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September 10, 2025

Minnesota Pollution Control Agency
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Re: Minnesota Nutrient Reduction Strategy 2025 update

Minnesota state agencies need a workable and fair plan to reduce nitrogen and phosphorus pollution in our lakes, rivers, streams and groundwater. At almost 300 pages of text, maps, graphs and charts, the NRS appears to hold the strategies necessary to finally protect our waters. But the NRS presents an illusion. Instead of presenting a real plan that would include enforceable standards, and mandating that polluters reduce their pollution, the NRS perpetuates voluntary approaches which have consistently failed.

The proposed NRS strategies are a continuation of current failed strategies. The NRS document itself acknowledges this failure: “Between 2008 and 2022, river nitrate concentrations have shown no trend in most (86.5%) of the 52 MPCA-monitored sites across the state. Where trends have been detected, nitrate concentrations have been increasing at five sites (10%) and decreasing at two sites (4%)” NRS p. xix.

Who Will Pay the Skyrocketing Cost?

The proposed NRS suggests doubling down on the past plans to “subsidize and hope” that polluters will reduce their pollution if given even more taxpayer assistance. In the Executive Summary – and elsewhere – the NRS stated “The cost of reaching NRS goals is estimated to be well above \$1 billion dollars annually.” NRS p. xxiii, 202. The NRS does not identify any specific source of funds for the high dollar cost. It proposes to do that later noting that Clean Water funds can only provide a fraction of the total, federal funding is inconsistent, and local funds are insufficient. NRS p. 284.

The NRS proposes to develop and recommend specific funding sources, but it already anticipates that “landowners, city residents and government agencies” would provide the funding because they benefit from clean water. NRS p. 202. The source of funds from

landowners and city residents would be property taxes. Landowners and city residents also fund government agencies with their sales and income taxes. The NRS would have landowners and city residents paying twice, directly and indirectly.

Since the NRS doesn't anticipate imposing any financial responsibility on those who profit from producing and selling the nitrogen and phosphorus, the plan is both unreasonable and unfair. By not holding polluters accountable, the NRS continues to provide the incentive for producers and sellers to produce and sell as much nitrogen fertilizer as the market will bear. But preventing pollution is better than neverending cleanup. Unfortunately, the NRS will perpetuate the need to provide funding to somewhat minimize the damage from the increasing use of nitrogen fertilizer on our waters and the climate. (We comment more below on climate in the discussion of nitrous oxide, a powerful greenhouse gas.)

The drafters of the NRS seem to realize that they are presenting an illusion: "Even with all NRS recommended measures, Minnesota must recognize that achieving all goals by 2040 will still be very challenging." One of the challenges they cite is the "willingness of landowners to store and treat tile drainage waters through edge-of-field practices." NRS p. 294. Tile drainage is the [biggest source of water pollution](#). If the plan can't count on stopping the pollution from tile drainage, it will not work.

Minnesota's waters belong to all Minnesotans. All Minnesotans did not create the nitrogen and phosphorus pollution. Telling Minnesotans that it is their responsibility—not the polluters' responsibility—to pay to clean up the lakes, rivers, streams, and groundwater is not reasonable or fair. It also won't ever happen. Because the plan is unreasonable, unfair and extremely expensive, it is very unlikely that Minnesota taxpayers will provide the steady stream of a billion plus dollars a year that the plan relies on.

The NRS concludes its Executive Summary saying "In the end, the people of Minnesota will determine what priority to place on NRS efforts, the desired rate of progress, and how much they are willing to invest toward solving our state's many nutrient-related challenges...." NRS p. xxx. In other words, the NRS is blaming the victims if they won't provide all the money state agencies want for their NRS. This is a gigantic exercise in "passing the buck" of responsibility away from the agencies that have the responsibility to protect our waters and authority to create enforceable standards and enforce them.

Impacts on Drinking Water Not Addressed

The NRS quotes the 1989 Groundwater Protection Act:

"It is the goal of the state that groundwater be maintained in its natural condition, free from any degradation caused by human activities. It is recognized that for some human activities, this degradation prevention goal cannot be practicably achieved. However, where prevention is practicable, it is intended that it be achieved. Where it is not currently practicable, the development of methods and technology that will make prevention practical is encouraged." NRS p. 20.

