

Hastings Drinking Water Supply Management Area
Nitrogen Rate Cover Crop and Perennial Alternative Management Tool
July 2023

Alternative Management Tools (AMTs) are specific agricultural practices and solutions, other than nitrogen fertilizer BMPs, to address groundwater nitrate problems. AMTs may substitute for one or more of the BMPs required. In some cases, these practices allow higher rates of nitrogen on individual fields.

The table provided in this document represents a series of alternative nitrogen rates for farmers in the Hastings Drinking Water Supply Management Area (DWSMA). There are other AMTs that can be substituted for Best Management Practices (BMPs) that are on the Minnesota Department of Agriculture's website¹. The AMTs in this document apply only to the Hastings DWSMA and can be used in place of BMP number 1 in the document *BMPs for the Hastings DWSMA*². If a farmer elects to use the table on page 2 they are still expected to follow all other BMPs (2 through 8) applicable to their operation. This table applies only to fields which have corn in the rotation.

This AMT provides an opportunity to apply rates higher than the BMP rate identified for the DWSMA:

- There are options to apply up to the 0.075 MRTN on dryland corn fields
- There are options to apply up to the 0.05 MRTN on irrigated corn fields

Any farmer electing to use this AMT must start by reviewing options 1 through 12 on the table, then select the option they prefer. For each option, every corresponding practice must be followed that is identified on that row of the table. The nitrogen rates and other management practices must be followed across all corn acres in a single farming operation (excluding acres outside DWSMA boundaries). The table is broken down into three main column headings:

- **N Rate Limit (lbs.-N/acre):** This is the maximum allowable nitrogen rate for each option. Separate rates exist for dryland corn and irrigated corn. For each of these crop management systems, two rates are given, separated by a forward slash. The number to the left of the slash mark applies to corn when soybeans were the previous crop, and the number to the right of the slash applies to corn following corn.
- **In-season application requirements:** This represents the minimum number of times nitrogen must be applied during the growing season in addition to preplant applications (although more in-season applications are encouraged). In-season is defined as any time after corn emergence. Each application must be 20 pounds of nitrogen or more.
- **Vegetative Cover:** This is the annual percentage of acres in a farm operation within the DWSMA required to be in perennials or have a fall seeded cover crop. This is calculated based on a farm operations total acres of corn and soybean fields that year (see an example calculation below).

Cover Crop: A cover crop is planted between successive cash crops, to grow during times of the year when a field would normally be bare. Refer to the Cover Crop AMT to determine requirements for cover crop establishment.³ In order to meet the required percentage, a farmer can grow cover crops on any field in the DWSMA.

¹ www.mda.state.mn.us/nitrogenamts

² Best Management Practices for the Hastings Drinking Water Supply Management Area (DWSMA)

³ www.mda.state.mn.us/sites/default/files/docs/2022-02/covercropamt2022.pdf

Perennials: Perennials that qualify are perennial vegetation as part of a government program⁴ or perennial grass pasture/hay systems. With pasture/hay systems, up to 60 lbs.-N/acre can be applied annually if the grass biomass is grazed by livestock or harvested at least once a year.

Option	N Rate Limit (lbs.-N/acre) Corn Following Soybean/Corn		In-season N application requirements		Cover Crop	Perennials
	Dryland	Irrigated	Fine-Textured Soils	Coarse-Textured Soils [†]	% Acres Per Year [‡]	% Acres Per Year [‡]
1	150 / 190	195 / 225	0	1	17%	0%
2	150 / 190	195 / 225	0	1	0%	10%
3	150 / 190	195 / 225	1	1	16%	0%
4	150 / 190	195 / 225	1	1	0%	9%
5	150 / 190	195 / 225	1	2	14%	0%
6	150 / 190	195 / 225	1	2	0%	8%
7	150 / 190	205 / 235	0	1	21%	0%
8	150 / 190	205 / 235	0	1	0%	12%
9	150 / 190	205 / 235	1	1	20%	0%
10	150 / 190	205 / 235	1	1	0%	11%
11	150 / 190	205 / 235	1	2	19%	0%
12	150 / 190	205 / 235	1	2	0%	10%

[†] A preplant N application of a polymer-coated urea fertilizer (ESN) can substitute for a one in-season application on coarse-textured soils

[‡] Acres required are based on a farms total corn/soybean acres multiplied by the percent acres per year

Example

A single farm operates 500 acres of cropland within the Hastings DWSMA, of which 300 acres are in a corn soybean rotation each year. They would like to use nitrogen rates higher than those listed on the Hastings BMP list. They decide they will use this AMT table and choose option 1. They are now able to apply up to 150 lbs.-N/acre to corn following soybeans on dryland fields, 190 lbs.-N/acre to corn following corn on dryland fields, 195 lbs.-N/acre to corn following soybeans on irrigated fields, and 225 lbs.-N/acre to corn following corn on irrigated fields. They must also make at least one in-season nitrogen application of 20 lbs.-N/ac or more on coarse-textured soils in corn. They will need to plant a minimum of 51 total acres of cover crops (17% of 300 acres in corn/soybean) on their operation every year.

Additionally, if in this example the farm operation added cover crops that exceeded the 51 acres required, they can apply the extra cover crop acres to another farm operation to meet the other farm's cover crop acre requirements. During the BMP evaluation the MDA will need to review the agreement between the parties that documents the credits given away or received. Existing perennial acres in farm operations cannot be provided as credit to other farm operations.

Contact

Jeppe Kjaersgaard
Research Scientist
651-201-6149
Jeppe.Kjaersgaard@state.mn.us

Travis Hirman
Soil Scientist
651-201-6566
Travis.Hirman@state.mn.us



⁴ For more information, see information about land conservation programs at www.mda.state.mn.us/nitrogenamt