

Best Management Practices for the Melrose Drinking Water Supply Management Area (DWSMA)

Published: 9-25-2024; Updated: 4-30-2025

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

- Best Management Practices for Nitrogen on Coarse Textured Soils,
- Best Management Practices for Nitrogen Use in South-Central Minnesota,
- 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 BMP 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 Melrose DWSMA.
- The [Melrose DWSMA Map](https://tinyurl.com/DWSMAMelrose) (<https://tinyurl.com/DWSMAMelrose>) 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 majority soil texture within the 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 "Definitions of Terms in the University of Minnesota Nitrogen Fertilizer BMPs" for definitions of terms related to the BMPs. This document is available on the [Melrose DWSMA](http://www.mda.state.mn.us/melrose-dwsma) webpage (www.mda.state.mn.us/melrose-dwsma)

Considerations regarding nitrogen rate

- Based on survey data MDA collected within the Melrose DWSMA, producers growing dryland corn currently apply nitrogen rates that are below the University of Minnesota 0.15 maximum return to nitrogen (MRTN) for corn following corn and corn following soybeans. For irrigated corn following soybeans producers apply at rates lower than the 0.20 MRTN. To protect groundwater below the cropland in this DWSMA the MDA expects that growers will continue to apply nitrogen to corn at their current rates. The nitrogen rates listed below provide a reference for future BMP evaluations and MDA approved alternative management tools (AMT).
- The MDA's computer modeling of nitrogen loss below the crop root zone is based on the nitrogen rates being applied.
- The strategy for protecting groundwater in this DWSMA, including the nitrogen BMPs listed below, is predicated on producers continuing to apply nitrogen at their current corn nitrogen rates.

Questions or Comments?

Casey Field | MDA Local Project Lead | Casey.Field@state.mn.us | 320-406-4958.

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 BMPs	Applies to
1	<p>Nitrogen rates are based on the nitrogen fertilizer application guidelines from the University of Minnesota¹. Rates were last updated in 2023.</p> <p>Dryland corn following corn: up to the 0.15 MRTN (currently at 165 lbs. N/ac)^{1,2}</p> <p>Dryland corn following soybean: up to the 0.15 MRTN (currently at 135 lbs. N/ac)^{1,2}</p> <p>Irrigated corn following soybeans: up to the 0.20 MRTN (currently at 150 lbs. N/ac)^{1,2}</p> <p>For other crops grown in the DWSMA, nitrogen rates must 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 and edible beans on coarse textured soils
4B	Acceptable, but less effective: Spring preplant application of ESN (polymer coated urea) ^{6,7,9}	Corn and edible beans on coarse textured soils
4C	Acceptable, but less effective: Spring preplant application with a nitrification inhibitor ^{6,7,10}	Corn and edible beans on coarse textured soils

⁶ BMPs 4A, 4B, and 4C only apply to corn and edible bean 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.

⁸ The 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.

⁹ The 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.

BMP	Nitrogen Placement, Timing and Source BMPs on Coarse Textured Soils	Applies to
5	Use N stabilizer on labeled crops when early sidedress is used ¹¹	Corn and edible beans on coarse textured soils

¹¹ For corn, this BMP applies to situations when a portion of the total nitrogen fertilizer is applied preplant and the remainder is applied as a single sidedress application early in the growing season. Early growing season is defined as the period from crop emergence through the V4 growth stage. This BMP does not apply to situations when there are more than one sidedress application within the growing season. For edible beans early sidedress is defined as within 17 days after planting.

BMP	Nitrogen Placement, Timing and Source BMPs on Fine Textured Soils	Applies to
6	Use split application of ammonia, urea, and UAN	Corn on fine textured soils

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 [Melrose DWSMA](http://www.mda.state.mn.us/melrose-dwsma) webpage (www.mda.state.mn.us/melrose-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 or provides useful information to guide the use of nitrogen fertilizer. Farmers are encouraged to consider these practices although some may not be appropriate or applicable to every farm.

Additional Practices	Applies to
Field testing to determine nitrogen requirements for specific crops	All agronomic crops on all soils
Test manure using a lab approved or certified by MDA	All agronomic crops on all soils
Develop irrigation, fertilizer chemigation, water, manure, or nutrient management plans with a qualified professional	All agronomic crops on all soils
Use products delaying nitrification, approved by the MDA	All agronomic crops on all soils
Use products delaying plant available nitrogen, approved by the MDA	All agronomic crops on all soils
Converting A-A-A-C-C rotation to a A-A-A-C-C rotation. Growing 2 years of corn instead of 3. Currently there are zero acres planted in a A-A-A-C-C rotation.	Alfalfa-Corn on all soils
Converting corn-corn rotation acres to a corn-soybean rotation.	Corn-Corn on all soils
Incorporating manure within 12hrs instead of within 12-96 hours of application on 135 acres of C-C. Incorporating manure sooner increases the plant available nitrogen (PAN) from the manure and reduces the total amount of manure needed to apply the same rate of PAN. Currently there are 135 acres of C-C that receive manure.	Corn-Corn on all soils

