

# Proceedings from the 12<sup>th</sup> Annual Nutrient Management Conference



**12th Annual**

**NUTRIENT MANAGEMENT CONFERENCE**

**Tuesday, February 4, 2020**

**VERIZON WIRELESS CENTER MANKATO**

**12th Annual**

**NUTRIENT MANAGEMENT CONFERENCE**

**Sessions 9:00 a.m.-3:25 p.m.**

**■ GENERAL SESSION**

8:30 a.m. *Registration*

9:00 a.m. *Welcome*  
Tom Rothman University of Minnesota

9:05 a.m. *Lessons Learned in 2019, Opportunities for 2020*  
Liz Stahl University of Minnesota  
Brad Carlson University of Minnesota

9:55 a.m. *Importance of Urban and Non-Urban Nutrient Reductions*  
Katrina Kessler Minnesota Pollution Control Agency

10:30 a.m. *Break*

10:45 a.m. *Farmers Working To Reduce Nutrient Losses*  
Brian Ryberg, Brian Biegler, Dan Coffman

11:45 *Lunch*

**■ BREAKOUT SESSION #1 - NUTRIENT REDUCTION STRATEGY TRACK**

12:45 p.m. *Minnesota's Nutrient Reduction Strategy- Progress Toward Milestone Goals*  
Glenn Skuta Minnesota Pollution Control Agency

1:25 p.m. *Urban Efforts to Reduce Nutrient Pollution*  
Katrina Kessler Minnesota Pollution Control Agency

2:05 p.m. *Potential for Cover Crops to Improve Nutrient Use Efficiency*  
Axel Garcia y Garcia University of Minnesota

2:45 p.m. *Tile Drainage, Cover Crops and Nitrogen Interactions*  
Jeffrey Vetsch University of Minnesota

**■ BREAKOUT SESSION #2 RESEARCH TRACK**

12:45 p.m. *Looking at Soil Health Tests*  
Anna Cates, Liz Stahl University of Minnesota

1:25 p.m. *Evaluating Biologicals*  
Dan Kaiser University of Minnesota

2:05 p.m. *Updating MN's P Index*  
Lindsay Pease University of Minnesota

2:45 p.m. *Liquid Swine Manure - A Viable Nutrient Source for Sidedressing Corn?*  
Melissa Wilson University of Minnesota

3:25 p.m. *Adjourn*

Thank you to all of our Supporters!

**mn DEPARTMENT OF AGRICULTURE**

**AFREC**  
Minnesota's Agricultural Fertilizer Research & Education Council

**CLEAN WATER LAND & LEGACY AMENDMENT**

**MVTL**

**Nutrien Ag Solutions™**

**N-Serve Instinct**  
NITROGEN STABILIZER NITROGEN STABILIZER

**SMBSC**

**AGRI-GROWTH**  
Growing MN Food & Agriculture™

**MAWRC**  
MINNESOTA AGRICULTURAL WATER RESOURCE CENTER

**MinnesotaCorn GROWERS ASSOCIATION**

**Mosaic**

**KOCH**  
KOCH AGRONOMIC SERVICES, LLC

**syngenta**

**UNIVERSITY OF MINNESOTA EXTENSION**

Do not reproduce or redistribute without written consent of the author(s)





