



Questions and Answers

Minnesota National Pollutant Discharge Elimination System (NPDES) Wastewater Permit Nitrogen Monitoring Implementation Plan

What is the plan?

Starting with their next permit reissuance, or a modification to their permits, wastewater dischargers with NPDES permits (surface water discharges) must monitor for nitrogen. The additional analytical tests are available in the full plan on the “Wastewater permits” webpage at www.pca.state.mn.us/gp0rb25.

Why is MPCA implementing this plan?

Nitrogen in water is a concern because it can be harmful to human and aquatic life. Our state’s economy and quality of life depend on the availability of safe drinking water and also on healthy waters for aquatic life and recreation. While phosphorus and sediment levels have been decreasing in Minnesota waters, nitrogen levels have been remaining the same or increasing. The MPCA is requiring additional monitoring from wastewater dischargers because it needs more data to accurately determine how much nitrogen in surface water comes from wastewater.

Nitrogen is a concern here and downstream. As a headwaters state, Minnesota affects the quality of water flowing to Canada, the Great Lakes, several states and the Gulf of Mexico. More than 200 million pounds of nitrogen flow out of Minnesota via the Mississippi River each year. Minnesota is one of 12 states along the Mississippi River developing a cleanup plan for the excess nutrients (phosphorus and nitrogen) impairing waters within the states and causing a hypoxic “dead zone” in the Gulf of Mexico.

Closer to home, concerns about nitrogen in surface and groundwater have prompted the MPCA to start working on an aquatic toxicity standard for nitrates. It is important to understand the wastewater sector’s nitrogen contributions to surface waters in order to evaluate whether permit limits will be needed and at what levels.

When do wastewater dischargers need to start doing the testing?

When the MPCA reissues their discharge permits or when they have a modification to their permits.

How much will the additional testing cost?

The cost will depend on the number of samples the facility analyzes. The MPCA expects the cost to be approximately \$50 for each sampling event. Dischargers should consult with their laboratory staff or services to estimate the financial impact to their individual facilities.

Who will pay for the additional monitoring?

The dischargers are responsible for paying for the monitoring, as they do with their current monitoring.

If the MPCA is the one that needs this information, why should permit holders have to pay for this data collection effort?

NPDES permit holders are responsible for the collection, analysis and reporting of samples in accordance with the monitoring requirements in their permits.

The MPCA will be responsible for analyzing the data and reporting back to the permit holders.

Will facilities receive a nitrogen limit in the future because of this additional monitoring?

That is a possibility. The data collected will help determine whether permit changes are needed for some facilities. The need for limits and magnitude of the limits will depend on various factors including the nitrate water quality standard concentration, the facility's effluent concentration, the condition of downstream waterbodies, the proportion of in-stream nitrate contributed by the discharger, and the amount of available assimilative capacity. This evaluation will be completed at the time of permit reissuance.

Phosphorus levels have been decreasing in Minnesota waters. Can't the same be said for nitrogen?

Phosphorus is a success story for Minnesota wastewater treatment plants. Long-term water monitoring does show decreasing phosphorus levels in Minnesota waters overall, but nitrogen levels are staying flat or increasing.

Is the MPCA doing this statewide? Why not just where nitrogen is a problem?

All wastewater dischargers to surface waters must comply with the nitrogen monitoring plan. Research so far shows that nitrogen levels vary greatly across Minnesota. One reason to do the monitoring is to get a better handle on nitrogen loads throughout the state.

How long will facilities need to monitor for these parameters?

Facilities will need to monitor for nitrogen for the long-term, starting with their next permit reissuance.

Does this monitoring requirement affect general permits or only individual permits?

Both general and individual permits will include nitrogen monitoring requirements. See the monitoring frequency table in the implementation plan document, available online at www.pca.state.mn.us/gp0rb25.

Does the nitrate/TKN monitoring include tile discharges, such as from wastewater ponds and land application sites? What about contaminated groundwater pump-outs and monitoring wells?

Tile lines around wastewater ponds and application sites are exempt from this monitoring requirement (the monitoring applies to wastewater discharge and tile lines should not be discharging wastewater). The MPCA will decide on land application sites and groundwater pump-outs on a case-by-case basis, as some are expected to contain significant nitrogen concentrations and/or already conduct nitrogen monitoring.

Can wastewater dischargers have more time before monitoring in order to adjust for sampling costs in their budgets?

The MPCA is communicating this new requirement now in order to give dischargers time to plan for the additional monitoring costs. Starting with their next permit reissuance, dischargers need to start this monitoring.

Does the nitrate/TKN monitoring include mining discharges (metallic and non-metallic), where ammonium nitrate is usually used for blasting?

If these facilities have dewatering operations, then yes, they must conduct the additional monitoring.

Do typical nitrogen treatment and removal methods for total N/nitrate exist?

Yes, nitrogen treatment methods do exist. In fact, a few Minnesota facilities already comply with a nitrogen limit to protect groundwater sources of drinking water.

The two main methods of nitrogen removal from wastewater include Biological Nutrient Removal (BNR) and Enhanced Nutrient Removal (ENR):

1. BNR is most commonly associated with sequenced combinations of aerobic, anoxic, and anaerobic processes, which facilitate biological denitrification via conversion of nitrate to nitrogen gas. For a mechanical WWTP the typical type of treatment is activated sludge, which could be in the form of an oxidation ditch, sequencing batch reactor, or “regular” aeration tanks. Another common option is a trickling filter followed by contact stabilization. Contact stabilization is achieved using tanks similar to aeration tanks. Adequate detention time is a key factor in achieving BNR and nitrogen removal.
2. ENR typically uses BNR along with filtration to achieve lower effluent nitrogen levels. This could also involve chemical addition. For a mechanical WWTP the typical type of treatment would be similar to BNR with the addition of a denitrification filter; adequate detention time is a key factor.

See the draft Minnesota Nutrient Reduction Strategy on the MPCA website (<http://www.pca.state.mn.us/86h6wwa>) for more information.

If your facility is planning construction projects or modifying their treatment processes, then you may want to consider incorporating nitrogen-related aspects into the designs. Contact Aaron Luckstein of the MPCA Municipal Wastewater Section – contact information below – for a referral to an MPCA engineer for further information.

My facility doesn't know its sources of nitrogen. Should we start gathering effluent nitrogen data from our industrial users?

It would be helpful but is not required by the MPCA at this time. Facilities may gather nitrogen data from industrial users at their discretion.

What is MPCA going to do with the data provided and how will that impact my facility in the future?

The MPCA will analyze the data over five years, sharing the statewide nitrogen data with facilities via the MPCA website (www.pca.state.mn.us). Long-term, the impact to wastewater dischargers may be implementing a nitrogen management plan.

Whom can I contact for more information?

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Also, search for "MPCA wastewater permits" on the internet.