

## Best Management Practices for the Sundsruds Court 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 Sundsruds Court 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 Northwestern Minnesota,
- Best Management Practices for Nitrogen Use: Irrigated Potatoes,
- Fertilizing Corn in Minnesota, and
- Fertilizer Guidelines for Agronomic Crops in Minnesota.
- 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 are either for coarse-textured soils or applicable to all soils. All cropland soils within the Sundsruds Court DWSMA are classified as coarse-textured.
- The [Sundsruds Court DWSMA Map](https://tinyurl.com/DWSMASundsruds) (<https://tinyurl.com/DWSMASundsruds>) identifies where coarse soils exist.
- 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 [Sundsruds Court DWSMA webpage](http://www.mda.state.mn.us/sundsrudscourtmdp-dwsma) ([www.mda.state.mn.us/sundsrudscourtmdp-dwsma](http://www.mda.state.mn.us/sundsrudscourtmdp-dwsma)).

### Additional considerations for the Sundsruds Court DWSMA

- Planting of a new crop variety with a lower nitrogen demand in this DWSMA provides a 13.9% reduction in nitrogen loss and is highly protective of groundwater. This change in the primary crop applies to 100% of the cropland during the years that crop is grown in the rotation. If in the future this primary cropping decision were to change, review of the approved nitrogen fertilizer BMPs for this DWSMA may be needed and a new list of nitrogen fertilizer BMPs approved.

### 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 BMPs	Applies to
1	<p>Corn nitrogen rates are based on the nitrogen fertilizer application guidelines from the University of Minnesota<sup>1</sup>.</p> <p><b>Irrigated corn following soybean:</b> at or below the high end of the 0.10 price ratio nitrogen rate range (currently at 195 lbs. N/ac)<sup>1,2</sup></p> <p><b>Irrigated corn following edible beans:</b> at or below the high end of the 0.10 price ratio nitrogen rate range (currently at 205 lbs. N/ac)<sup>1,2</sup></p> <p><b>Irrigated corn following corn or potatoes:</b> at or below the high end of the 0.10 price ratio nitrogen rate range (currently at 225 lbs. N/ac)<sup>1,2</sup></p> <p>For other crops grown in the DWSMA, follow the current University of Minnesota guidance applicable to that crop<sup>3</sup></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 <sup>4</sup>	All agronomic crops on all soils
3	Take appropriate N credit for previous legume crops and manure used in the crop rotation <sup>5</sup>	All agronomic crops on all soils

<sup>1</sup> 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.

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

<sup>3</sup> 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.

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

<sup>5</sup> 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 tables, laboratory analysis, including first and second year credits) such as biosolids and industrial by-products.

BMP	Placement, Timing and Source BMPs for <i>Corn and Edible Beans on Coarse Textured Soils</i>	Applies to
4	Use split applications of N fertilizer	Corn and edible beans on coarse textured soils

BMP	Rate BMPs for irrigated potatoes only	Applies to
5	Base N rate on variety, harvest date, and realistic yield goals <sup>6,7</sup>	Irrigated Potatoes
6	Account for nitrogen from previous crop (take N credits from legumes)	Irrigated Potatoes
7	Test irrigation water for N content and adjust N fertilizer accordingly	Irrigated Potatoes

<sup>6</sup> At the time this list was published, the highest University of Minnesota nitrogen rate guidelines were 250 lbs. N/acre. Higher nitrogen rates may be used if using a petiole analysis.

<sup>7</sup> Yield refers to total yield, not harvestable yield.

<b>BMP</b>	<b>Timing BMPs for irrigated potatoes only</b>	<b>Applies to</b>
<b>8</b>	Do not use more than 40 lbs N/acre in the starter for mid/late season varieties <sup>8</sup>	Irrigated Potatoes
<b>9</b>	Do not use more than 60 lbs N/acre in the starter for early harvested varieties <sup>8</sup>	Irrigated Potatoes
<b>10</b>	Nitrogen applied through the hilling stage should be cultivated/incorporated into the hill	Irrigated Potatoes
<b>11</b>	Plan the majority of soluble N inputs from 10 to 50 days after emergence	Irrigated Potatoes
<b>12</b>	Use a petiole analysis to aid in making post-hilling nitrogen applications	Irrigated Potatoes

<b>BMP</b>	<b>Source BMPs for irrigated potatoes only</b>	<b>Applies to</b>
<b>13</b>	Do not use fertilizers containing nitrate (e.g., UAN) in the starter	Irrigated Potatoes
<b>14</b>	For mid to late season varieties <sup>8</sup> , apply ESN no later than emergence	Irrigated Potatoes
<b>15</b>	ESN for early harvested potatoes is not recommended due to slow release of N	Irrigated Potatoes

<b>BMP</b>	<b>Other BMPs for irrigated potatoes only</b>	<b>Applies to</b>
<b>16</b>	Follow proven water management strategies (irrigation scheduling) to provide effective irrigation and minimize leaching	Irrigated Potatoes
<b>17</b>	Establish a cover crop following potatoes whenever possible <sup>9</sup>	Irrigated Potatoes

<sup>8</sup> Early = vines killed or green dug before August 1; Mid = vines killed or green dug August 1 – August 31; late = vines killed or green dug after September 1.

<sup>9</sup> Establish a cover crop following potatoes harvested before September 1. Potatoes harvested on or after this date need a cover crop established unless the soil is too wet for seeding, weather is too cold or it is too late in the growing season for cover crop growth. These and other reasons for not planting cover crops will be considered on a case-by-case basis.

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 keeping form can be found on the [Sundsruds Court DWSMA webpage](http://www.mda.state.mn.us/sundsrudscourtmhp-dwsma) ([www.mda.state.mn.us/sundsrudscourtmhp-dwsma](http://www.mda.state.mn.us/sundsrudscourtmhp-dwsma)).