# Urban Efforts to Reduce Nutrient Pollution

Dana Vanderbosch | Director, Municipal Division

February 4, 2020

## **Main focus: Reducing urban regulated sources of nutrients**

Overview of phosphorus and nitrogen sources to rivers

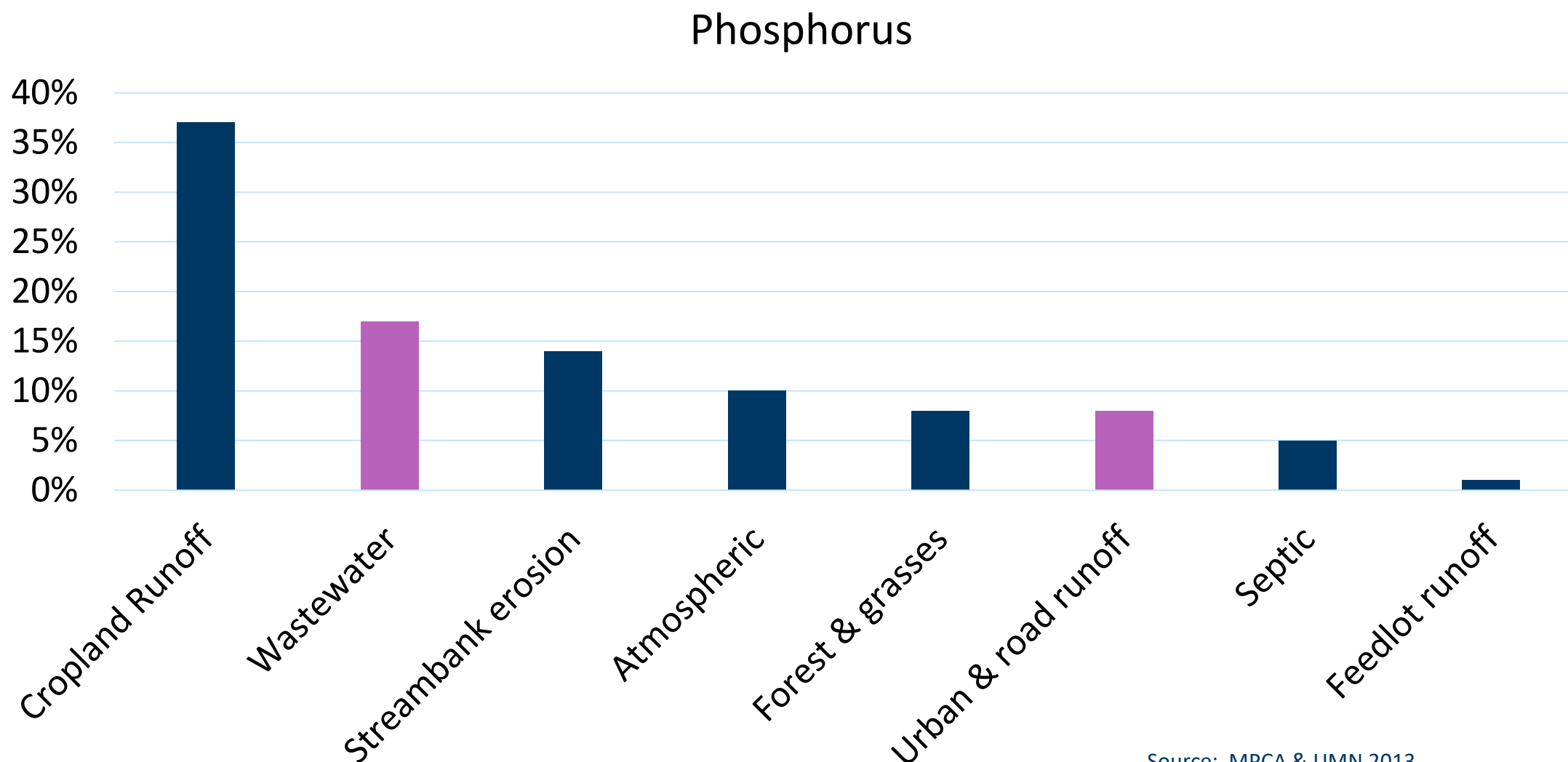
Reducing nutrients through wastewater treatment

