MINNESOTA POLLUTION CONTROL AGENCY

MPCA Updates

Nicole Blasing| Municipal Division Director

Sherry Bock | Municipal Wastewater Supervisor

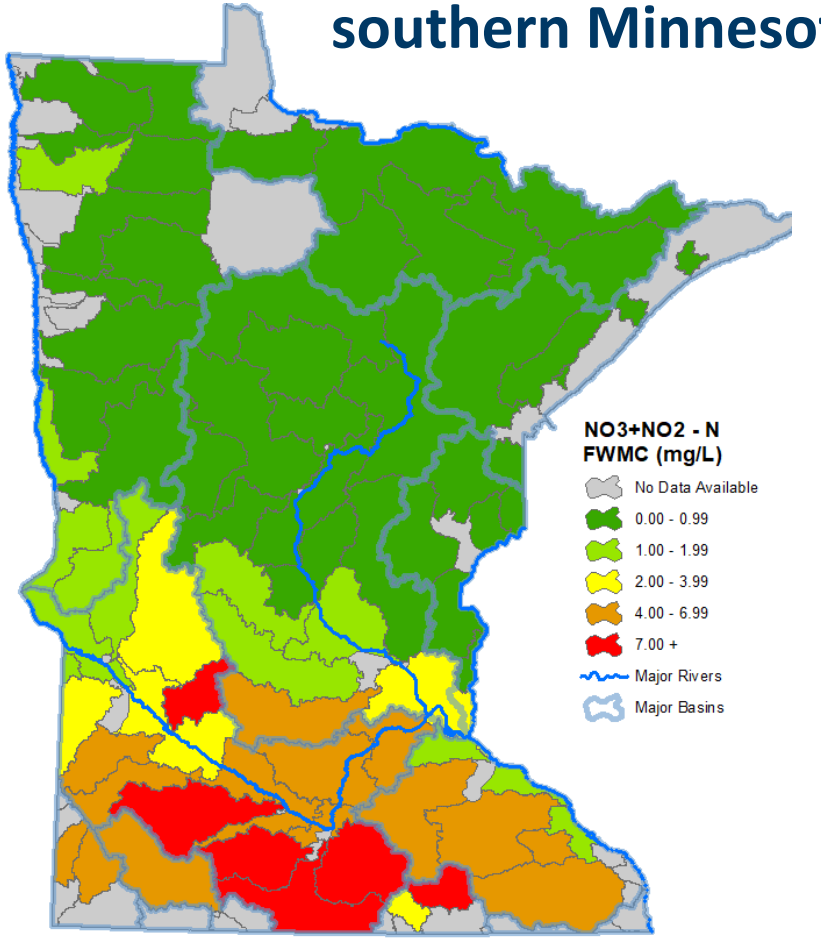
June 13, 2024

Wastewater Nitrogen Reduction Strategy

MINNESOTA POLLUTION CONTROL AGENCY

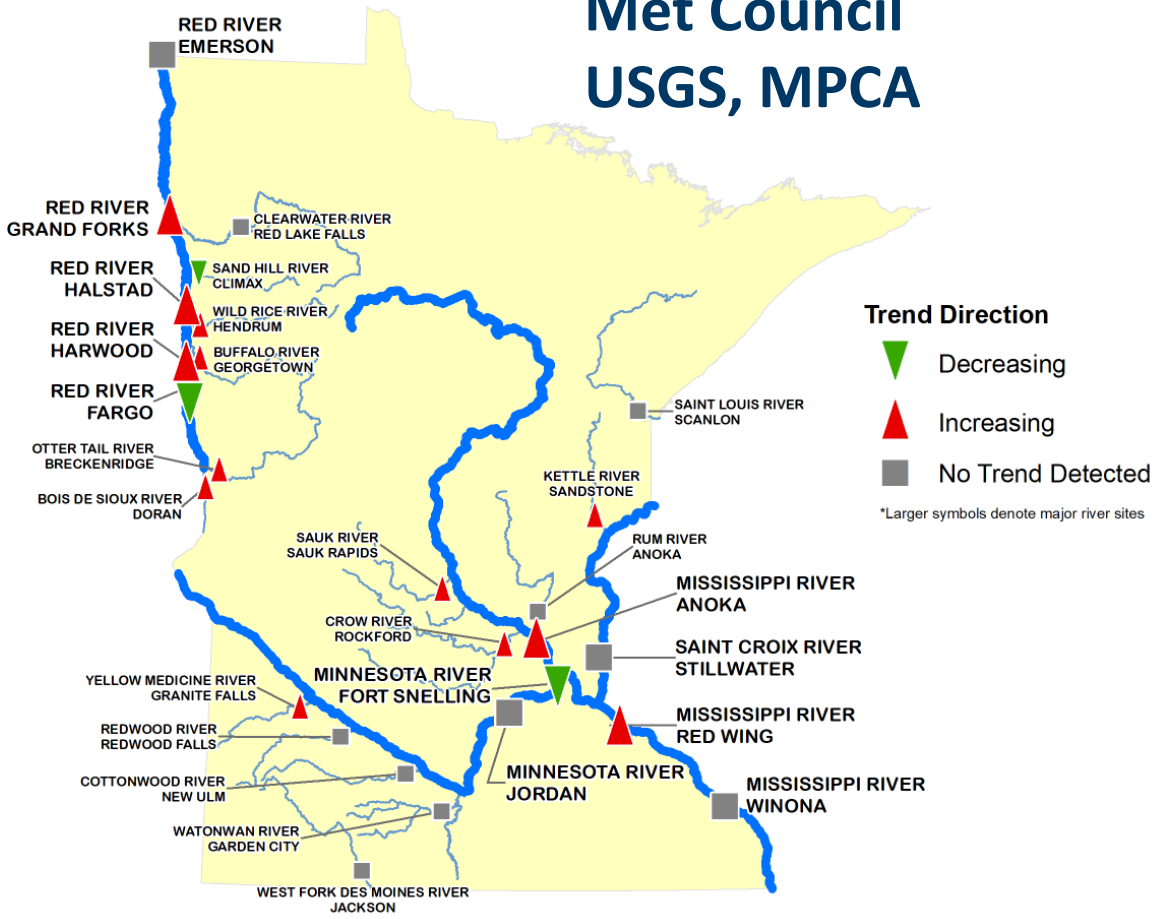
River condition, trends - nitrate

Highest nitrate in southern Minnesota



20-year

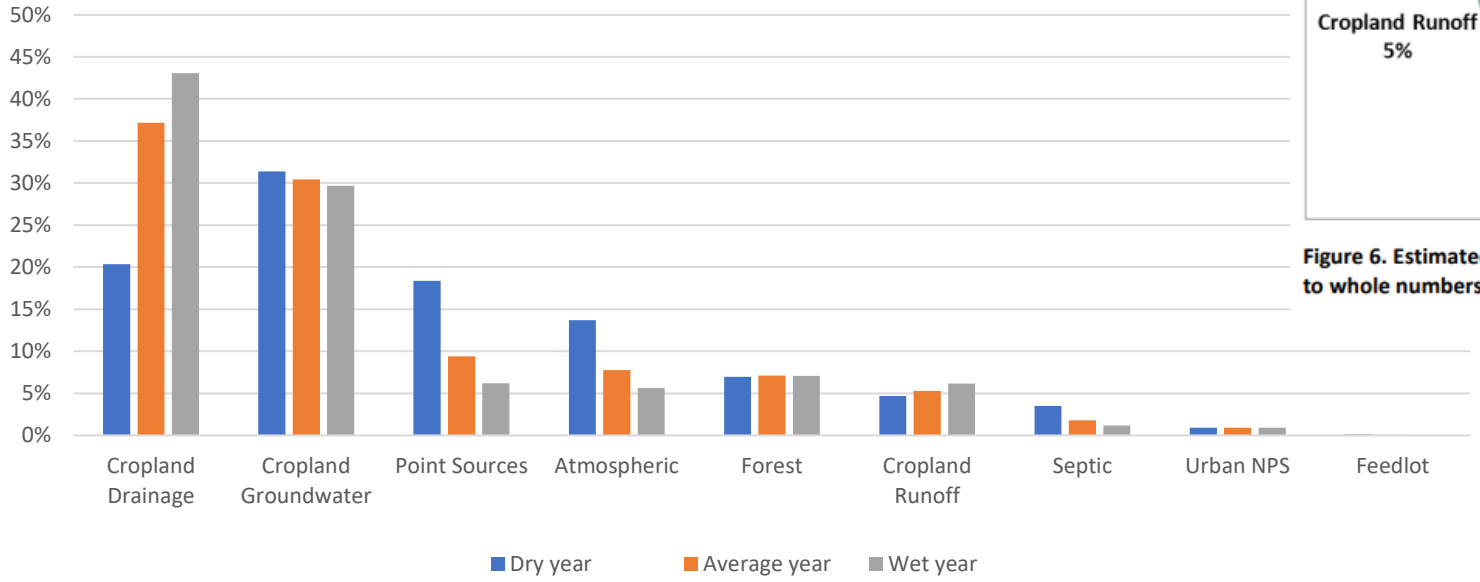
Met Council
USGS, MPCA



QWTREND model (most sites)

