

Best Management Practices for the Lincoln Pipestone Rural Water - Verdi Drinking Water Supply Management Area



DWSMA

October 2026

This document is a list of University of Minnesota nitrogen fertilizer best management practices (BMPs) that apply within the Lincoln Pipestone Rural Water (LPRW) - Verdi 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 Southwestern and West-Central Minnesota
- Fertilizing Corn in Minnesota
- University of Minnesota Extension webpage [Crop-Specific Nutrient Needs](https://extension.umn.edu/nutrient-management/crop-specific-needs) (extension.umn.edu/nutrient-management/crop-specific-needs)

Considerations when reading the BMP tables

- The BMPs listed below are applicable to all soils or specific to coarse-textured soils. There are both coarse and fine textured soils within the Verdi DWSMA.
- The [Verdi DWSMA Map](https://mda.state.mn.us/verdi-dwsma-soil) (mda.state.mn.us/verdi-dwsma-soil) 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 type within the field.
- Nitrogen management records must 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 not implemented during the MDA's evaluation/survey of nitrogen fertilizer BMP implementation.
- Some BMPs may not apply to all cropping systems, such as incorporating 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 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 [Verdi DWSMA webpage](https://mda.state.mn.us/lprwverdi-dwsma) (mda.state.mn.us/lprwverdi-dwsma) and used as a reference for BMP 4A and 4B.
- See the document "Overview of Accepted Nitrification and Urease Inhibitors" for inhibitors approved for use in DWSMAs with published BMP lists. This document is available on the [Verdi DWSMA webpage](https://mda.state.mn.us/lprwverdi-dwsma) (mda.state.mn.us/lprwverdi-dwsma) and used as a reference for BMP 4C.

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 loss.

BMP	Nitrogen Rate BMPs for All Soil Types
1	<p>Dryland corn: at or below the low end of the 0.075 price ratio range</p> <p>Currently up to 180 lbs. N/acre for corn following corn Currently up to 145 lbs. N/acre for corn following soybeans</p> <p>Irrigated corn: at or below the 0.10 Maximum Return to Nitrogen (MRTN)</p> <p>Currently up to 210 lbs. N/acre for corn following corn Currently up to 180 lbs. N/acre for corn following soybeans</p> <p>References:</p> <ul style="list-style-type: none">• Corn nitrogen rates are based on current nitrogen fertilizer application guidelines for corn from the University of Minnesota (extension.umn.edu/crop-specific-needs/fertilizing-corn-minnesota) or its successor.• For other crops grown in the area, follow the current University of Minnesota nitrogen rate guidance applicable to that crop (extension.umn.edu/nutrient-management/crop-specific-needs). <p>Note: The implementation of approved AMTs may allow a higher nitrogen rate, provided that field-specific data indicates this is appropriate.</p>
2	<p>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</p> <p>Note: The total N rate also should include any ammonium sulfate (AMS) or other inorganic fertilizers containing nitrogen.</p>
3	<p>Take appropriate N credit for previous legume crops and manure used in the crop rotation</p> <p>Note: In addition to legumes and manure, total N rate also should include nitrogen from organic sources with a known nitrogen availability factor (i.e. research-based nitrogen availability tables, laboratory analysis, including first- and second-year credits) such as biosolids and industrial by-products.</p>

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.

BMP	Nitrogen Placement, Timing and Source BMPs for Coarse Textured Soils
4A	<p>Use split applications of N fertilizer</p> <p>Notes:</p> <p>This split-application BMP applies only to corn and edible bean acres that receive commercial nitrogen fertilizer. If manure is the only source of nitrogen, this BMP does not apply.</p> <p>Refer to the definition of split application in the “Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs.” Practices that meet this definition will be considered meeting this BMP.</p>
4B	<p>Spring preplant application of ESN (polymer-coated urea)</p> <p>Note: Refer to the definition of ESN in the “Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs.” This definition includes the allowable urea/ESN ratio.</p>
4C	<p>Spring preplant application with a nitrification inhibitor</p> <p>Note: Refer to the list of approved nitrification inhibitors in the “Overview of Accepted Nitrification and Urease Inhibitors.” This document is available on the Verdi DWSMA webpage (mda.state.mn.us/lprwverdi-dwsma).</p>

Record Keeping
<p>Keep records of nitrogen use, including rates, crediting of nitrogen sources, timing, placement, and source. The MDA will provide guidance on recordkeeping requirements.</p> <p>Note: An example recordkeeping form is available on the Verdi DWSMA webpage (mda.state.mn.us/lprwverdi-dwsma).</p>