Reducing nutrients through stormwater controls

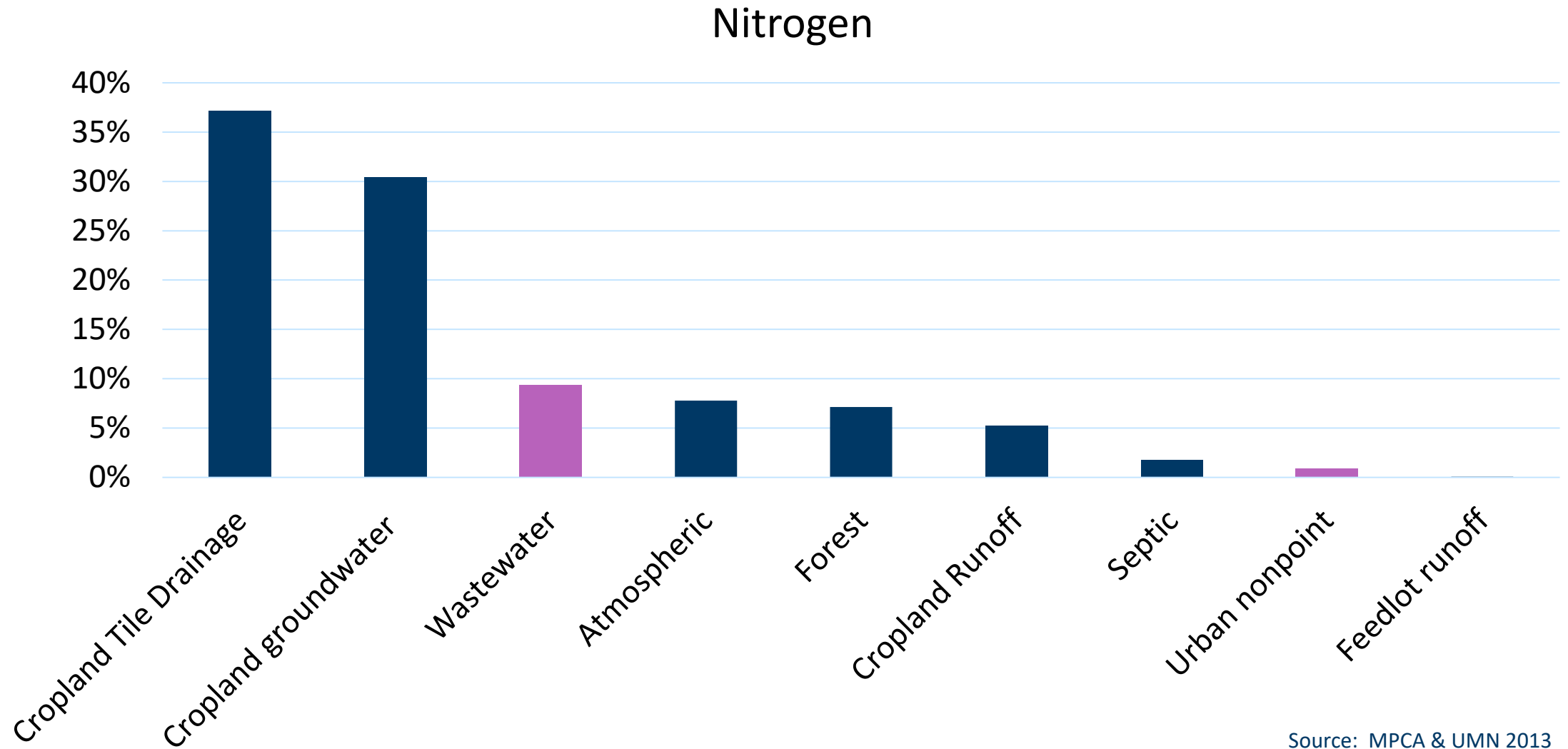
Future focus

Questions?

