

# FRESHWATER

March 12, 2026

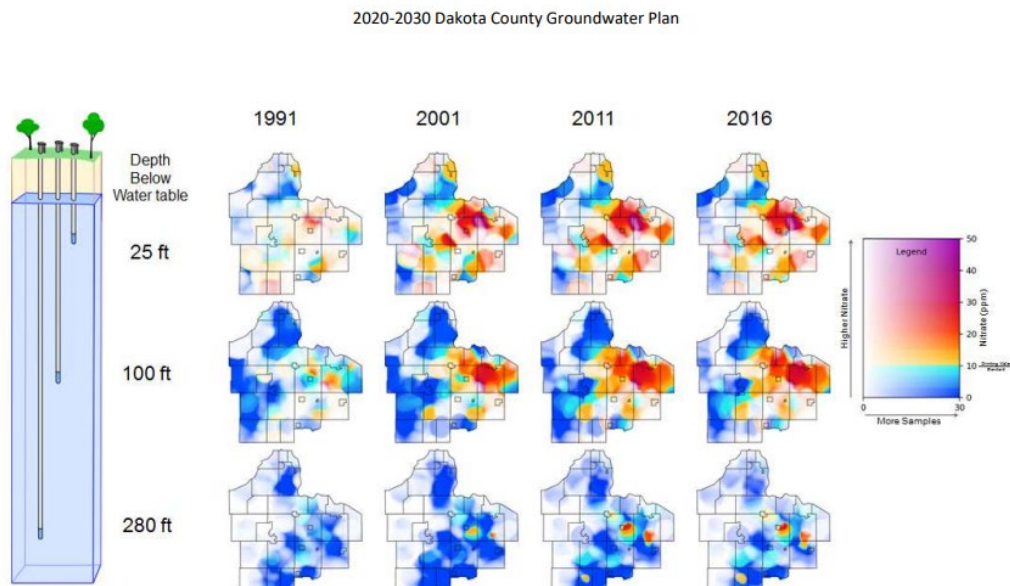
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## RE: Freshwater comments on the MDA Groundwater Protection Rule

Although nitrogen is a critical input for agricultural productivity, it is a widespread pollutant of groundwater and the surface water that recharges groundwater. Significant state and local investment has been required to address the environmental degradation. Increasingly, private well-owners and rural residents are being directly impacted whether they are benefiting from increased agricultural productivity or not.

Freshwater sees the MDA Groundwater Protection Rule (the Rule) as an opportunity for a more sustainable economy of nitrogen cycling to achieve balance by reducing nitrogen load overall, increasing nitrogen-use efficiency, and reducing losses to the environment, thereby providing savings to the State and protection to rural residents. The Rule as it is being currently implemented falls short in all categories.

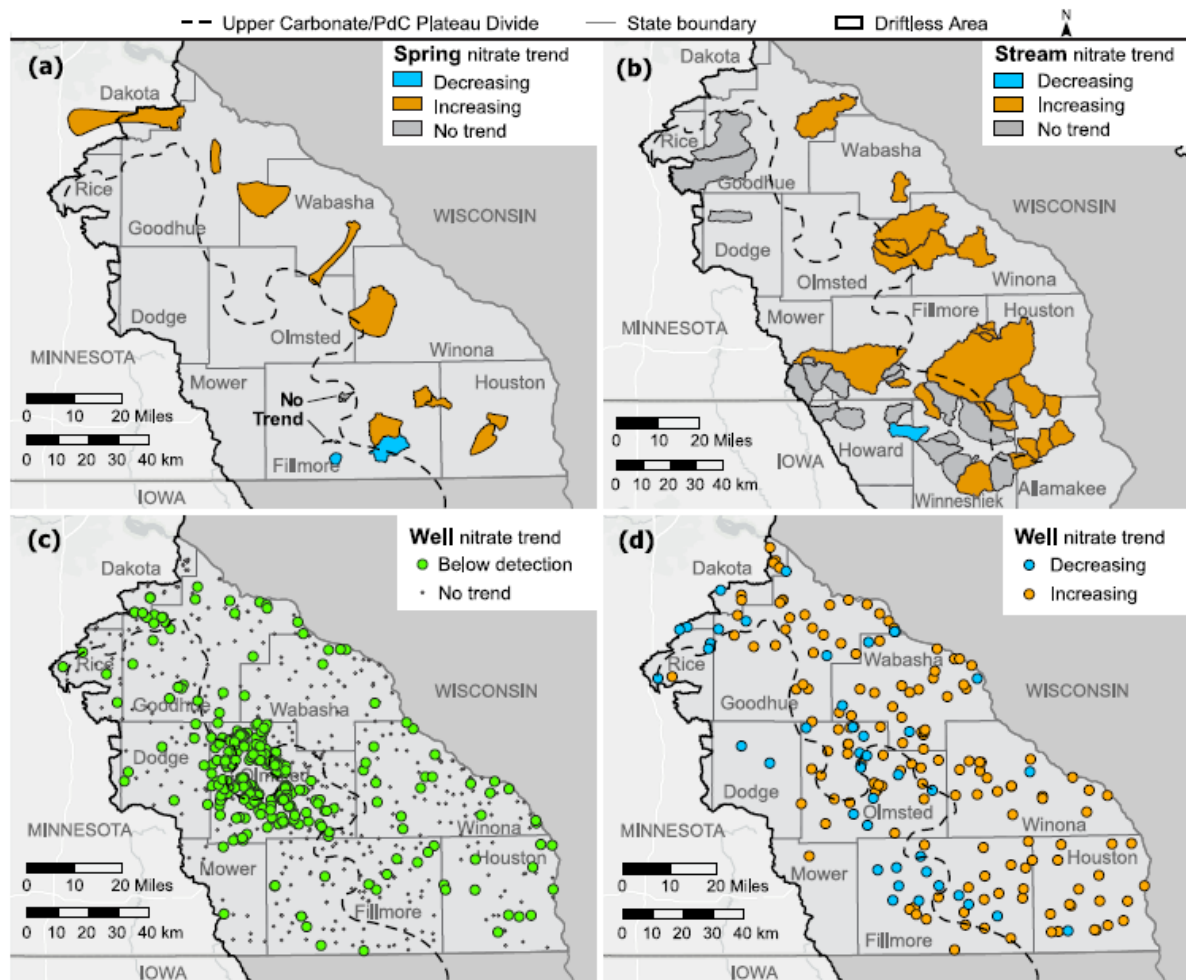
Nitrogen levels have not only been increasing in groundwater, but high concentrations have been moving deeper into aquifers making remediation more difficult. This is clearly demonstrated in a longitudinal study performed in Dakota County ([2020-2030 Dakota County Groundwater Plan](#)).



