover change can reduce nitrogen loss below the root zone by 83%. This estimate assumes the pasture is grazed and has zero nitrogen applied.	Corn-Soybean acres on all soils

Map of Coarse Soils within the Rock County Rural Water Drinking Water Supply Management Area



This map shows the boundary of the Rock County Rural Water DWSMA. The yellow line marks the DWSMA boundary. Within this area, adoption of the BMPs listed on pages 2-3 is needed. The pink areas are coarse soils. Where the coarse soils are the dominant soil type within a field, the BMPs for coarse soils should be followed. Areas that are not identified as having coarse soils should follow the fine textured soil BMPs.