Nitrogen in Minnesota surface waters

	Dry year	Average year	Wet year
Cropland Drainage	20%	37%	43%
Cropland Groundwater	31%	30%	30%
Point Sources	18%	9%	6%
Atmospheric	14%	8%	6%
Forest	7%	7%	7%
Cropland Runoff	5%	5%	6%
Septic	3%	2%	1%
Urban NPS	1%	1%	1%
Feedlot	0.1%	0.1%	0.1%



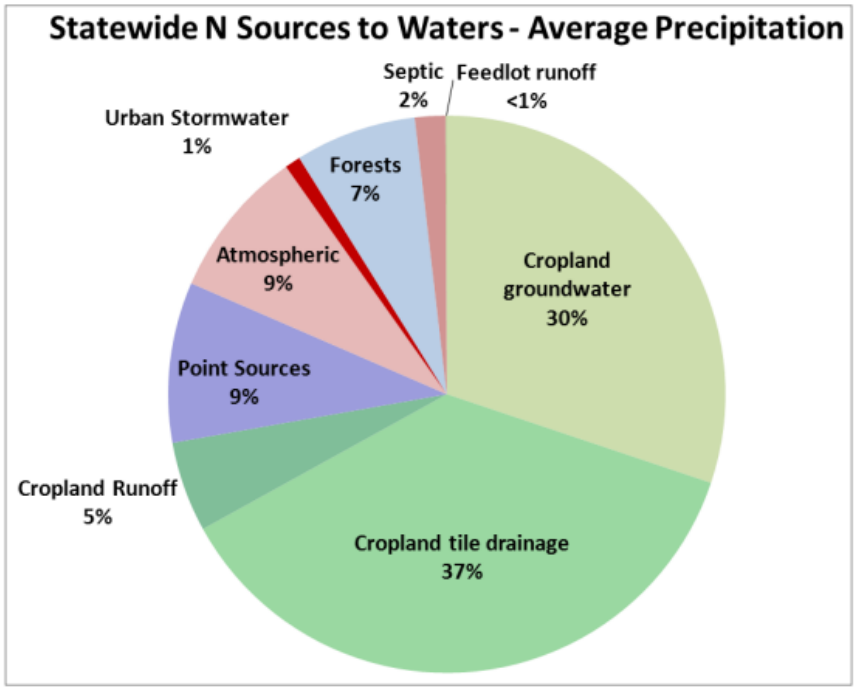
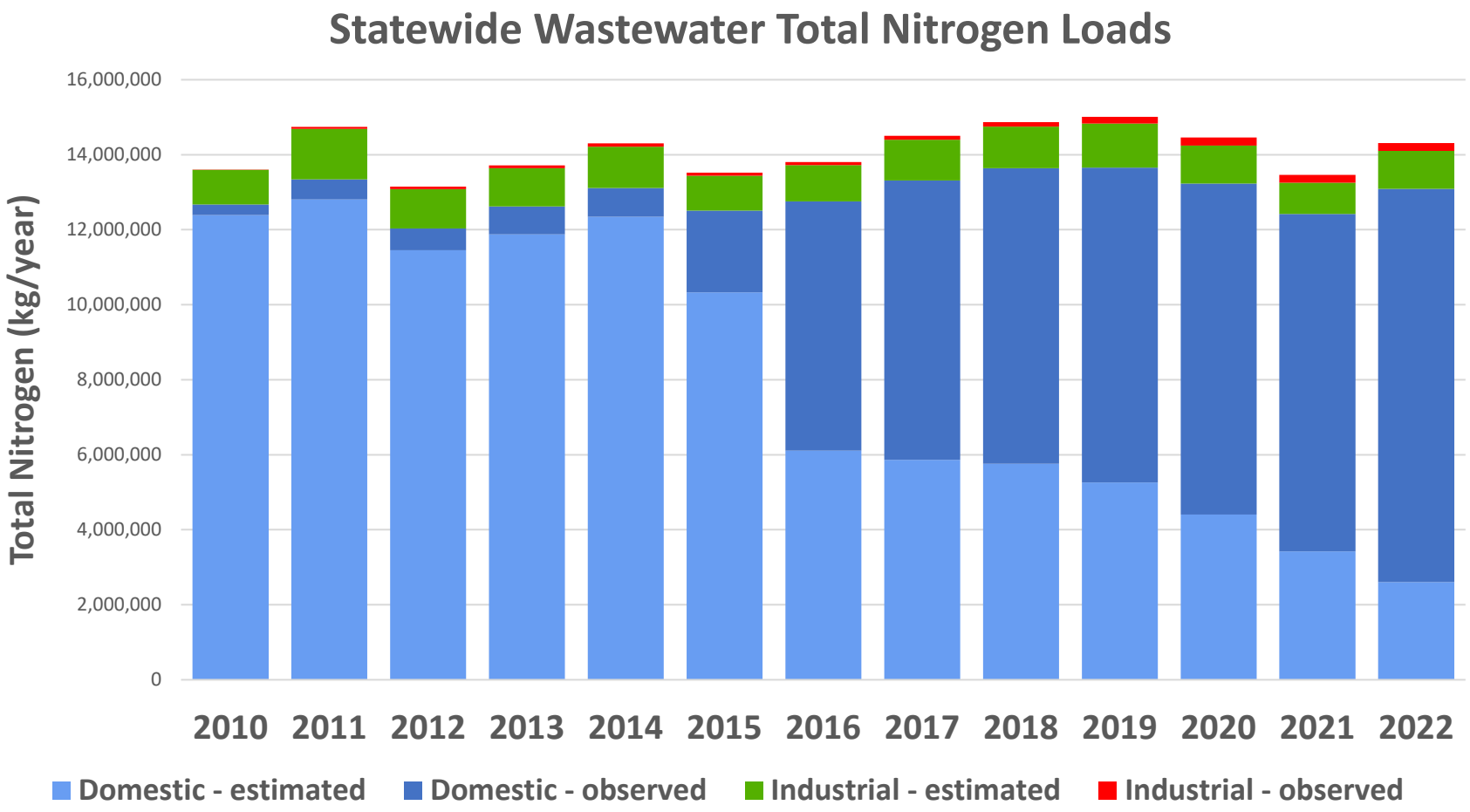


Figure 6. Estimated statewide N contributions to surface waters during an average precipitation year (rounded to whole numbers).

Source: Nitrogen in Minnesota Surface Waters (MPCA 2013)

2010-2022 Wastewater Total Nitrogen Loads



Sector	% of Total
Domestic	92%
Industrial	8%
Majors	91%
Minors	9%
Domestic Majors	86%
Industrial Majors	5%
Domestic Minors	6%
Industrial Minors	3%

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Draft Aquatic Life Toxicity Nitrate Water Quality Standards

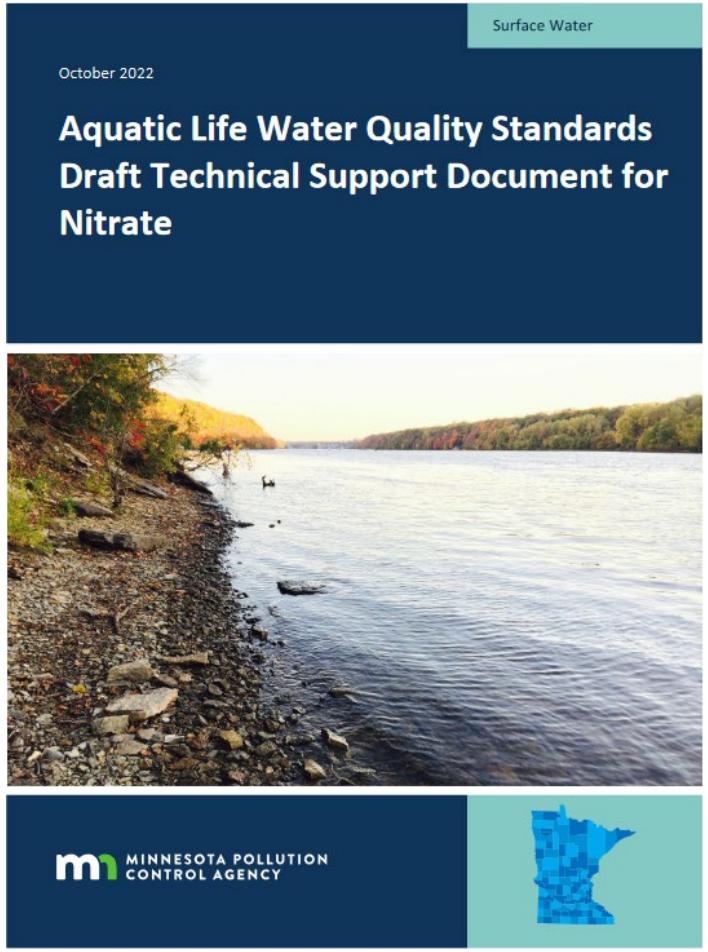
https://www.pca.state.mn.us/sites/default/files/wq-s6-13.pdf