Additional Practices and AMTs

The tables below are additional practices and AMTs. Adoption of these practices is not required in a Mitigation Level 2 DWSMA. However, each of the listed practices could protect groundwater or 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
Use nitrification inhibitor with preplant urea applications 1,127 applicable acres. Using a nitrification inhibitor on all applicable acres would reduce nitrogen loss in the DWSMA by 1.5%	Corn on all soils
Use nitrification inhibitor with preplant urea and hog manure applications 1,367 applicable acres. Using a nitrification inhibitor on all applicable acres would reduce nitrogen loss in the DWSMA by 2.4%	Corn on all soils
Split application of nitrogen 985 applicable acres. Applying 1/3 of nitrogen fertilizer in-season would reduce nitrogen loss in the DWSMA by 0.5%	Corn on all soils
Use products delaying plant available nitrogen, approved by the MDA	Corn on all soils
Small grain replacing one year of corn in rotation 5,625 applicable acres. If all acres converted from a C-Sb-C-Sb rotation to C-Sb-Oats-Sb with 75 lbs. N/acre applied to the oats, nitrogen loss within the DWSMA could be reduced by 4.4%	All corn-soybean acres
Test manure using a lab certified or approved by the MDA	All agronomic crops on all soils

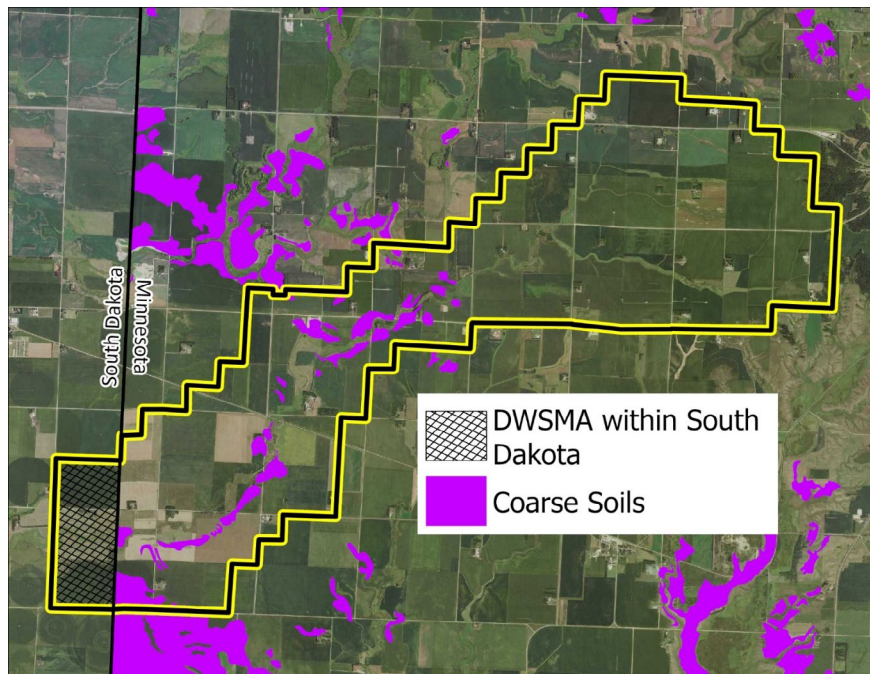
AMTs provide additional protection from the loss of nitrogen below cropland. The following is a list of AMTs discussed with the local advisory team (LAT), which acknowledges the protective potential of these practices. The MDA will work with the Verdi LAT, Lincoln Pipestone Rural Water System, local conservation district staff, and other state agencies to seek out funding to support adoption of these AMTs within the Verdi DWSMA.

Producers can voluntarily adopt these AMTs. During the MDA's evaluation of nitrogen fertilizer BMPs in a Mitigation Level 2 DWSMA, some AMTs 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 on 20% of the corn-soybean acres in the DWSMA 1,101 applicable acres in the DWSMA. If all acres adopt this practice, nitrogen loss within the DWSMA could be reduced by 3.4%.	All corn-soybean acres
Land conservation programs	All acres
Minnesota Ag Water Quality Certification Program	All Acres
On-farm nitrogen rate trials	All acres
Precision nitrogen management	All acres

On irrigated acres within the Verdi DWSMA, irrigation water application timing decisions and system upgrades to improve irrigation water-use efficiency could further reduce the risk of saturated soil conditions that are conducive to leaching.

Map of the Lincoln Pipestone Rural Water - Verdi Drinking Water Supply Management Area



The Verdi DWSMA is outlined in yellow and black. Coarse-textured soils are shaded in purple. Within this area, adoption of the BMPs listed on pages 2 and 3 is needed.

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