The NRS acknowledges the conclusion in MPCA's 2013 "[Nitrogen in Minnesota's Surface Waters](#)" report that 73% of the nitrogen water problem comes from agriculture. That report revealed that the nitrogen problem was not just from drainage at the surface, but that a stunning 30% of the nitrogen was the result of nitrogen-contaminated groundwater under row crop agriculture flowing into surface waters. Clearly state agencies are not meeting the goal of the 1989 Groundwater Protection Act. Moreover in order to significantly reduce nitrates in surface waters, nitrates in ground water would need to be reduced.

Minnesota's drinking water problems are the clearest indicators of the extent of nitrates in groundwater. Since the adoption of the 2014 NRS an increasing number of municipal water utilities have installed nitrate treatment systems paid for not by the fertilizer industry but by state taxpayer dollars. That number of polluted wells will likely increase since there are approximately 100,000 acres of row crops being planted in areas around municipal wells that the Department of Health deems vulnerable to pollution and have yet to be protected.

The NRS correctly states ground water is the drinking water source for more than 75% of Minnesotans and that "high nitrate concentrations cause drinking water standard exceedances in numerous wells." NRS p. xix. How "numerous"? PCA can't tell us how many even though the Minnesota Department of Health says "[nitrate in drinking water is an acute health risk for some Minnesotans](#)."

The NRS celebrates its "wealth of monitoring data" NRS p. 1. Under the original NRS, state agencies spent untold millions of dollars monitoring waters, making plans, and paying farmers to adopt farming practices that might help reduce water pollution, many designed primarily to ensure that profits from farming are maintained without disruption. But even with all the spending and monitoring, PCA did not make an effort to determine which private wells produced unsafe drinking water. The PCA never reached out to those well owners and offered to help them obtain safe drinking water.

The result: a child born in 2014, living in a household that didn't know that their water was unsafe or knew and couldn't afford a system to make it safe, is still drinking unsafe water. And without a change in the NRS, that child will become an adult still drinking unsafe water. How many children are impacted? State agencies still don't know. Keeping its citizens safe is the first responsibility of a democratic government. State agencies continue to ignore their responsibility and the NRS reflects that choice.

There is a total disconnect between the NRS's saying there is a need to reduce nitrogen in ground water and the reality of Minnesotans who continue to drink unsafe water through no fault of their own because agricultural chemicals polluted their groundwater. The NRS does not have a specific plan to test private wells. They should test private wells until we know that the groundwater used for drinking water is safe. The NRS says "Many of the practices identified in the NRS will yield multiple benefits while also improving drinking water." NRS p. 291. "Improving" drinking water to an unspecified degree does not make it safe.

Science is now telling us that it is finding multiple cancers that are linked to nitrates yet the nitrates health risk limit is the same one that was adopted in 1962. The health risk limit for nitrates is outdated and needs to be stricter in order to protect Minnesotans from unsafe drinking water. The NRS doesn't acknowledge the new science.

The problem of private wellwater being unsafe to drink because of nitrogen is compounded because of the additional presence of pesticides. We know this from the Minnesota Department of Agriculture which has determined that where there is nitrogen, there will be agricultural pesticides – the more nitrogen, the more pesticides.

In response to an 2023 emergency petition asking the US EPA to intervene in the drinking water crises in Minnesota's SE Karst Region, EPA directed state agencies to offer safe drinking water at no cost to residents; to implement long-term solutions to reduce in nitrate concentrations; and to hold sources of nitrate accountable using [all tools available](#).

State agencies are not using all tools available in Minnesota's Karst Region and continue to ignore Minnesotans who are drinking unsafe well water in other parts of the state.

[Many farmers rely on agricultural retailers](#) to determine the amount of nitrogen fertilizer to apply. In its [response to the US EPA](#), the Minnesota Department of Agriculture (MDA) endorsed the practice of relying on retailers. But fertilizer retailers have an obvious conflict of interest. Reducing the amount of nitrogen fertilizer they sell also reduces their profits. And since retailers have no responsibility to pay to clean up water they pollute, they lack the necessary incentive to prevent pollution. MDA is not solving the nitrate problem, it is exacerbating the nitrate problem.

The NRS wants a reader to believe that it includes plans for drinking water that would solve the drinking water problem. It does not. It's another illusion.

