

Minnesota Nutrient Permitting and Facility Optimization

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ACWA Nutrients Permitting Workshop

June 5, 2018

Minnesota: Land of 10,000 Lakes



Legacy Amendment

- In 2008, MN passed Clean Water, Land and Legacy Amendment
- Increased state sales tax by 0.375% until 2034
- 33% of revenue to Clean Water Fund
- Protect, enhance, and restore water quality in lakes, rivers, and streams
- Protect groundwater from degradation
- Over \$750 million appropriated to Clean Water Fund since 2010

<https://www.legacy.mn.gov/>



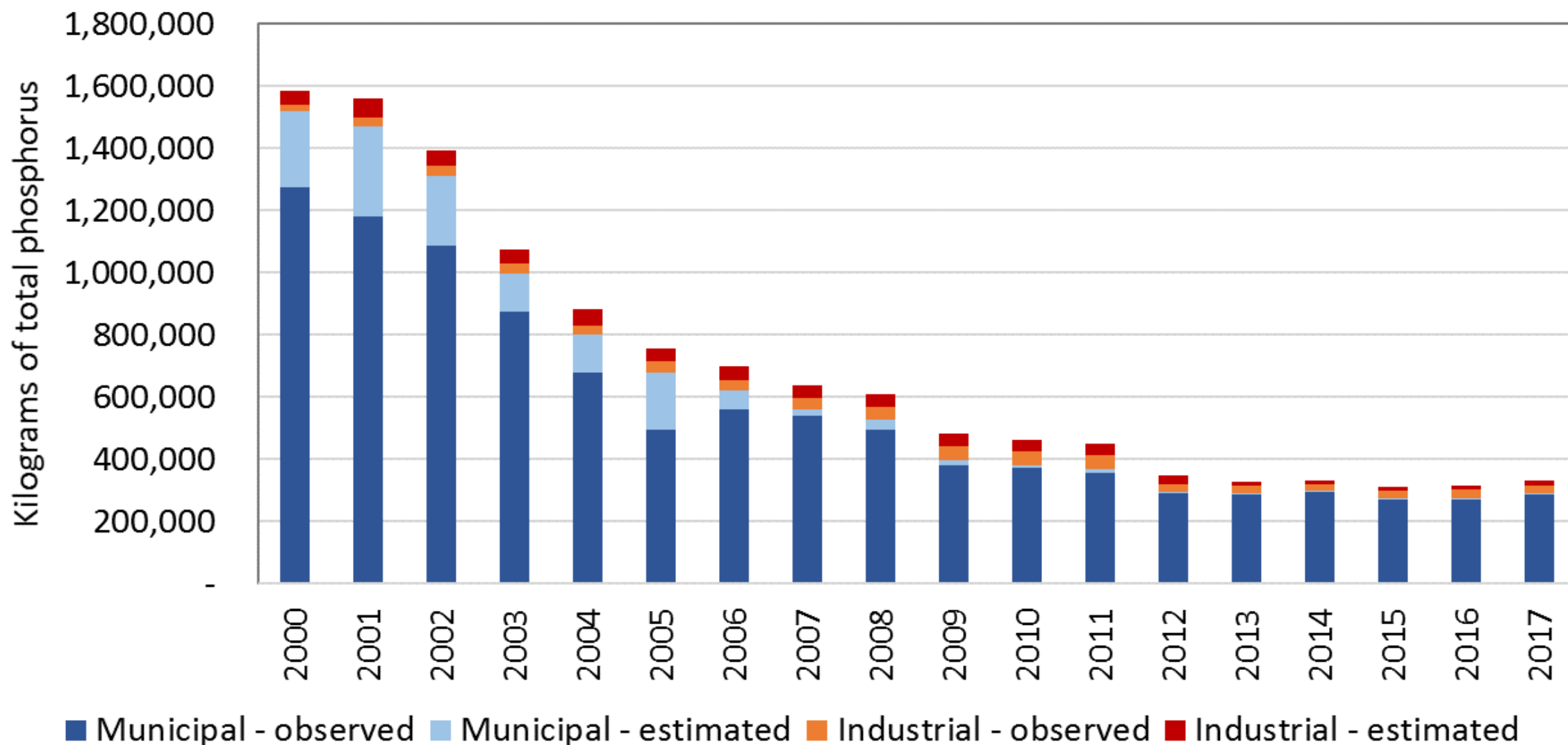
History of Phosphorus Removal

- 1967 - MPCA Established
- 1973 - 1 mg/L limit if discharge directly to or affects a lake
- 2000 - MPCA Phosphorus Strategy
- 2002 - Lake Pepin listed as impaired water
- 2006 - Met Council Metro WWTP permit includes 1 mg/L limit
- 2015 - Procedures for implementing River Eutrophication Standards