Table 1. Proposed nitrate criteria for the protection of aquatic life

	Acute (all Class 2 waters)	Chronic (Class 2A)	Chronic (2Bd)
Criteria value	60 mg/L*	5 mg/L^	8 mg/L^

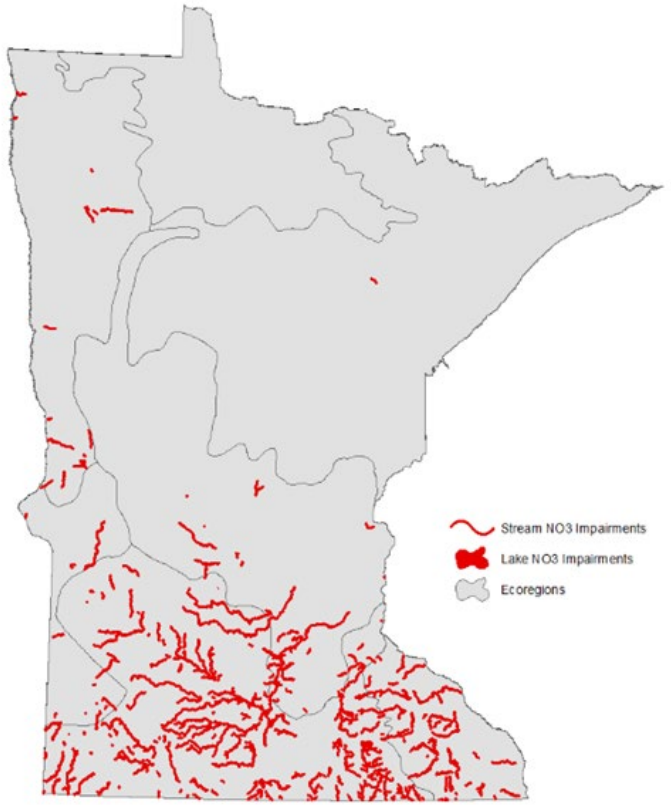
*one day duration

^four day duration



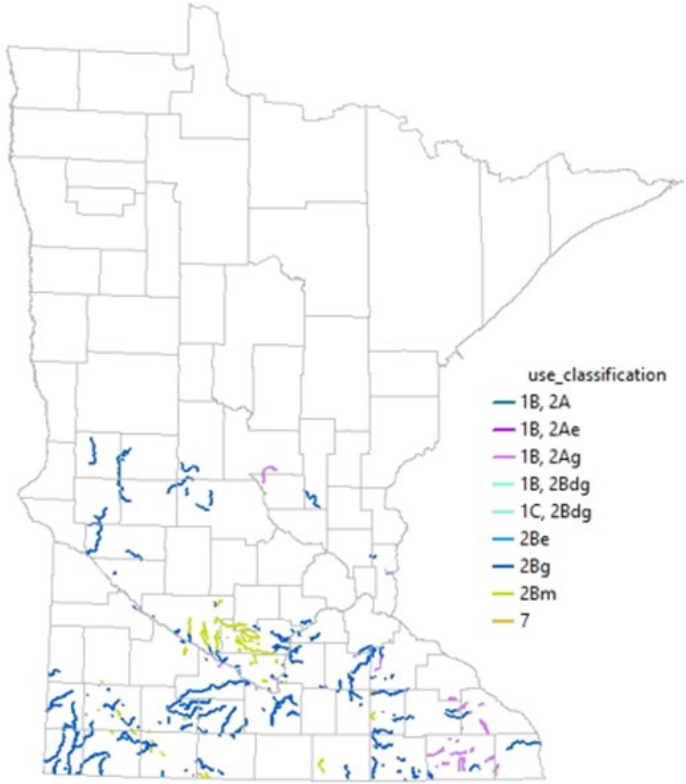
Potential nitrate related impairments and effluent limits

Potential NO3-N Impairments based on Concentration



n = 512

IBI Impairments Linked to Excess NO3-N



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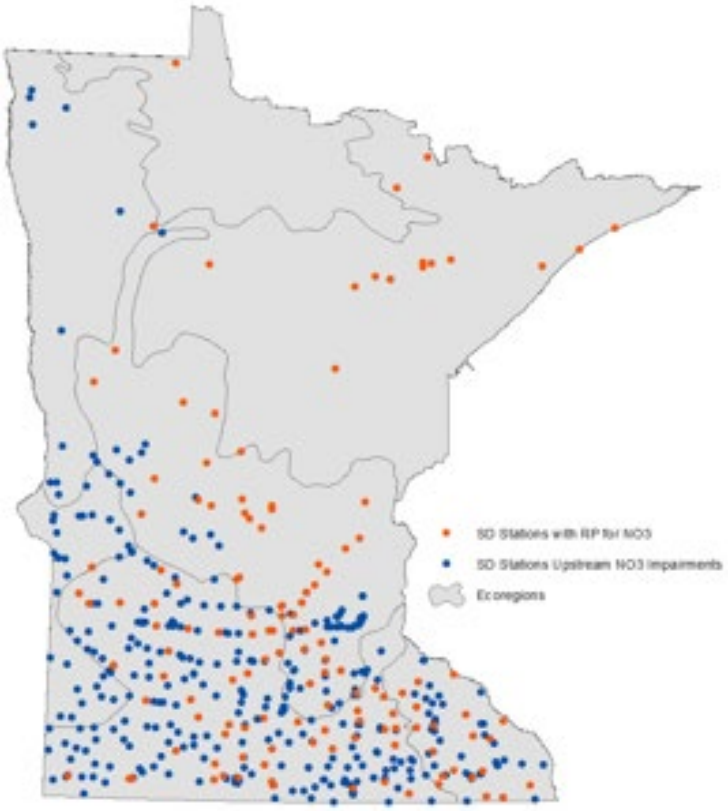
Potential N water quality-based limits