Impacts on Climate Change Not Addressed

Nitrogen fertilizer is not just the source of water pollution in Minnesota, it is also the source of nitrous oxide, a potent greenhouse gas (GHG) that is responsible for more of Minnesota's agriculture's GHG emissions than carbon dioxide or methane. PCA has been [tracking and reporting on Minnesota's greenhouse gas emissions](#) for decades. In its most recent report, PCA says [agriculture](#), right behind transportation, produces 25% of Minnesota's GHG emissions. Together transportation and agriculture produce more than half of Minnesota's emissions.

Minnesota's row crop agriculture is responsible for more than two thirds of agriculture's GHG emissions. In 2022, 70% of row crop's emissions came from nitrous oxide and 30% from carbon dioxide with the nitrous oxide emissions mainly from nitrogen fertilizer to grow industrial corn.

Some nitrous oxide emissions come from spreading manure on the land but far more comes from synthetic nitrogen fertilizer, mostly made from natural gas, a fossil fuel. These Minnesota emissions don't even include emissions attributed to other states where nitrogen fertilizer, [produced from natural gas](#), is destined for Minnesota.

Nitrous oxide is a Minnesota GHG problem. To their credit, Gov. Tim Walz and Lt. Gov. Peggy Flanagan set a goal of reducing greenhouse gas emissions from Minnesota 50% by 2030. That goal is now in law. This goal cannot be met unless agriculture does its fair share. Yet PCA in authoring the NRS ignores state law and its own GHG reporting.

Problem solving is dependent on honestly and correctly defining the problem. The NRS does not honestly or correctly define the nitrogen fertilizer problem. In several places in the NRS, it notes nitrous oxide emissions but doesn't acknowledge the magnitude of the emissions. Rather it minimizes it, promoting "solutions" that will not work to both reduce nitrogen pollution in our waters and reduce our greenhouse gas emissions. "In-field nutrient management helps but has limited potential. Collectively, the large acreages of potential improvement with fertilizer and manure application refinements can make a difference for water quality. However, fertilizer and manure application refinements will not lower nitrate losses to waters per treated acre as much as other practices." NRS p. 15. Focusing on waters alone ignores the need to reduce the use of nitrogen fertilizer to reduce nitrous oxide emissions.

This lack of honesty and correctly defining the nitrogen problem is especially egregious since Governor Walz and state agencies are promoting increasing production of corn ethanol. Increasing production of ethanol is fundamentally incompatible with reducing climate emissions. A recent study from the University of Wisconsin found that the carbon intensity of corn ethanol produced under the federal Renewable Fuel Standard (RFS) is "no less than gasoline and likely at least 24% higher." To reduce emissions from vehicles, electrification is already far superior to any liquid fuel and this superiority will only grow as our electricity supply gets greener. To make matters worse, the administration is also promoting expanding the use of corn and corn waste to make fuel for airplanes. Expanding the use of corn and corn waste will exacerbate the nitrogen water and climate problems and cost Minnesotans even more in dollars and pollution.

Prevention Needed, Not Just Clean Up

Instead of reducing the amount of nitrogen that is spread on our lands, the NRS puts its greatest focus on farming practices that try to keep the excess nitrogen that corn isn't using from getting into groundwater. These practices have to be employed year after year after year. In opting for these practices, the NRS doesn't consider that the excess nitrogen is also being released into the air as nitrous oxide.

Protecting both our waters and meeting our GHG emissions goals requires reducing the use of nitrogen fertilizer. The NRS documents the potential for reducing nitrogen use: "Results of this in-depth statewide nutrient balance assessment suggest that nitrogen additions, from the combination of nitrogen fertilizer and manure crop-available nitrogen, onto all cropland exceed UMN recommended rates by an estimated statewide average of 18%....The nitrogen balance results are almost identical when estimating nitrogen fertilizer use from farmer survey results (MDA 2023) or from fertilizer sales data provided by MDA...." NRS p. 168. While watersheds in Minnesota's north have "a good match between available nitrogen and crop needs...southern Minnesota has many watersheds with nitrogen surplus potential." Southern Minnesota is a prime location for reducing nitrogen fertilizer with positive results. (see nitrogen balance map on NRS p. 171)

Helping farmers reduce nitrogen use reduces their production costs, an appealing outcome to an individual farmer that is supported by financial data. Farm financial data between 2017 and 2022 show that [the least profitable farms spend 15-30% more on fertilizer](#) per year than the most profitable farms. New 2023 financial data show that the least profitable farms spent 33% more on fertilizer than the most profitable ones.