# Phosphorus sources to rivers statewide



# Nitrogen sources to rivers statewide



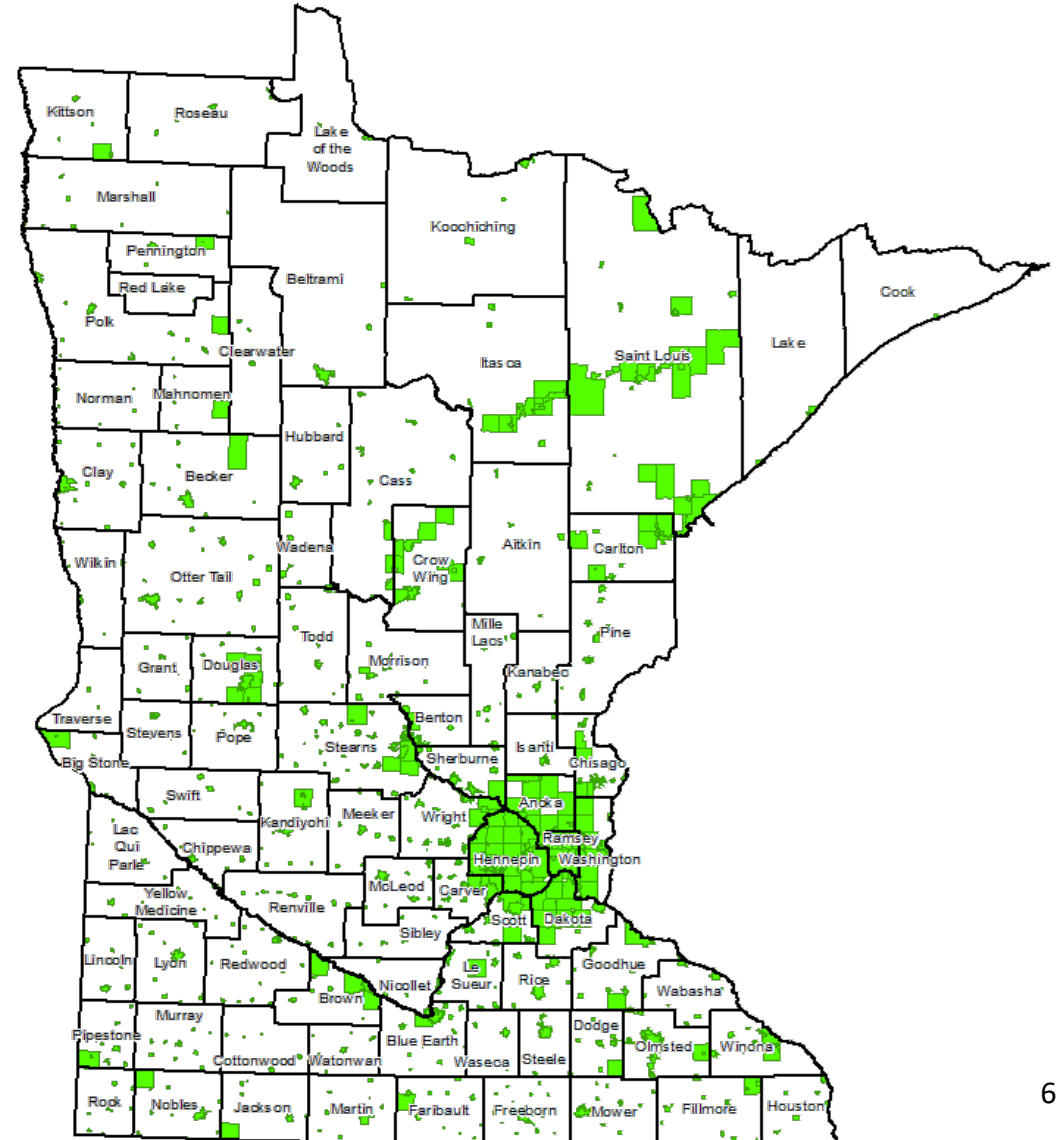




# Wastewater

# Facilities with wastewater discharge permits

- 729 permitted wastewater treatment facilities
  - Mix of public, private and tribal WWTFs
  - 80% Minnesotans connected
- 688 permitted industrial discharges
  - Power generation, mining, food processing, manufacturing, water supply, petroleum refining, biofuels, transportation