Phosphorus Strategy

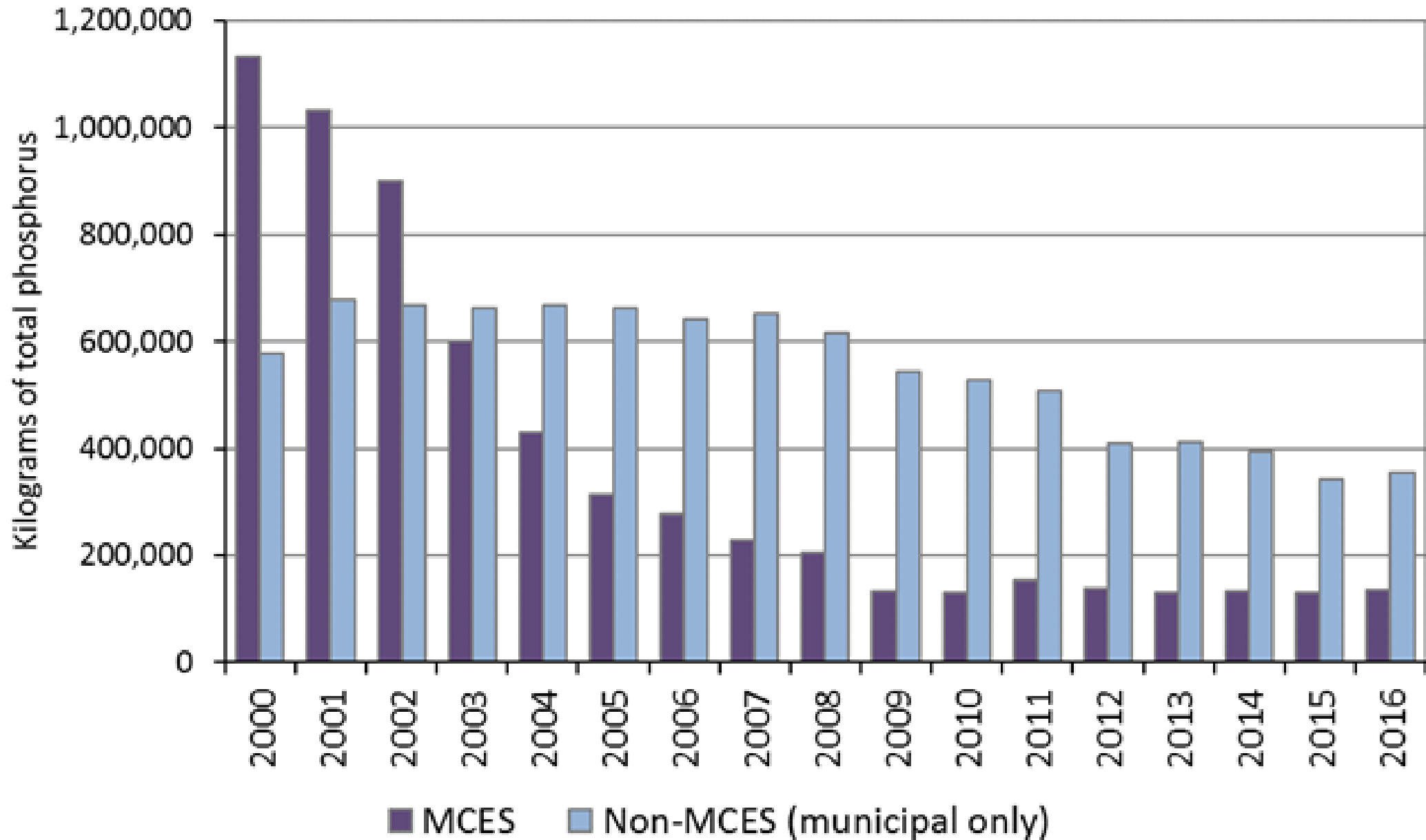
- Early 2000s
- 1 mg/L phosphorus limit if discharge to lake
- If discharge > 1,800 lbs/year, subject to 1 mg/L limit effective at upgrade/expansion
- Phosphorus Management Plans required for facilities with effluent > 4 mg/L
- From 2000-2008, phosphorus discharge in MN was reduced by 900,000 kg/year

Annual NPDES Wastewater Phosphorus Loads in the Lake Pepin Watershed



Metropolitan Council Environmental Services

- 8 wastewater treatment facilities in Minnesota
- Over 600 miles of sewer
- Some sewer up to diameter of 14 feet!
- Largest facility designed to treat about 300 MGD
 - Metro plant with 1 mg/L phosphorus limit in 2006*
- Proactive treatment experimentation for more than 20 years
- Regulatory partner and resource for Minnesota operators