<b>Record Keeping</b>	<b>Applies to</b>
Keep records of nitrogen use, including rates, crediting of nitrogen sources, timing, placement, and source. The 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.

Below is a list of additional practices that could be protective of groundwater. These additional practices have been discussed with the LAT and they acknowledge the protective potential of these practices. The primary crop change is a commitment this producer has made for groundwater protection within the DWSMA. The use of nitrification inhibitors in addition to split applications of nitrogen fertilizer is a protective practice LAT members support. The practice of using a nitrification inhibitor with early season nitrogen applications in addition to in-season split applications is different than the University of Minnesota's BMP for inhibitor use on coarse-textured soils; however, this is an additional practice with potential to reduce nitrogen loss below cropland.

These additional practices can be adopted voluntarily by producers, but they are not required to pass the BMP evaluation in a Mitigation Level 2 DWSMA.

Additional Practices	Applies to
<b>Primary crop change</b> 260 acres adopting this change when this crop is grown in the rotation reduces the total nitrogen loss below the crop root zone by 13.9%	All cropland
The use of nitrification inhibitor products with early season nitrogen applications in addition to in-season split applications of nitrogen fertilizer	Edible beans, corn, potatoes, and wheat

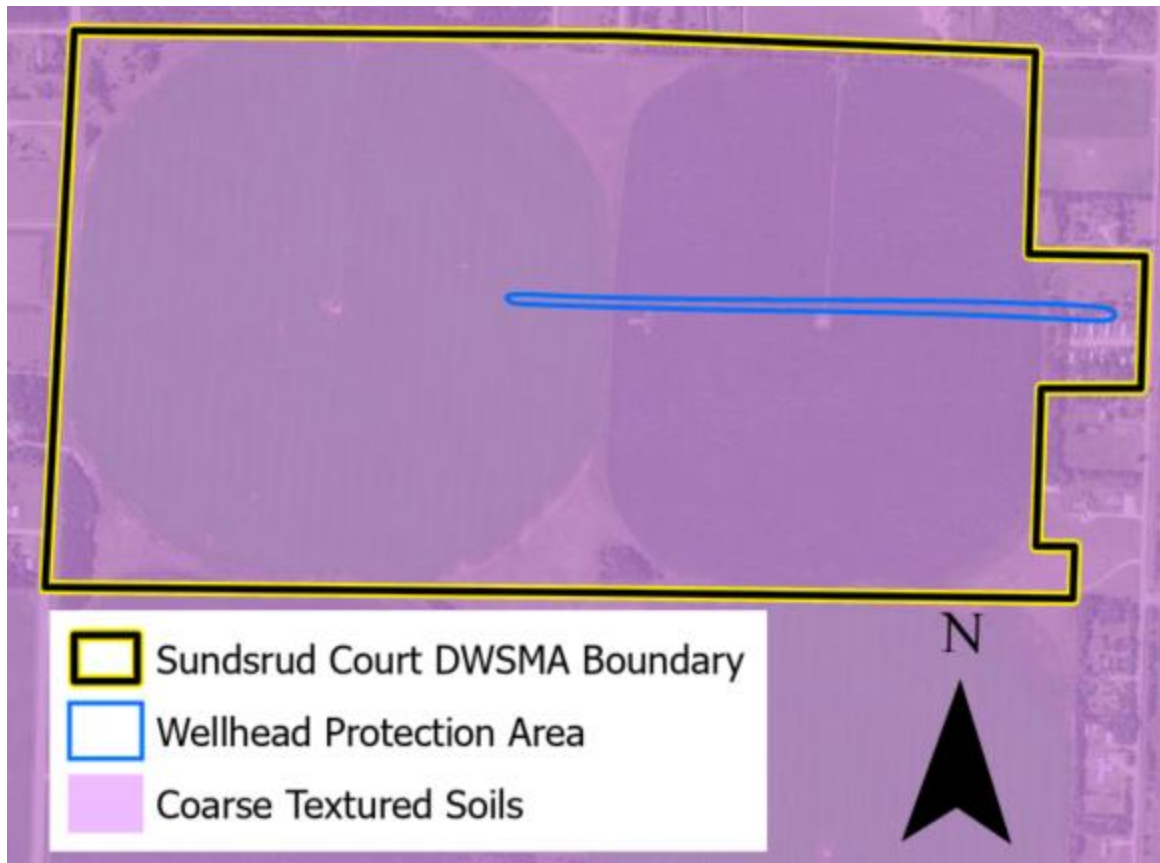
## Alternative Management Tools (AMTs)

AMTs provide additional protection from the loss of nitrogen below cropland. The following is a list of AMTs that have been discussed with the LAT. The MDA will work together with the LAT, Sundsruds Court owners, local soil and water conservation district staff, and other state agencies to seek out funding to support the adoption of these AMTs within the Sundsruds Court 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. AMT adoption is not required to pass the BMP evaluation in a Mitigation Level 2 DWSMA.

Alternative Management Tools (AMTs)
Minnesota Ag Water Quality Certification Program
Land Conservation Programs
Increasing Continuous Cover: Cover Crops
Intermediate Wheatgrass (Kernza)
Perennial Vegetation
On Farm Nitrogen Rate Trials
Precision Nitrogen Management

### Sundsruds Court Drinking Water Supply Management Area (DWSMA)



This map shows the boundary of the Sundsruds Court DWSMA. The yellow and black line marks the DWSMA boundary. Within this area, adoption of the BMPs listed on page 2 is needed. All soils within this DWSMA are identified as coarse-textured.