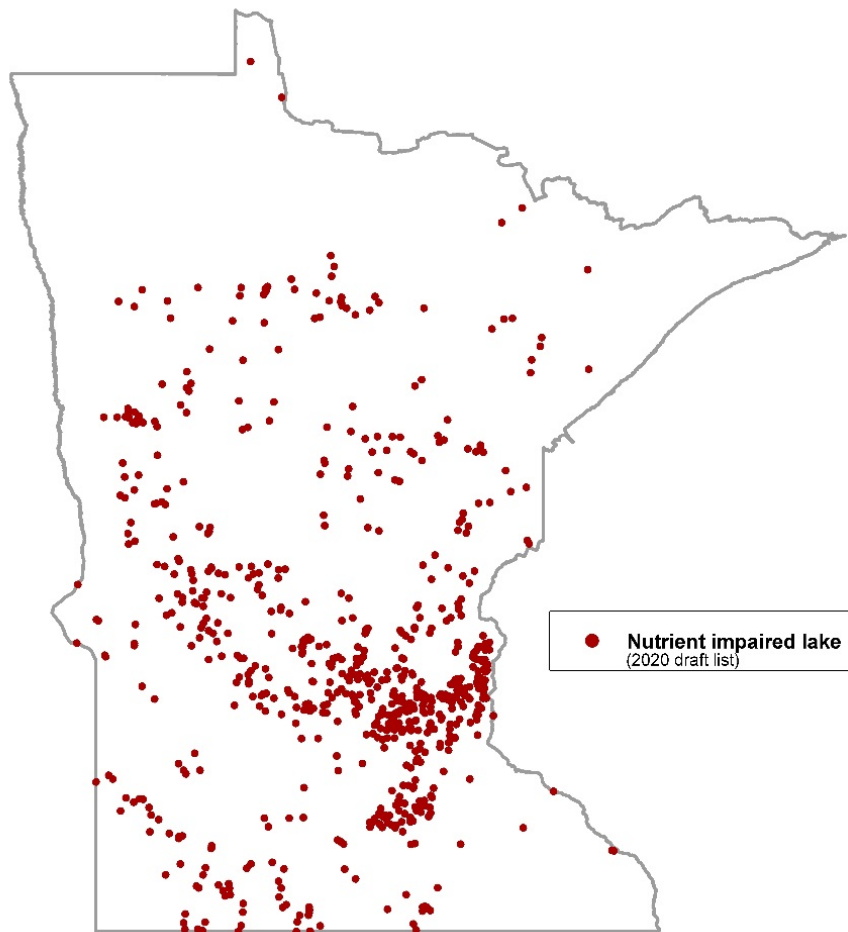
# Wastewater treatment



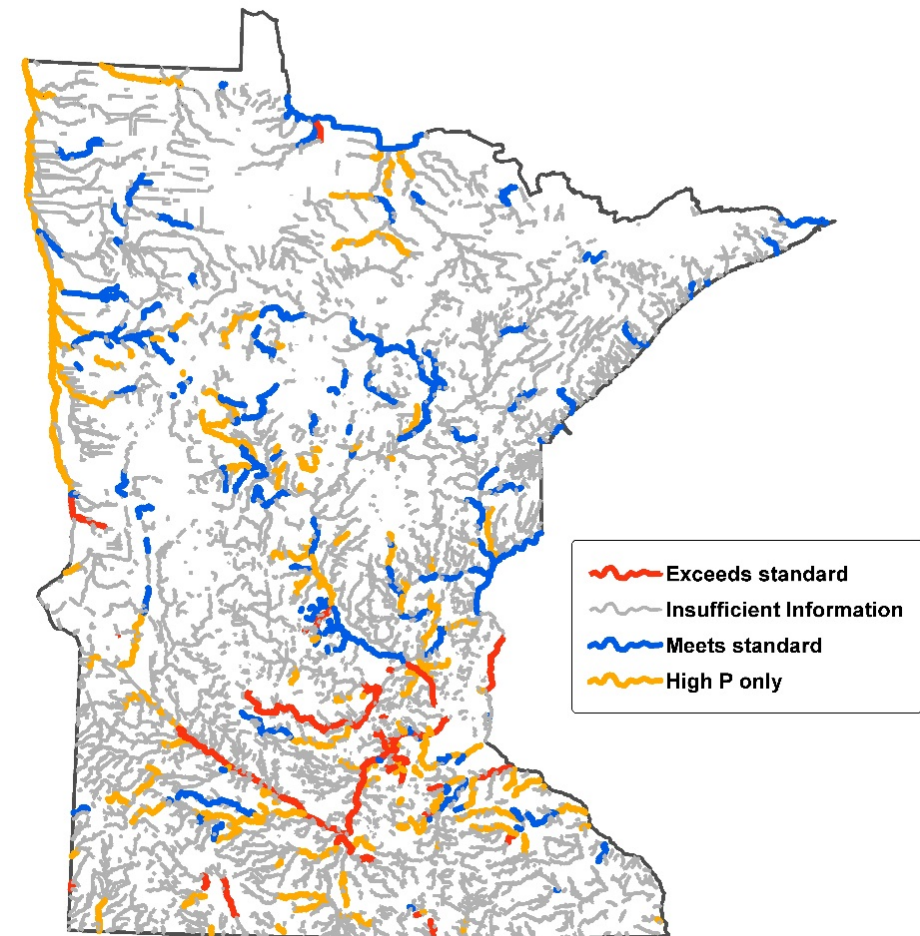


# Lake and stream impairments from