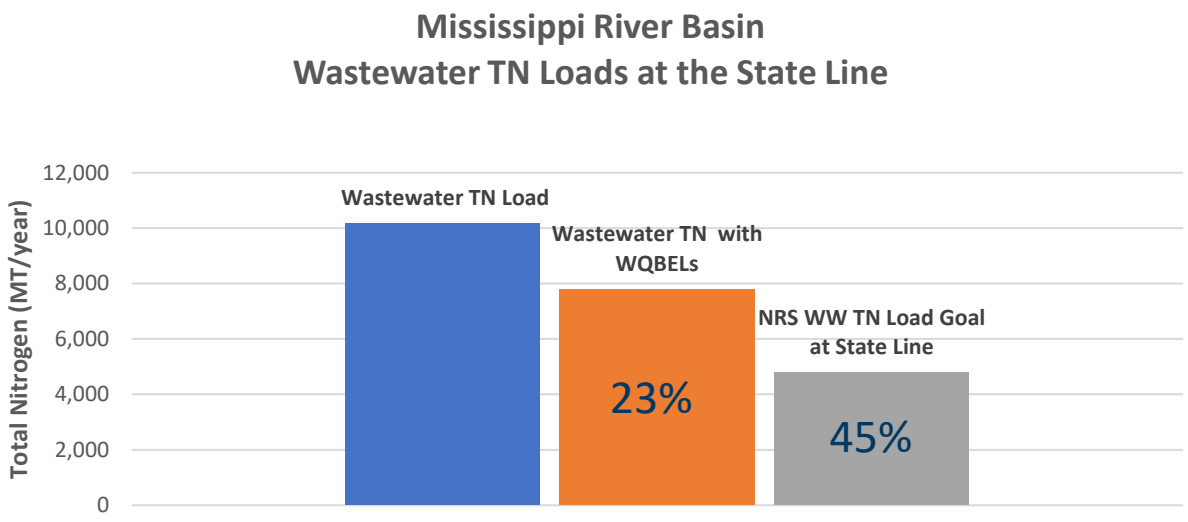
n = 531

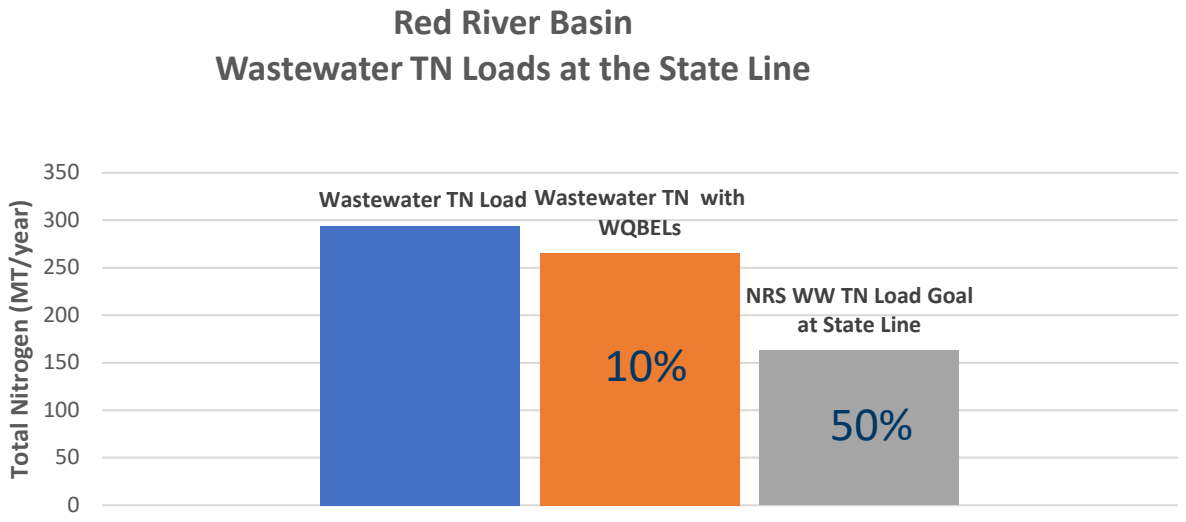
Minnesota's Nutrient Reduction Strategy

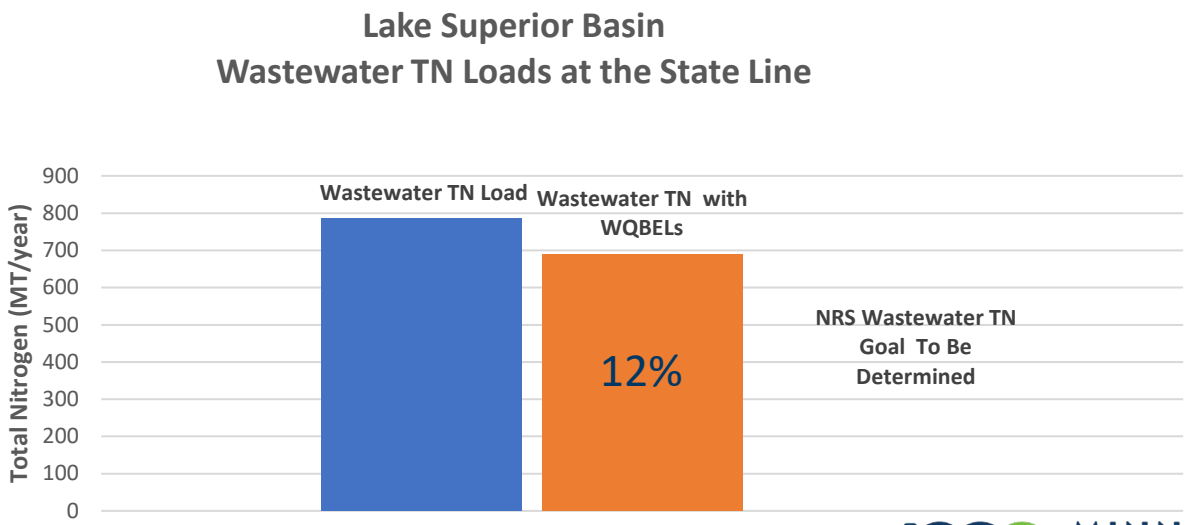
Major Basin	2025 (Milestones goals)	2040 (Final goals)
Mississippi River	12% for TP	45%
	20% for TN	
Red River & Lake Winnipeg	10% for TP	50%
	13% for TN	
Lake Superior	No net increase from 1970's	
Statewide Groundwater/ Source Water	Meet 1989 Groundwater Protection Act Goals	

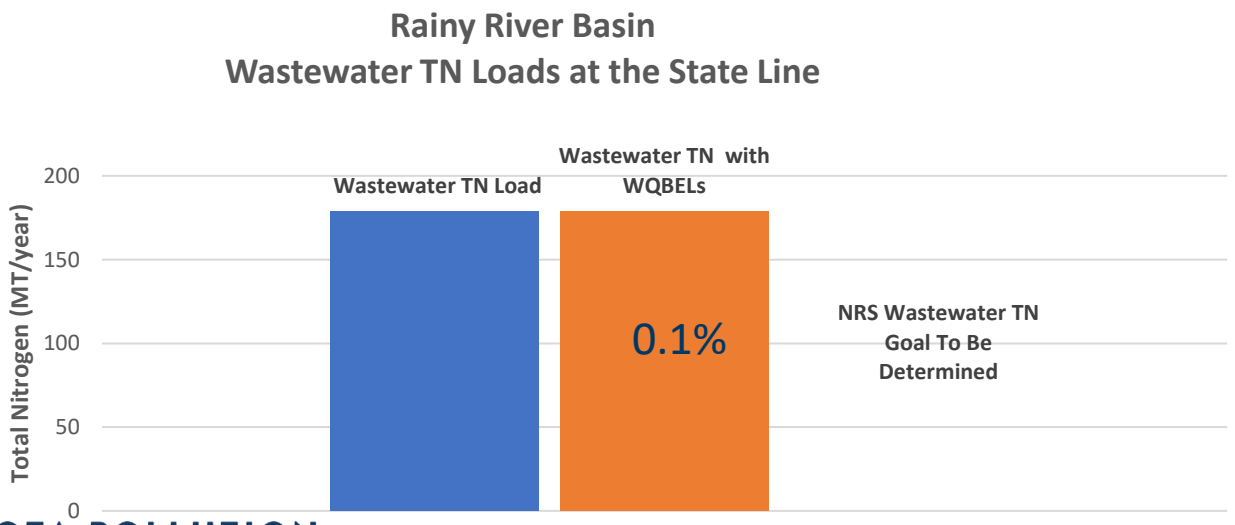
https://www.pca.state.mn.us/air-water-land-climate/reducing-nutrients-in-waters

TN Reductions obtained by WQBELs vs NRS Goals









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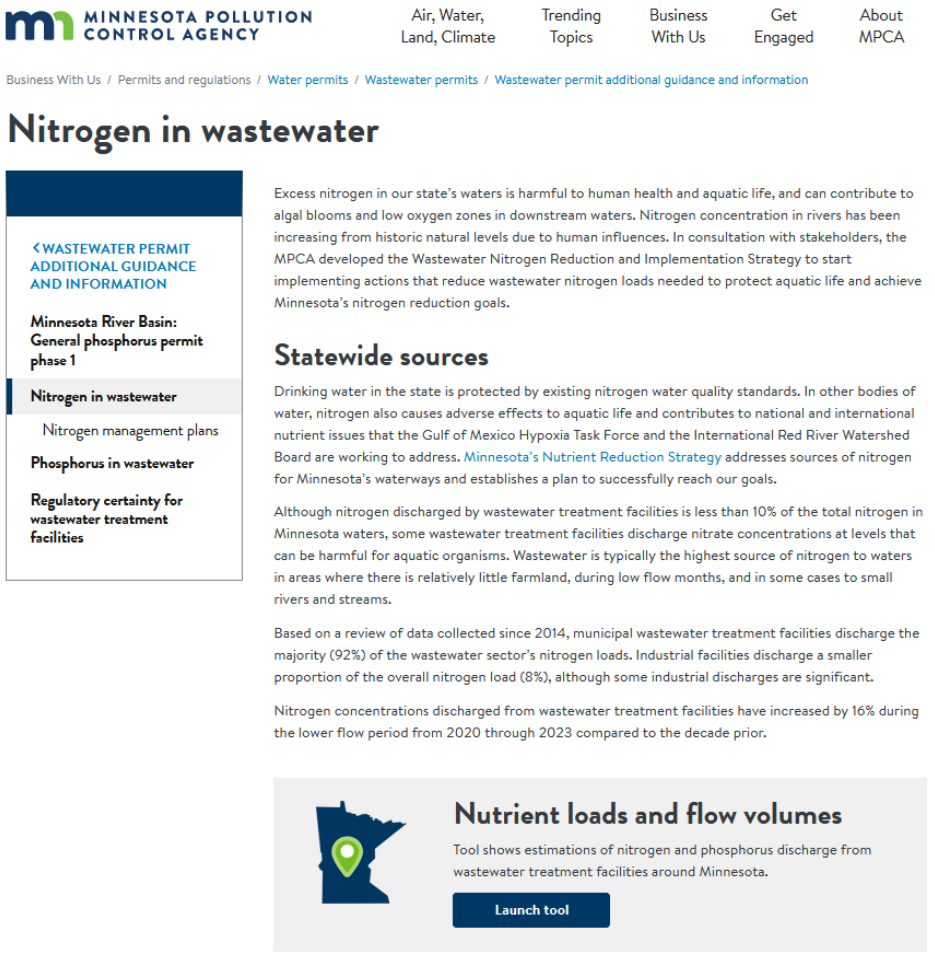
Wastewater Nitrogen Reduction Strategy

https://www.pca.state.mn.us/business-with-us/nitrogen-in-wastewater

- Nitrogen Management Plans
- MPCA policy requiring new, expanded and significantly upgraded WWTPs to include design considerations for denitrification
- Minnesota Rules 7050 & 7053 rulemakings
  - 7050 – nitrate water quality standards
  - 7053 – 10 mg/L total nitrogen effluent limits for major municipal WWTPs and other high concentration dischargers
- WQBEL and SDR limit implementation over multiple permit cycles