Manure Affects Both Waters and Climate

While the nitrous oxide emissions coming from synthetic nitrogen fertilizer are the largest, nitrous oxide emissions coming from spreading manure on the land is also a serious problem. Nitrous oxide emissions related to manure are primarily generated by confined animal feeding operations (CAFOs) for cattle and swine with liquid-based manure management systems. The liquid manure is sprayed for fertilizer. The highest density of CAFOs in Minnesota is in the southern and western areas of the state, which is also the location of a high number of impaired waters. The NRS addresses CAFOs, the current regulatory authority, practices, manure management plans, and permitting, but does not discuss the contribution of manure to nitrous oxide emissions or strategies to prevent or manage this emissions source. Manure is used to provide crop fertilizer nitrogen to meet 27 percent of the state's needs ([Bahe](#), 5/15/2025). While the NRS discusses nitrate concerns related to CAFOs and manure use on water bodies and groundwater, nitrous oxide emissions are not included.

The impacts of manure on nitrous oxide emissions can vary and depend on storage, application methods, and environmental factors. Anaerobic conditions at liquid manure storage facilities of large CAFOs cause nitrous oxide emissions, and manure application on frozen ground causes a release of nitrous oxide emissions in the spring. Best management practices to minimize nitrous oxide include application of manure close to when needed by crops. This is now regulated for fall application in vulnerable areas. Application of nitrogen fertilizer on frozen soil is regulated and this should be extended to include manure applications. The number and size of CAFOs continue to grow, and with the concern for nitrate water pollution and nitrous oxide emissions affecting climate change, a moratorium on CAFOs should be considered.

Previously Unknown Nitrous Oxide Surface Water Release Increases Total Emissions and Need for Action

Recent research shows that surface waters are a major source of nitrous oxide, a powerful greenhouse gas. While the NRS addresses nutrient management from various sources, it gives little attention to their role in climate change, particularly nitrous oxide. Agriculture is the leading driver, with nitrogen fertilizer, manure, and soil management practices accounting for about [75% of U.S. nitrous oxide emissions](#).

A joint study from the University of Minnesota and the University of Illinois found that over one-third of these emissions originate from surface waters, especially streams. This happens when nitrification in agricultural soils produces nitrous oxide, which then runs off into waterways and is released to the atmosphere ([Sotelo](#), 7/3/2025). With growing waste from CAFOs being used as fertilizer, surface water emissions are now considered as significant as those from soils.

Current measurement methods overlook nitrous oxide that moves from soil into surface waters before being emitted, meaning total emissions are underestimated, rising faster than reported,

and contributing more to global warming than previously recognized. ([Sotelo](#), 2025). The urgency to manage these emissions is critical. At present, the only effective mitigation strategy is to reduce nitrogen fertilizer and manure use – an approach that improves both water quality and nitrous oxide control.

Expedientiously Promulgate the Nitrate Ambient Water Quality Standards

Adoption of the Nitrate Water Quality Standard (WQS) is critical to establishing numerical and narrative goals for the health of people, aquatic life, and all ecosystems and in the implementation of the NRS. The WQS proposed is the result of research on aquatic life toxicity due to nitrate in surface waters and is a numerical standard to protect aquatic life Class 2 waters, 2A cold water uses and 2B cold/warm water uses. The draft plan discusses the nitrate WQS development and inclusion in the 2025-2027 Water Quality Standards Triennial Review (MPCA, p. 105). Adoption of the WQS was halted by PCA, claiming that more recent water quality findings in Southern Minnesota required further consideration. Completion of the NRS and WQS are separate processes, but both are needed to improve Minnesota's waters. We urge the MPCA to complete the work needed to finalize the WQS once knowledge of the updated nitrate and total nitrogen reduction targets and proposed approaches are determined with the completion of the NRS.

Prioritize and Scale Up Transformative Agricultural Practices

The NRS promotes a wide array of BMPs. A more focused approach on the most impactful practices would yield better results.