MCES Total Phosphorus Watershed Permit

- Watershed permit idea started during early Lake Pepin TMDL discussions (mid 2000s)
- Creative solution to manage facilities under single owner in same watershed
- Permit issued in 2015
- Limits for 5 facilities contained in single permit
 - 71% reduction in permitted limits upon permit issuance
- Committed to make further nitrogen reductions

Minnesota Nutrient Reduction Strategy

- Document published in September 2014
- Downstream waters include Lake Winnipeg, Gulf of Mexico, and Lake Superior
- Sets major nitrogen and phosphorus reduction goals
- Example: Mississippi River
 - 20% reduction by 2025
 - 45% reduction by 2040



River Eutrophication Standards

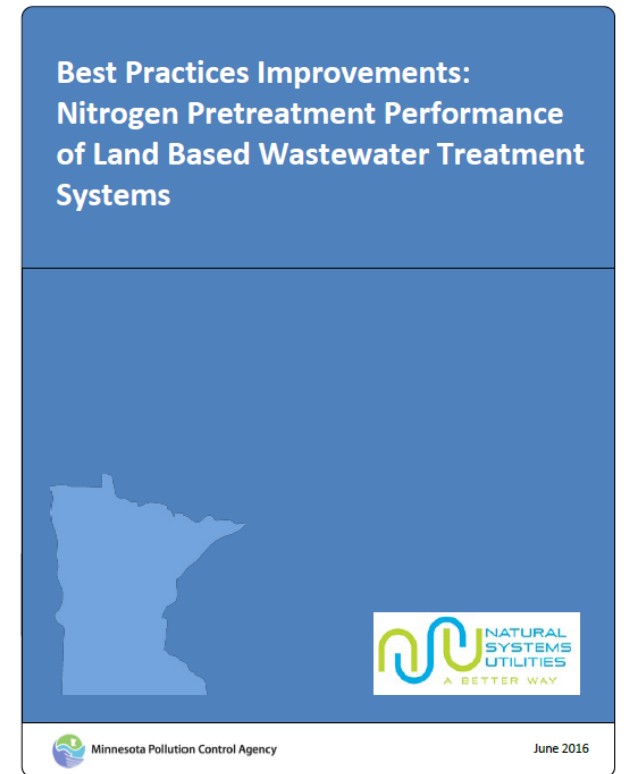
- Minnesota's approach approved by EPA
- Phosphorus is a long term (summer) average pollutant
- Limits expressed as a monthly average (June-September)
- Limits derived from multi-summer long term average wasteload allocation
- Data showed facilities tend to operate at about half of the concentration limit
- Add to permits now. Evaluate wasteload allocation at permit reissuance.
- May lower limits in future if needed to meet wasteload allocation

Nitrogen-Groundwater Concerns

- MN permits over 100 large subsurface sewage treatment systems
- MPCA Nitrogen Policy
 - 10 mg/L total nitrogen prior to subsurface dispersal
 - 10 mg/L total nitrate in groundwater at property boundary
- Many facilities violating limits for nitrogen

Best Practices Improvements

- Contracted with local operational company
- Studied nitrogen treatment performance of 10 facilities
- Report published in June 2016
- Report makes recommendations for operators, design parameters, etc.
- Poor nitrification leads to little/no denitrification
- MPCA also updated monitoring requirements based on feedback from operators



Regulatory Certainty

- Signed into state law in May 2016
- Build biological nutrient removal facility + accept total nitrogen limit (10 mg/L)
- MPCA will not implement more restrictive phosphorus or nitrogen limits for up to 20 years.
- Advantages
 1. Reduce nitrogen discharge now prior to WQ standard
 2. Allow facilities to plan for more “stable” future

Protection of Water Quality Investment

“To the extent allowable under federal law, for a municipality that constructs a publicly owned treatment works to comply with a new or modified effluent limitation, compliance with any new or modified effluent limitation adopted after construction begins that would require additional capital investment is required no sooner than 16 years after the date the facility begins operating.”

- MN typical bond = 20 years, so debt reduced by 80% after 16 years
- Applies to ALL parameters (both nutrients and toxics)
- Protects public investment while incentivizing facilities which have delayed project to act to meet current standards

Facility Optimization

- Legislature appropriated \$700,000
Study nutrient removal optimization at 5 mechanical facilities and 30 ponds
- Minnesota Rural Water Association to hire a pond expert to evaluate statewide ponds
- Minnesota Technical Assistance Program, City of St. Cloud, Metropolitan Council Environmental Services provides operator mentorship and optimization activities
- 2 year pilot project
- Includes asset management training and MnWARN training

Show Me the Money!

- Point Source Implementation Grant program
- Meet TMDL wasteload allocation
- Reduce phosphorus to 1 mg/L or less
- Meet WQBEL
- Total nitrogen of 10 mg/L
- Up to 80% grant (max of \$7 million)



Thank You!

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