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Effluent TN Concentrations by Facility Class

2018 – 2022 total nitrogen effluent concentrations (mg/L)

	Class A	Class B	Class C	Class D	High Concentration Industrial	Low Concentration Industrial
Mean	19.8	19.0	20.5	4.4	44.0	2.3
Median	19.0	17.2	18.0	3.6	35.6	1.5
Max	54.0	53.0	73.0	14.0	160.0	8.1
Min	1.6	0.5	0.1	0.0	1.3	0.0
Standard Dev.	10.5	10.5	14.8	3.1	33.0	1.9
Mean + Standard Dev.	**30.3**	**29.5**	**35.4**	**7.5**	**77.0**	**4.2**

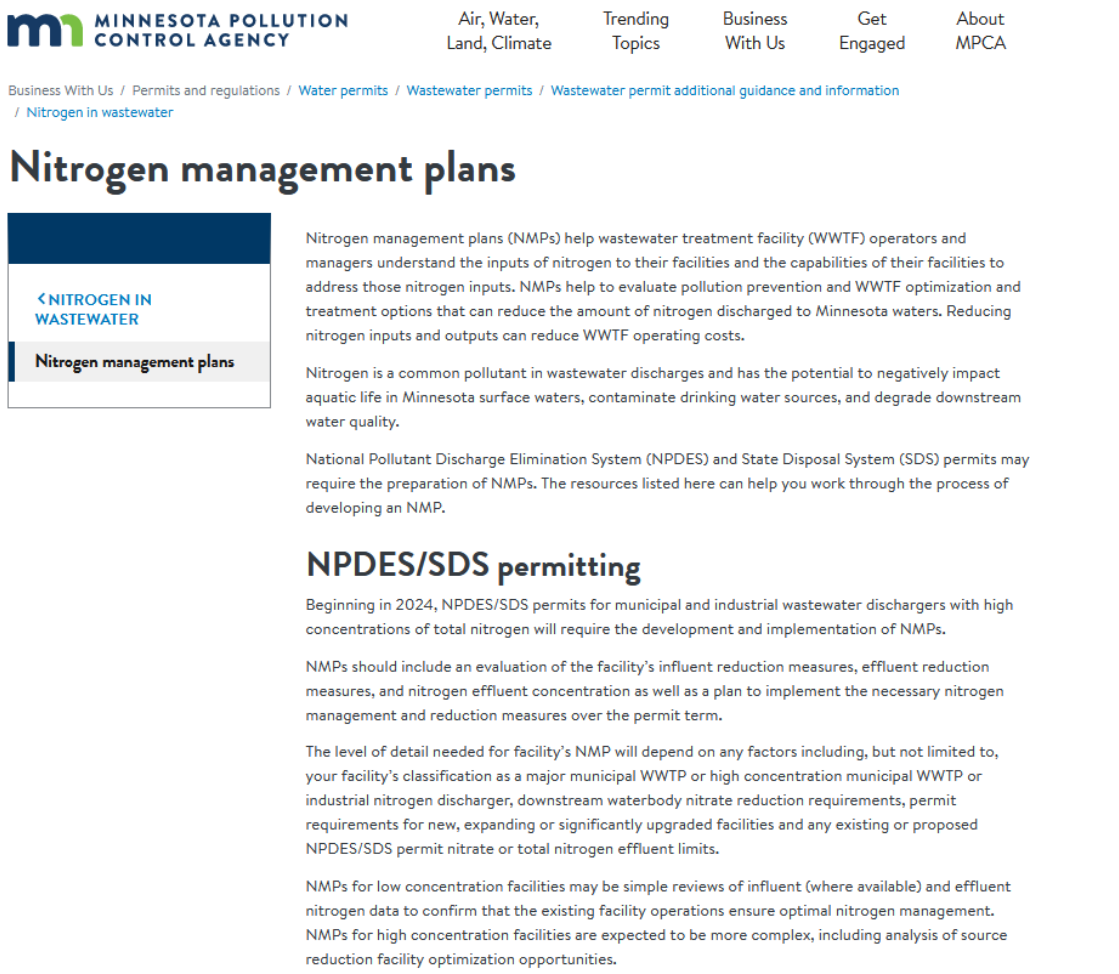
High vs. low concentration discharge threshold

	Class A	Class B	Class C	Class D	HCI	LCI
High/low discharge TN concentration threshold	30 mg/L	30 mg/L	35 mg/L	8 mg/L	30 mg/L	5 mg/L

Nitrogen management plans

- Nitrogen Management Plan Guidance
  1. Data review
  2. Facility performance evaluation
  3. Process control monitoring plan
  4. NMP goals
  5. NMP implementation plans
- Wastewater nitrogen data summary tool
  - Facility nitrogen and flow summaries
  - Intended to assist with NMP development
  - Provides influent and effluent comparison to similar facilities
- Nitrogen DMR lookup tool
  - Tables and graphs that can be used for NMP development

https://www.pca.state.mn.us/business-with-us/nitrogen-management-plans



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Air, Water, Land, Climate | Trending Topics | Business With Us | Get Engaged | About MPCA

Business With Us / Permits and regulations / Water permits / Wastewater permits / Wastewater permit additional guidance and information / Nitrogen in wastewater

Nitrogen management plans

< NITROGEN IN WASTEWATER

Nitrogen management plans

Nitrogen management plans (NMPs) help wastewater treatment facility (WWTF) operators and managers understand the inputs of nitrogen to their facilities and the capabilities of their facilities to address those nitrogen inputs. NMPs help to evaluate pollution prevention and WWTF optimization and treatment options that can reduce the amount of nitrogen discharged to Minnesota waters. Reducing nitrogen inputs and outputs can reduce WWTF operating costs.

Nitrogen is a common pollutant in wastewater discharges and has the potential to negatively impact aquatic life in Minnesota surface waters, contaminate drinking water sources, and degrade downstream water quality.

National Pollutant Discharge Elimination System (NPDES) and State Disposal System (SDS) permits may require the preparation of NMPs. The resources listed here can help you work through the process of developing an NMP.

NPDES/SDS permitting

Beginning in 2024, NPDES/SDS permits for municipal and industrial wastewater dischargers with high concentrations of total nitrogen will require the development and implementation of NMPs.

NMPs should include an evaluation of the facility's influent reduction measures, effluent reduction measures, and nitrogen effluent concentration as well as a plan to implement the necessary nitrogen management and reduction measures over the permit term.

The level of detail needed for facility's NMP will depend on any factors including, but not limited to, your facility's classification as a major municipal WWTP or high concentration municipal WWTP or industrial nitrogen discharger, downstream waterbody nitrate reduction requirements, permit requirements for new, expanding or significantly upgraded facilities and any existing or proposed NPDES/SDS permit nitrate or total nitrogen effluent limits.

NMPs for low concentration facilities may be simple reviews of influent (where available) and effluent nitrogen data to confirm that the existing facility operations ensure optimal nitrogen management. NMPs for high concentration facilities are expected to be more complex, including analysis of source reduction facility optimization opportunities.

Guidance for new, expanded and significantly upgraded WWTFs

Discharges contributing to:

- Exceedance of nitrate drinking water standard in downstream waterbodies utilized as drinking water sources; or
- Nitrate concentrations causing biological stress to aquatic organisms

- The MPCA will develop nitrogen effluent limits that ensure that downstream uses are protected
- Effluent limits will be included in the WWTF's NPDES/SDS permit.
- Construction of all necessary treatment units will be required to achieve effluent denitrification to levels sufficient to protect downstream uses.