The picture is more complicated in southeastern Minnesota where groundwater residence times are on the order of two to four decades, but nitrate concentrations are still increasing in springs and many wells ([Kuehner et al., 2025](#)).

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Hydrogeology Journal (2025) 33:167–192



**Fig. 8** Nitrate trends from time-series concentrations within the Driftless Area of southeast Minnesota: **a** springs ( $n=16$ ); **b** streams ( $n=43$ ); **c** wells: no trend ( $n=541$ ) or below detection ( $n=374$ ); **d** wells: increasing ( $n=140$ ) and decreasing ( $n=42$ ). Additional stream

sites within the Upper Iowa Watershed in Iowa were also included (**b**). Trends were analyzed primarily between years 1997 to 2019 for wells and 2000 to 2021 for streams and springs

It is also important to note that nitrogen, which is easily tested for, can indicate the potential presence of other, more dangerous herbicides, pesticides and their breakdown products that may be more harmful to humans and the ecosystem.

Ideally, a low-cost but effective solution for producers, such as perennial cover, would be promoted and supported by the State for an overall savings in water treatment costs borne by taxpayers. However, this Rule has promoted a cost-neutral practice to producers with no benefit to the State or its citizens.

Reduction in nitrogen loss in similar settings has been achieved by regulations that encourage producers to more highly value manure and fertilizer. The lesson we can take from their experiences is that once widespread excessive application is controlled everywhere, further reductions can be made by targeting vulnerable areas (Dalgaard et al., 2014).

We believe that efforts should not be restricted to areas designated “vulnerable” by the MDA for a few reasons. The method used to identify areas for the Township Testing Program minimized areas of coarse-textured soil and excluded areas where runoff leads to vulnerable soils or surface water that recharges groundwater. For example, tile outlets are the largest sources of nitrogen to surface water in Minnesota. Horizontal and vertical movement of nitrates can be significant both within the normal flow of the aquifer and because of tile drainage. Rivers and lakes with high nitrogen loads are used directly by cities for drinking water and have losing reaches that recharge shallow alluvial aquifers used by cities like Mankato and Fairmont.

We have previously identified specific deficiencies with the Rule and repeat many of them here as they are still relevant.

1. This rule implemented low-cost nitrate reduction measures known to have very little effectiveness. Real progress will only be made by identifying opportunities to increase the efficiency of N application while reducing N losses to groundwater.

2. This rule conflicts with or does not reference the work of other agencies.

- MPCA has a non-degradation standard for inputs to groundwater and has proposed nitrogen reduction best management practices for surface water. Example BMP scenarios to achieve the nutrient reduction goals and milestones in each major basin were developed by the MPCA. The MDA does not offer goals and milestones tied to actual measures of nitrogen with this rule.
- MDH defines much larger areas as being at risk of nitrate contamination. These areas were not even tested by MDA so were not considered in the Rule.
- Long-established and more thorough MDNR protocols for pollution sensitivity mapping were not used by MDA for this effort.