- **Emphasize Continuous Living Cover (CLC):** The NRS 2025 draft has rightly identified continuous living cover as a cornerstone of nutrient reduction. This is a crucial and transformative shift. The strategy needs to go all-in on this concept, mandating the widespread adoption of winter annuals like pennycress and camelina, as well as perennial crops. This would create a system that not only sequesters nutrients but also offers new economic opportunities for farmers.
- **Support for Innovative Cropping Systems:** The NRS could provide more funding and technical assistance for farmers to experiment with and adopt new cropping systems that are inherently less nutrient-intensive. This includes using precision agriculture technologies and supporting the development of markets for new, low-input crops.
- **Soil Health:** A healthier soil ecosystem is better at retaining water and nutrients. The strategy should more explicitly link nutrient reduction to soil health, providing incentives for practices like diverse crop rotations, reduced tillage, and the application of compost and other organic matter. This not only reduces nutrient runoff but also improves agricultural productivity and resilience to climate change.

Develop and Implement Mandatory Treatment for Tile Drainage

Tile drainage contributes significantly to nutrient water quality concerns in Minnesota waterbodies and ground water. We have already lost wetlands due to the use of tile drainage until federal protection was provided in the Clean Water Act. Approximately 21% of the land in Minnesota has some subsurface drainage which varies based on location; in the Minnesota River Basin, 20 to 30% of the land has tile drainage ([MPCA](#), 2013). Approximately 37 % of the

nitrate pollution in Minnesota is generated through tile drainage ([MPCA, 2013](#)), though this can reach as high as 95 % in the Minnesota River Basin. Tile drainage directs nitrogen and phosphorus containing water to surface waters without treatment, though ground water is partially filtered prior to discharge. With climate change, the weather in the Midwest is expected to be wetter and the demand for tile drainage will likely increase ([Bahe, 5/15/2025](#)), further exacerbating nutrient water pollution and impacting water quality.

Tile drainage is considered a nonpoint source of water pollution as it is agricultural pollution and does not fall under the Clean Water Act (CWA) provisions for treatment and is essentially unregulated. Best management practices to prevent and decrease the tile drainage nutrient pollution have been developed, but are implemented on a voluntary basis on only a limited basis, even with grants and tax incentives. Currently, drainage in Minnesota is governed through the [Minnesota Public Drainage Law](#), Chapter 103E, which provides for constructing and maintaining both open ditches and subsurface tile drainage. Regulations and review of new systems depend on how the drainage authority, county boards, joint county boards, and watershed districts, conducts impact review on the wetlands, water quality, and flooding. No rules to implement the drainage law have been developed and adopted (BWSR, 2020).

Tile drainage discharge clearly contributes to nutrient water pollution in Minnesota, and treatment using a voluntary approach has proven to be unsuccessful as seen in the continued levels of nutrients in waterbodies and groundwater across the state. The determination that tile drainage is not a point source [has been challenged in the courts](#) which ruled that tile drainage is exempt from point source permitting. Even though the drainage is through a pipe or conveyance, its source is diffuse which differs from a factory where wastes originate from a specific source production process. The federal CWA exempts cropland runoff from federal enforcement, but Minnesota can and must develop its own statutes and implement regulations for managing tile drainage pollution. This could be done through changing the Minnesota Drainage Law to include water quality management via permitting and treatment of the discharge.

Agricultural BMP Effectiveness

The NRS covers the use of BMPs, their appropriateness and their utility in management with supporting research from the University of Minnesota and the MDA. BMPs have been demonstrated to mitigate water quality impacts due to land use activities and contribute to healthy water systems. However, these techniques must be implemented, and that implementation checked, to prevent and decrease nutrient pollution.

As discussed earlier in these comments and in the NRS, nutrient pollution continues to increase in many areas. Without changes, it is not likely that goals to decrease nutrient pollution in Minnesota waters or lessen the dead zone in the Gulf of Mexico will be met. The voluntary approach to BMP implementation for agriculture is not working, and Minnesota must consider developing and implementing a regulatory scheme with authority to mandate BMP planning and use. There are several approaches used in the US that can be considered in Minnesota and these include:

- Nutrient Management Plans (NMPs)