All other discharges:

- Facility plans, and other planning or design documents submitted by project proposers will be required to include design considerations for denitrification to levels sufficient to protect downstream uses and to achieve the future projected nitrogen.
- Construction of denitrification not required until effluent limits are in effect.

https://www.pca.state.mn.us/sites/default/files/wq-wwprm1-44.pdf

Wastewater nitrogen reduction and implementation strategy
Phase 1 (first permit cycle beginning on April 1, 2024)

Table 4. Wastewater nitrogen reduction strategy implementation summary		Major municipal WWTP Low concentration[1]	Major municipal WWTP High concentration[1]	Minor municipal WWTP Low concentration[1]	Minor municipal WWTP High concentration[1]	Industrial discharger Low concentration[1]	Industrial discharger High concentration[1]
Phase 1 – First permit cycle starting April 1, 2024	MPCA	Begin administrative process to adopt 10 mg/l TN State Discharge Restriction (SDR) and NO_3-N WQS. Notify permittees of eligibility for deferred implementation of 10 mg/l SDR TN limits to Phase 3 if facilities have successfully optimized operations to a 15 mg/l annual average concentration during Phase 1.					
	All NPDES wastewater facilities		Develop & implement NMP		Develop & implement NMP		Develop & implement NMP
	New, expanded, and significantly upgraded facilities[3] with RP for drinking water and IBI impaired waters with NO_3-N stressors	Designed and built to meet N WQBELS	Designed and built to meet N WQBELS	Designed and built to meet N WQBELS	Designed and built to meet N WQBELS	Designed and built to meet N WQBELS	Designed and built to meet N WQBELS
	All other new, expanded, and significantly upgraded facilities[3]	Designed for denitrification	Designed for denitrification	Designed for denitrification	Designed for denitrification	Designed for denitrification	Designed for denitrification
	RP for exceedance of existing class 1 waters 10 mg/L NO_3-N WQS	TN WQBEL[2]	TN WQBEL[2]	TN WQBEL[2]	TN WQBEL[2]	TN WQBEL[2]	TN WQBEL[2]
	Facilities discharging upstream of IBI impaired waters with NO_3-N stressors	Develop & implement enhanced NMP[4]	Develop & implement enhanced NMP[4]	Develop & implement enhanced NMP[4]	Develop & implement enhanced NMP[4]	Develop & implement enhanced NMP[4_5]	Develop & implement enhanced NMP[4]
	TMDL wasteload allocation	TN WQBEL if discharge has RP[2]	TN WQBEL if discharge has RP[2]	TN WQBEL if discharge has RP[2]	TN WQBEL if discharge has RP[2]	TN WQBEL if discharge has RP[2]	TN WQBEL if discharge has RP[2]

[1]High vs. low concentration determined based on facility class mean concentration + standard deviation (see Table 7).
[2]TN limit and limit type to be determined at permit issuance.
[3] Facilities considered to be significantly when biological treatment units are replaced or substantially rebuilt.
[4]Enhanced NMP is a goal-oriented optimization plan designed to achieve a specific effluent concentration target.
[5]Low concentration industrial dischargers to develop NMPs if effluent concentrations exceed threshold TN concentration (see Table 7).
[6]Limit parameter and limit type to be determined at permit issuance.
[7]Attainment of 10 mg/l TN limit deferred to the third permit cycle if the facility has successfully optimized operations to a 15 mg/l annual average concentration during Phase 1.
[8]10 mg/l TN limits implemented as 12-month moving average limit types.

Wastewater nitrogen reduction and implementation strategy Phase 2 & 3 (permit cycles following adoption of WQS & SDR rules)

Table 4. Wastewater nitrogen reduction strategy implementation summary		Major municipal WWTP Low concentration[1]	Major municipal WWTP High concentration[1]	Minor municipal WWTP Low concentration[1]	Minor municipal WWTP High concentration[1]	Industrial discharger Low concentration[1]	Industrial discharger High concentration[1]
Phase 2 – First permit cycle following adoption of 10 mg/l TN SDR and NO_3-N WQS [all Phase 1 requirements remain in effect except as modified by implementation of Phase 2]	MPCA	Begin implementation of 10 mg/L TN SDR & NO_3-N WQBELS					
	All NPDES wastewater facilities	Develop & implement NMP	Update & implement NMP	Develop & implement NMP	Update & implement NMP	Develop & implement NMP[5]	Update & implement NMP
	All NPDES wastewater facilities	10 mg/L SDR TN limit[7–8]	10 mg/L SDR TN limit[7–8]		10 mg/L SDR TN limit[7–8]		10 mg/L TN SDR limit[7–8]
	RP for exceedance of AQL NO_3-N WQS or IBI impairments with NO_3-N stressors	TN or NO_3-N WQBEL[6]	TN or NO_3-n WQBEL[6]	TN or NO_3-N WQBEL[6]	TN or NO_3-N WQBEL[6]	TN or NO_3-N WQBEL[6]	Tn or no_3-n wqbel[6]
Phase 3 – Second permit cycle following adoption of 10 mg/l SDR & NO_3-N WQS [all Phase 1 and 2 requirements remain in effect except as modified by implementation of Phase 3]	All NPDES wastewater facilities	Update & implement NMP	Update & implement NMP	Update & implement NMP	Update & implement NMP	Update & implement NMP[5]	Update & implement NMP
	All NPDES wastewater facilities	10 mg/L TN limit for facilities that have successfully optimized operations during Phase 1[8]	10 mg/L TN limit for facilities that have successfully optimized operations during Phase 1[8]		10 mg/L TN limit for facilities that have successfully optimized operations during Phase 1[8]		10 mg/L TN limit for facilities that have successfully optimized operations during Phase 1[8]