3. Groundwater and surface water are exchanged freely. MPCA recommendations and BMPs for protecting surface water should be incorporated or referenced in this Rule.

4. All groundwater should be protected, not just groundwater that is already contaminated by nitrate pollution.

5. The assumption that there will be a large adoption of voluntary measures is not borne out by current acceptance of conservation practices. Only 1.2 million acres have enrolled in the Minnesota Agricultural Water Quality Certification Program, 5% of estimated 25 million acres of agricultural land. BMP money goes unspent in some areas.

6. The rule is tied to BMPs that have been developed to optimize agricultural production. These are not groundwater BMPs.

7. New management practices are continually being developed and improved. There should be flexibility to adopt them in this Rule. Locking a producer into the Minnesota Agricultural Water Quality Certification Program (MAWQC) does not allow this flexibility and does not adequately consider the impact of tiled landscapes.

8. Nitrogen lost to the atmosphere is also a problem. The entire nitrogen budget should be considered.

9. This rule does not address nitrogen losses from livestock farming.

### Other studies relevant to improving the Rule:

The following studies might provide additional guidance for rule revisions.

#### **Science Assessment of Cropland Practices for Minnesota’s Nutrient Reduction Strategy: Part 1**

**Nitrogen** is a recent review of nearly 800 sources to develop nitrogen (N) loss reduction efficiencies appropriate for Minnesota for a variety of conservation practices. This was intended to support efforts related to the 2025 revision of the Minnesota Nutrient Reduction Strategy and increase knowledge of how conservation practices perform in Minnesota, which is intended to help accelerate adoption of these practices.

*Christianson, L. and C. Rosen. 2025. Science Assessment of Cropland Practices for Minnesota’s Nutrient Reduction Strategy: Part 1 Nitrogen. University of Minnesota, St. Paul, Minnesota.*

**Minnesota Department of Health (MDH)** Source Water Protection Unit developed a nitrate-nitrogen (nitrate) risk ranking that considered more variables than the MDA effort in identifying areas of the water table aquifer sensitivity. The assessment included:

- 1) nitrate loading estimated from land use data
- 2) hydrogeologic sensitivity based on:
  - a. permeability of geologic materials
    - i. surficial geology,
    - ii. soil parent material type and
    - iii. bedrock type
    - iv. land slope
  - b. relationship between depth-to-water and depth-to-bedrock.

The MDH emphasizes that point datasets (e.g. wells) should not be used to determine nitrate risk because their distribution is non-uniform and too sparse. Point data like the Township Testing Program should be restricted to checking the accuracy of a nitrate model.

**Minnesota Department of Natural Resources (MDNR)** Minnesota Hydrogeology Atlas (MHA) Pollution Sensitivity of Near-Surface Materials was developed to model the sensitivity of the water table aquifer to pollutants. The transmission rate through the top 3 feet was modeled using the Hydrologic Soil Group (HSG) from the Natural Resources Conservation Service (NRCS), as was the MDA map. The transmission rate from a depth of 3–10 feet was estimated using the matrix texture of unconsolidated

geologic units, commonly glacial sediments, assumed to be laterally and vertically homogenous and assigned a dominant texture for 3–10 feet by the Minnesota Geological Survey (MGS). The 2-layer model was overridden in regions where the unique geological environments dominate: karst within 50 feet of the land surface, bedrock at or near surface, north-central peatlands, and large areas of disturbed land. The MDA map considers some of these special conditions but does not otherwise consider the deeper geologic layers which are key to transmission of water to the water table aquifer.

A Nitrogen Best Management Practice watershed planning tool was developed by the **University of Minnesota** (William Lazarus, David Mulla, et al.) to identify and test state-level or watershed-level N reduction strategies for cropland. It included potential costs of achieving various reduction goals and limitations to adoption based on real landscape features. The model generates the approximate percent reduction of N when either a single BMP or a suite of BMPs is adopted at specified levels across the watershed and identifies which BMPs will be most cost-effective for achieving N reductions.

Researchers at **Iowa State University** concluded that no single practice would achieve the hypoxia nutrient reduction goals (unless major land use changes occurred), but that a combination of practices could meet long term goals. There was limited potential for significant decrease using controlled drainage because of the land area suitable for this practice (slopes less than 1%). Switching all fall applied fertilizer to spring without a corresponding decrease in rate only yielded a negligible 0.1% reduction. However, cover crops can achieve a 28% reduction in nitrate load, (Iowa State University, 2012).

The Minnesota study results suggest greater nitrate reductions from switching from fall to spring application than the Iowa study does. These differences were due to differences in assumptions and approaches used to determine suitable lands for each BMP, and due to real differences in land, landscape, and climate between the two states.

Thank you for the opportunity to comment and for our shared goals of protecting the health of our community and environment.

Respectfully,

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