Manure management plans (MMPs) are currently required for feedlots under MPCA permitting, and this approach could be extended to all fertilizer applications to croplands in Minnesota. These plans cover the timing and amount of agricultural nutrients applied, along with other BMPs, to manage nutrient pollution. NMPs are required in Maryland, Delaware, and Vermont, and include enforcement authority with administrative penalties. Ohio requires NMPs in targeted areas where the waters are impaired or there is a concern for drinking water. NMPs should include water quality testing at intervals and a number of locations to monitor for their effectiveness. NMP implementation by MDA staff can be done on a routine basis, as done in Maryland ([Fernholz & Feeney](#), 2018, [Hall & Essman](#), 2019). As in the Southeast Minnesota Nitrate Strategies Collaborative Work Group [Report of Recommendations](#), utilize teams of experts, agronomists, water quality specialists, Soil and Water Conservation District staff and well management experts. Go on-site to assess and consult with farmers and feedlot owners on their use of best management practices and provide recommendations on improvements and changes that would best prevent water quality impacts

- Certification of Fertilizer and Manure Applicators

A number of states require a certified fertilizer and manure applicator for both commercial and private applications of fertilizer and manure, and the states sponsor certification programs ([Hall & Essman](#), 2019).

- Water Quality Trading

While it is not an enforcement approach, water quality trading allows regulated point sources to meet their permit requirements by buying nutrient reduction credits for nonpoint sources from farmers who implement BMPs. It is an incentive for farmers to install BMPs and provides cost savings to point sources, usually in the same watershed.

CONCLUSION

The excessive use of nitrogen fertilizers in Minnesota is directly responsible for the nitrate pollution in our waters and the massive emissions of nitrous oxide, a powerful greenhouse gas. Minnesota laws and policies require state agencies to protect our waters and rapidly reduce greenhouse gas emissions. Yet in designing the NRS, state agencies chose to focus on the water problem and ignore the need to significantly reduce nitrous oxide emissions. As a result of that decision, state agencies then choose “practices/solutions” that could continue or worsen the nitrous oxide problem. Growing corn, the big user of nitrogen fertilizer, could continue to expand just as it has done since 1982 as long as state agencies continue to promote practices that only prevent a portion of the nitrogen not needed by corn from getting into our waters. And the cost of those practices at a billion dollars plus each year would be paid for by Minnesotans who are not responsible for the water pollution.

If the NRS were to move forward, the big winners of the NRS would not be Minnesotans whose waters are being polluted or who want our state to do its part on climate change. The big winners of the NRS would be the companies who produce nitrogen fertilizer from natural gas, their natural (methane) gas suppliers and those who sell nitrogen fertilizer to farmers. They would keep or possibly increase their market for nitrogen fertilizer and would have no financial responsibility to provide safe drinking water when drinking water wells have been polluted or for cleanup of nitrate water pollution.

Paying farmers year after year for practices that only prevent a portion of the nitrogen not needed by corn from getting into our waters also takes away the needed incentive to reduce the overuse of nitrogen. To justify these subsidies, the PCA has adopted the talking points of the fertilizer industry that farmers must be paid to compensate “for the burden and risks associated with newer practices,” NRS p. 196. These “newer practices” benefit fertilizer companies at the expense of both farmers and Minnesotans.

Both the subsidies and the state agencies' failure to hold polluters accountable and protect drinking water sources sends the wrong message. It says that nobody who is overusing nitrogen fertilizer is responsible for the pollution caused by that overuse and nothing needs to change.

By contrast, the PCA is telling Minnesotans whose water is polluted by agricultural chemicals through no fault of their own that they are responsible for paying to clean it up so it is safe to drink. This is the agencies' denying their responsibility and failure. Agencies have known that it is their responsibility to protect groundwater use for drinking since the Groundwater Act of 1989. State agencies' failure to keep Minnesotans safe—the fundamental governmental responsibility—is another big win for those profiting from producing and selling nitrogen fertilizer.

The NRS holds harmless those who developed the NRS. They will never be held accountable for this unworkable and unfair plan because nobody will ever pay for the ever-increasing cost of their plan.

State agencies need a new plan, one that has standards that are enforceable. Strategies must actually reduce the use of nitrogen fertilizer including sharply cutting the overuse of nitrogen for corn. The new plan must be free of conflicts of interest, help farmers increase their profits, and have bench marks and goals that are intended to be met and not just aspirational words. It must also include providing safe drinking water to those whose wells have been contaminated by agricultural chemicals until their groundwater used for drinking water no longer exceeds health risk limits.

Minnesota waters belong to all Minnesotans, not to those who profit from polluting them. The new plan must make that a reality. Falling sales of nitrogen fertilizer and a reduction of nitrous oxide emissions can be two measures of the effectiveness of state agencies if they meet their responsibility to both protect our waters and meet the state's GHG emission goals.