Alternative Management Tools (AMTs)

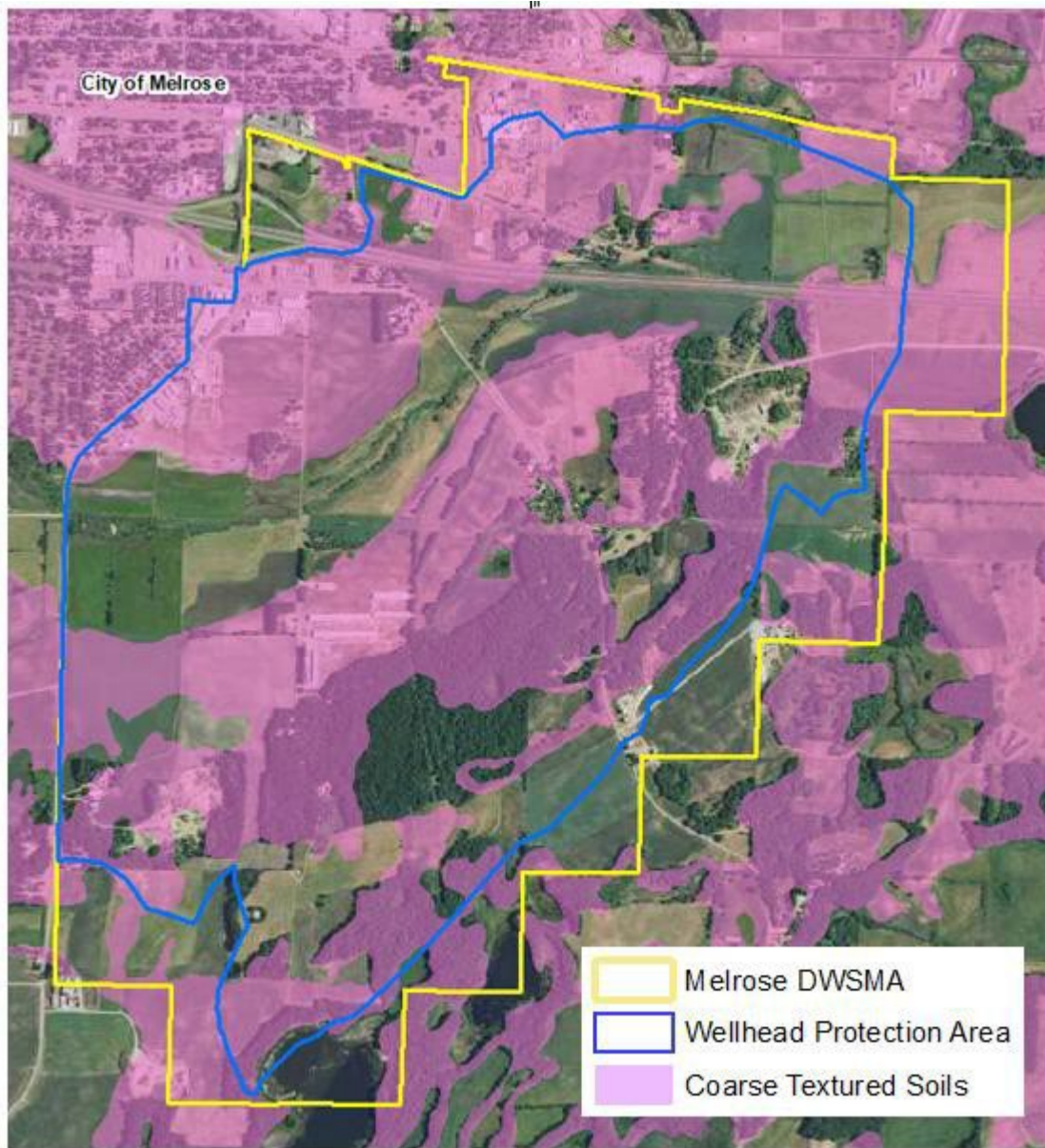
AMTs provide additional protection from the loss of nitrogen below cropland. The following is a list of AMTs that have been discussed with the local advisory team (LAT). The LAT acknowledges the protective potential of these practices. The MDA will work together with the LAT, the City of Melrose, local Soil and Water Conservation District staff, and other state agencies to seek out funding to support the adoption of these AMTs within the Melrose 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
Convert corn-corn rotation acres to an alfalfa-corn rotation (A-A-A-C-C-C).	Corn-Corn
Convert corn-corn rotation acres to perennial grass (i.e, CRP).	Corn-Corn
Convert corn-soybean acres into grass hay.	Corn-Soybean
Plant cover crop after soybeans on all corn-soybean rotation acres within the DWSMA.	Corn-Soybean

Melrose

Drinking Water Supply Management Area (DWSMA)



This map shows the boundary of the Melrose 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.