[1]High vs. low concentration determined based on facility class mean concentration + standard deviation (see Table 7).
[2]TN limit and limit type to be determined at permit issuance.
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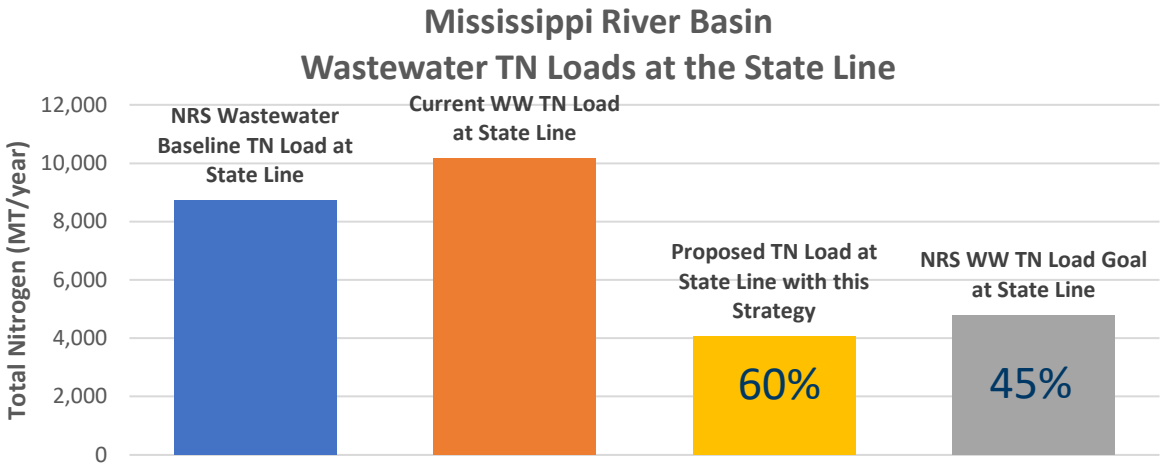
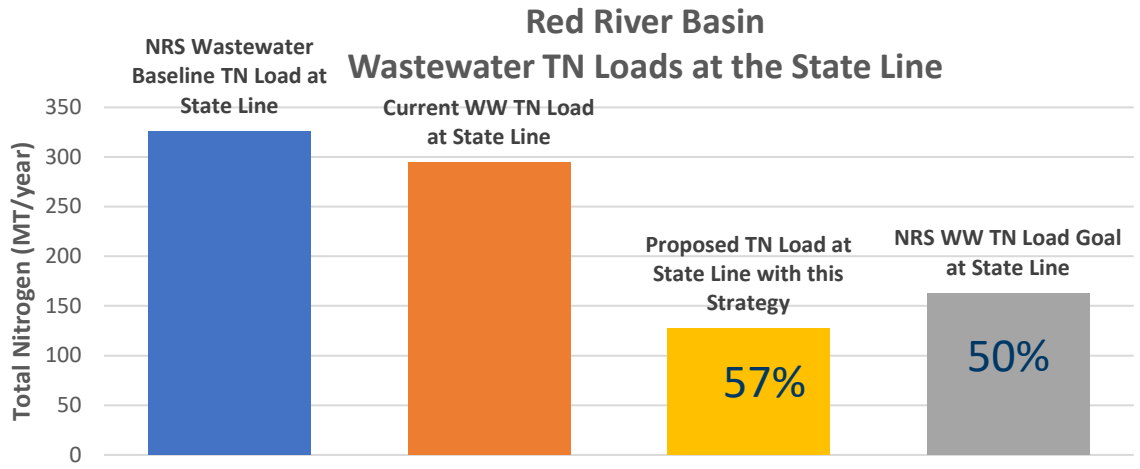
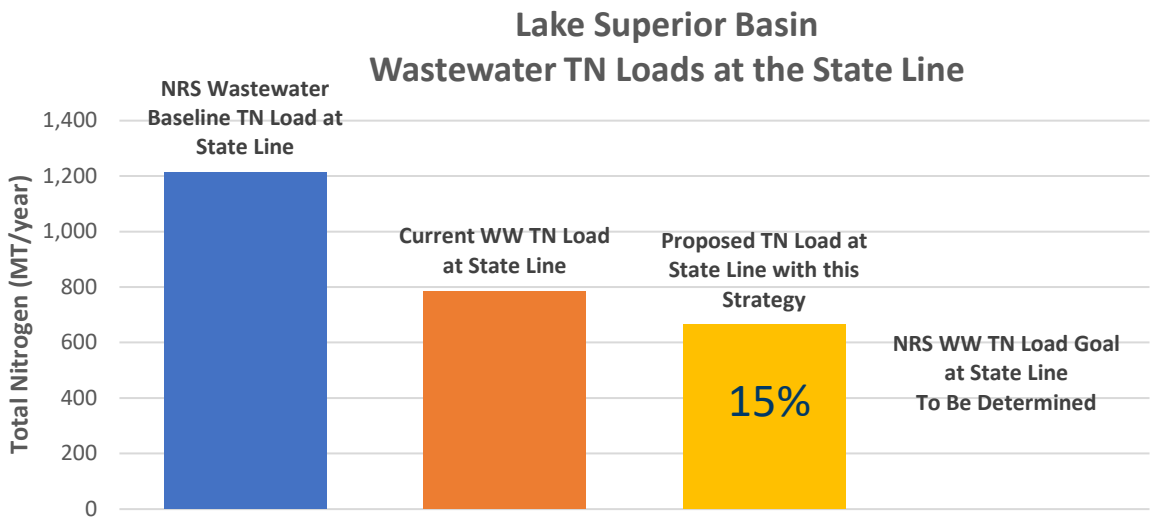
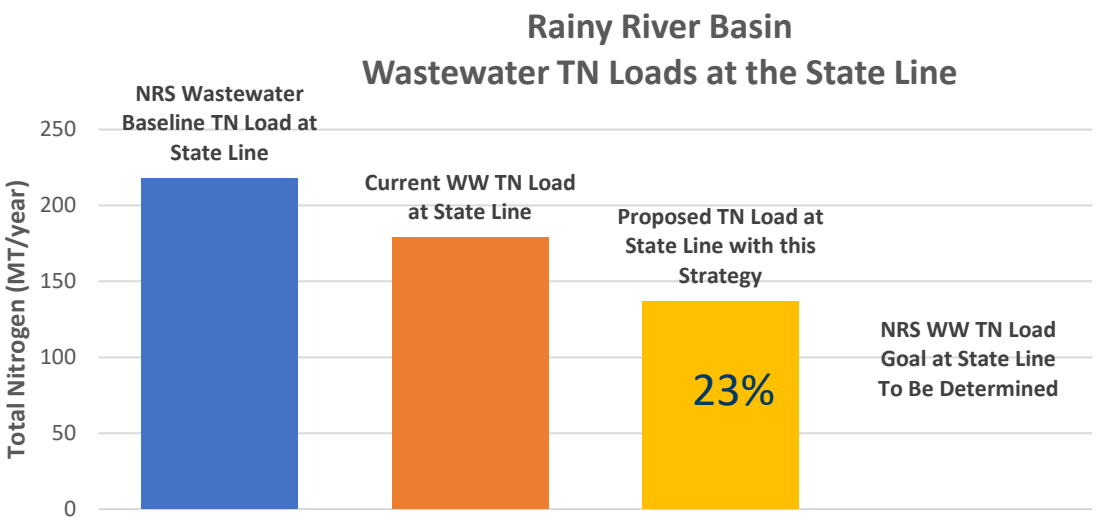
[7]Attainment of 10 mg/l TN limit deferred to the third permit cycle if the facility has successfully optimized operations to a 15 mg/l annual average concentration during Phase 1.
[8]10 mg/l TN limits implemented as 12-month moving average limit types.

Wastewater strategy TN load reductions would meet NRS goals









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Sulfate/Wild Rice

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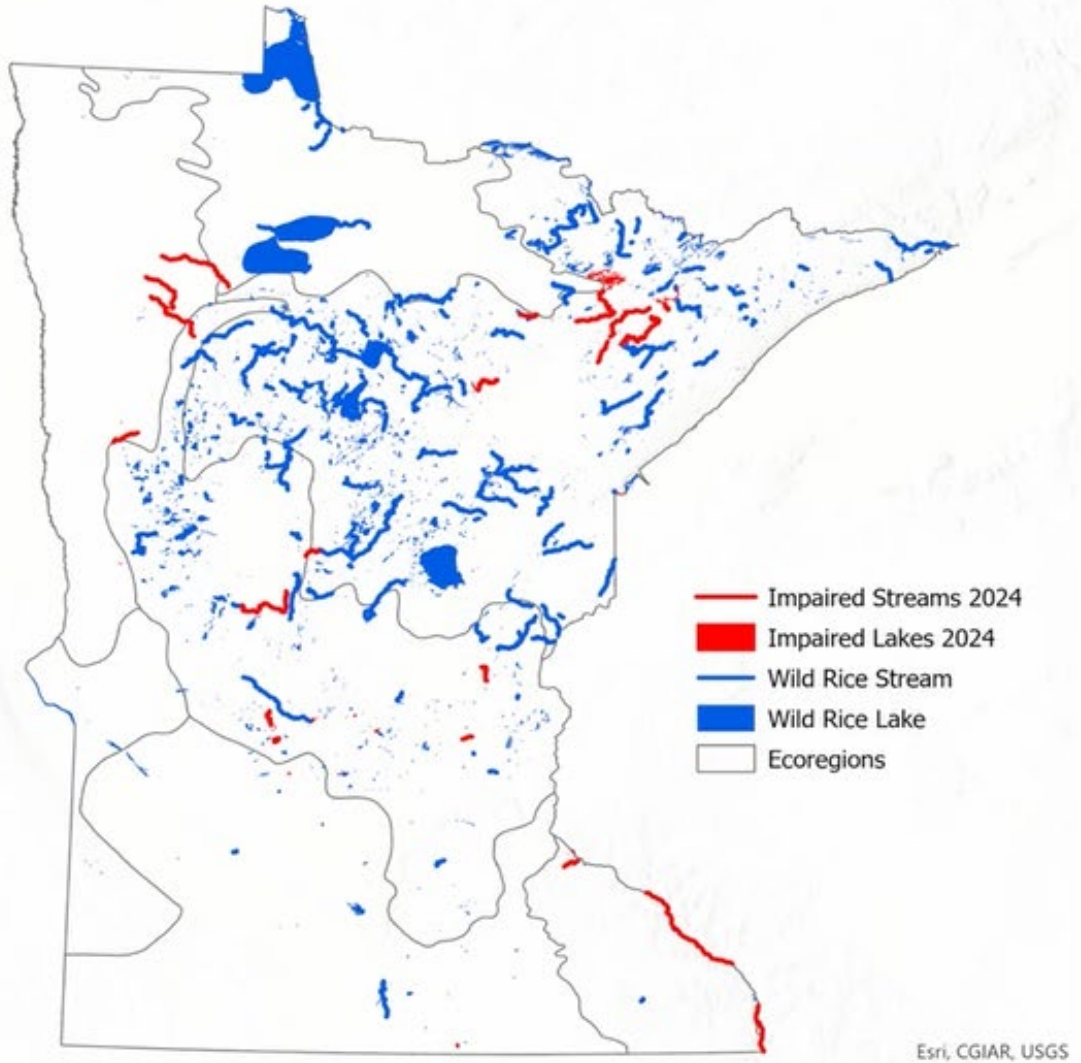
Wild Rice in Minnesota

Minnesota has approximately **2,400** waters used for production of wild rice with 55 (2024 List) sulfate impairments



Permitting Approach

As permits are reissued (since July 2023):

- No data: Sulfate monitoring is added to permits during reissuance
- Where data is available: Multiple new limits have been communicated to permittees

Time, flexibility, & other tools will be important in implementation efforts

- Site Specific Standards
  - 2 requests received, MPCA working on Lower Mississippi SSS
- Variances
  - Utilizing a streamlined process, similar to chloride variances
  - Fee waiver applied for first variance request
  - Actively working on developing a multi-discharge variance = administrative efficiency
- Compliance Schedules
  - Not likely to be the correct permitting tool

Progress on MDV

- **Permittee** vs. Waterbody: Currently MPCA is leaning towards a permittee-based MDV. In this instance MPCA will identify all permittees to a waterbody covered under the Variance.
- Factor 3 vs. **Factor 6**: The installation of treatment technology to remove sulfate at the end of pipe is considered to be unaffordable for most (if not all) WWTPs in MN.
- Currently developing decision trees for actions to be taken during the variance term.

