

# Minnesota’s approach to nitrogen reduction implementation plan

Nitrogen in Minnesota’s water has impacts both locally and downstream. Excess nitrate concentrations in drinking water are unhealthy for humans and wildlife and nitrate toxicity in lakes and streams is a concern for aquatic life. Concern about nitrogen in Minnesota’s surface and groundwaters is due to:

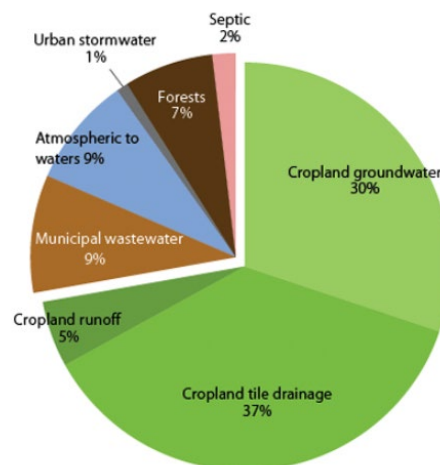
1. Elevated levels of nitrate (a form of nitrogen) in surface waters are toxic to fish and other aquatic life;
2. Nitrate contamination of drinking water supplies continues to be a serious health concern; and
3. Nitrogen leaving Minnesota contributes to the oxygen-depleted dead zone in the Gulf of Mexico and eutrophic conditions in Lake Winnipeg.

The MPCA released a report on nitrogen pollution in 2013, indicating that artificial subsurface drainage (drain tile) of agricultural fields and cropland groundwater are key sources of nitrogen pollution to lakes and streams. Across much of Minnesota, nitrate levels in surface and groundwater are increasing. More than 70% of nitrate comes from cropland. The remaining comes from regulated sources such as wastewater treatment plants, septic systems and urban runoff. Additional sources are forests and the atmosphere.

In 2014, the Minnesota Pollution Control Agency (MPCA) released a state-level Nutrient Reduction Strategy (NRS), which set nutrient reduction goals for reducing both point and nonpoint sources of nitrogen levels by 13% to 20% by 2025 and 45% to 50% by 2040 over much of the state. The NRS also identified actions that would be taken to advance programs and efforts to achieve the nutrient reduction goals.

Since 2014, Minnesota’s NRS has served as a large-scale framework for reducing nutrients, including nitrogen, in Minnesota’s waters. During the first five years of implementation, Minnesota advanced almost every major program area identified in the NRS; despite these successes, Minnesota is not on track to reach the needed scales of change in agricultural and wastewater sectors. Ten- and twenty-year water quality trend analyses published in the MPCA’s 5-year Progress Report on Minnesota’s Nutrient Reduction Strategy (MPCA 2020) found that statewide nitrogen concentrations are generally increasing or showing no trend.

Following up on the recommendations of the NRS, additional nitrogen monitoring data from wastewater facilities, watershed pollutant load monitoring station data, and ongoing chemical and biological waterbody monitoring provide a much better understanding of the sources, concentrations and biological impacts of nitrogen in Minnesota watersheds. Ambient and effluent water quality data confirm that significant nonpoint source nitrogen reductions are needed to protect drinking water sources and achieve NRS reduction goals in the Mississippi River Basin and the Red River of the North Basin. Point source reductions are also needed to achieve NRS goals and to address nitrate toxicity in some lakes and streams. This work highlighted the importance of establishing enhanced programs that target nonpoint reductions prior to adoption of a nitrate water quality standard.



The MPCA, in coordination with a broad stakeholder group, will take the following stepwise approach to achieving our goals. This approach includes developing a holistic strategy to achieve nitrogen reductions prior to adoption of a nitrate, aquatic-life toxicity water quality standard:

1. Develop a detailed Wastewater Nitrogen Reduction Strategy with targeted actions to reduce nitrogen coming from WWTPs to protect drinking water, aquatic life, and meet the Nutrient Reduction Strategy’s point source goals. These actions will:
  - a. Include the development of Nitrogen Management Plans to ensure nitrogen is being reduced to the extent possible.
  - b. Utilize optimization and water quality trading to support cost effective solutions; and
  - c. Include permit conditions and/or the development of state discharge restriction(s) to ensure aquatic life is protected where wastewater contributions are significant, and to ensure attainment of Nutrient Reduction Strategy goals for the wastewater sector.
2. Coordinate the 10-year revision of the Nutrient Reduction Strategy, updated with enhanced strategies and targeted actions designed to achieve reductions in nonpoint and point sources of nitrogen. These strategies and actions will:
  - a. Enhance programs that address the largest nonpoint sources of nitrogen to our surface water and groundwater.
  - b. Targeted point source nitrogen management and reduction strategies, consistent with the Wastewater Nitrogen Reduction Strategy developed in action #1.
3. Adopt a nitrate aquatic-life toxicity water-quality standard.
4. Coordinate with stakeholders and provide opportunities for review and input throughout all action steps.