- The EPA must agree with, have the data for, and approve any reasoning for an MDV.
  - What alternatives must be shown to be unaffordable before a permittee can be considered eligible?
- The EPA must approve activities that can be carried out by a permittee to "make progress towards meeting the in-stream WQS."
- Public participation

2024 Legislative Initiatives

MINNESOTA POLLUTION CONTROL AGENCY

2024 Legislation

Environment and Natural Resources Omnibus Bill

- Waste heat recovery from wastewater treatment operations (115.01, Subd 1, (16), 116D, Subd. 2, & 216B.2427, Subd. 1)
- Definition of prepared sewage sludge, references existing def of exceptional quality biosolids (115A.03)
- Development of Biosolids PFAS strategy by Dec 31, 2024. To be implemented in permits.
- MPCA/MDH report – strategies/fee mechanisms for PFAS manufactures to pay for safe drinking water and reduction and treatment of PFAS at WWTPs
- $300,000 to RRBC to develop a feasibility assessment of adaptive phos man in Red River Basin
- Various enforcement updates

Legacy Finance Bill

- Enhanced SSTS Program Support – Additional $1.95M grant funding for low income SSTS upgrades

Technical Assistance/Technical Services Unit Update

MINNESOTA POLLUTION CONTROL AGENCY

Technical Assistance Advisor

- Brett Brehm
  - Class D wastewater/Class C water license
  - Has operated several small wastewater and water systems including a tribal system
  - Previously employed with the Midwest Assistance Program

Technical Assistance Optimizer

- Kira Peterson - Optimizer
  - Wastewater Engineer
  - Class C wastewater license
  - Has operated industrial and municipal wastewater systems
  - Previously employed with the Minnesota Technical Assistance Program doing energy efficiency assistance

PFAS Coordinator

- Stephanie Lyons – PFAS
  - Over 10 years permit writing experience
  - Experience with many complex permits and also lead the pond general permit reissuance

Biosolids Coordinator

- Cory Schultz - Biosolids
  - Class B wastewater license
  - Worked for a couple municipalities which include land application
  - 10 years with the agency in compliance and enforcement for wastewater

Wastewater Webinar Series for 2024

March 27, Facility Classification

- Purpose: educate participants about the facility classification process for new and existing municipal WWTPs.

June 12, Sulfate Standards, Treatment and Permitting Approaches in Minnesota

- The purpose of this Webinar is to educate participants on the standards for sulfate in Minnesota surface water, their history, ambient sulfate levels, treatment technologies, and permitting options.

September 11, Discharge Monitoring Reports (DMR) Tips and Training

- The purpose of this webinar is to educate participants on how to complete Discharge Monitoring Reports (DMRs), what is expected, and how to submit and/or amend DMRs online via MPCA e-Services.

December 4, Nitrogen Treatment/Nitrogen Removal

- A presentation on basic forms of nitrogen removal and nitrogen treatment ideas as permittees look ahead towards the impending nitrate water quality standard rulemaking effort and potential future limits.

Look for GovDelivery messages for each webinar as the dates approach. No registration is required

Per-and Polyfluoroalkyl Substances (PFAS)

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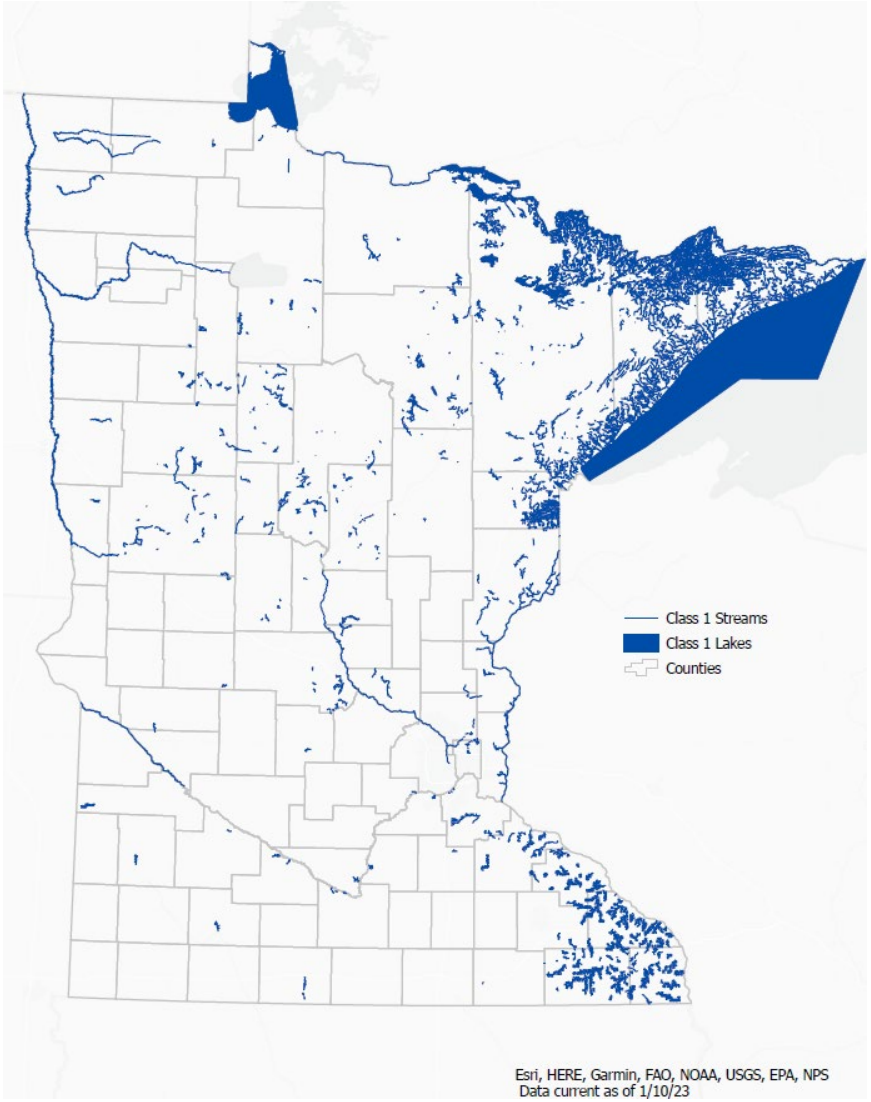
PFAS Updates

- Monitoring Plan update
  - Monitoring PFAS | Minnesota Pollution Control Agency (state.mn.us)
- Permitting Strategy
  - Class 1 receiving waters, PFOA, PFOS, PFNA, HFPO-DA (GenX), PFHxS, and PFBS
    - Limits by July 1, 2026, however, EPA's MCLs will be incorporated by reference on June 25, 2024
    - American Water Works Association and Association of Metropolitan Water Agencies filed a petition of EPA's MCLs
    - All groundwaters are Class 1



PFAS Updates

- Biosolids Strategy
  - Legislation supports current work
  - Communication with high priority facilities that are to be sampled this fall is complete
  - On-going planning for communicating out to all facilities
    - Have discussed at Type IV refreshers
- PFAS Grants
  - [PFAS source identification and reduction grant program | Minnesota Pollution Control Agency (state.mn.us)]

MINNESOTA POLLUTION CONTROL AGENCY

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Business with us / Business support / Grants, loans, and contracts

Application deadline
April 2, 2025
4:00 p.m.

Category
Grant

Contact
Grant questions
grants.pca@state.mn.us

PFAS source identification and reduction grant program

This opportunity provides funding for activities related to planning, development and implementation of PFAS source identification and reduction plans, product substitutions and system improvements in Minnesota.

Applications will be accepted on a rolling, "first come, first serve" basis until all dedicated funds have been dispersed or April 2, 2025, (4 p.m. Central Time), whichever occurs first.

Projects must be completed by December 18, 2026, to be eligible for reimbursement.

Questions and answers

Applicants who have any questions regarding this RFP must email questions to grants.pca@state.mn.us using the subject line: "PFAS Source Identification and Reduction Question." Answers to questions will be posted frequently on this web page.

- PFAS Source Identification and Reduction Grant Program questions and answers (p-f2-60d-fy24)

Thank You!

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Ph. 218-316-3882

Nicole Blasing, Municipal Division Director
nicole.blasing@state.mn.us
Ph. 218-316-3890

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