phosphorus

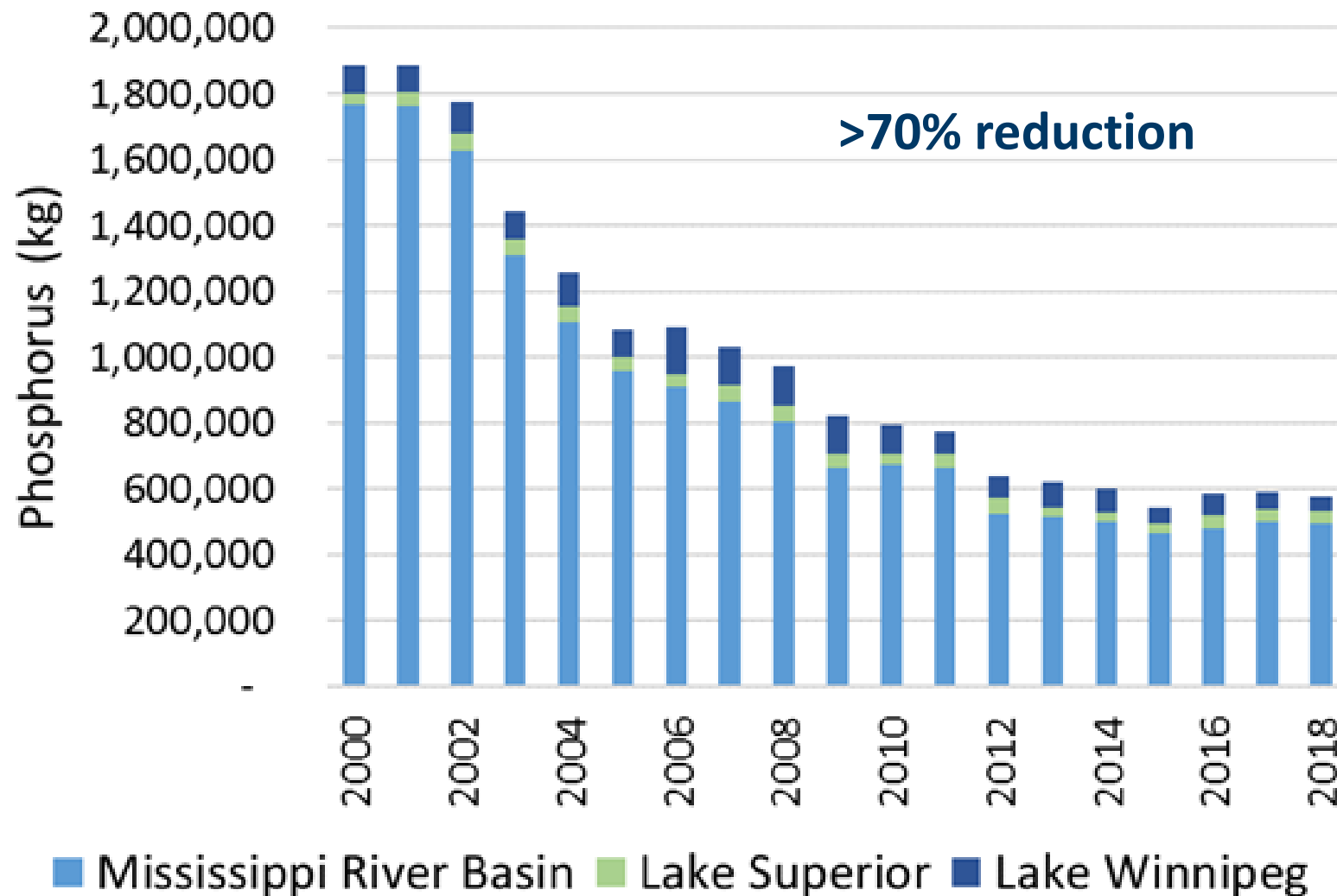
**693** lakes impaired



**814** river miles impaired



# Phosphorus reductions from WWTFs





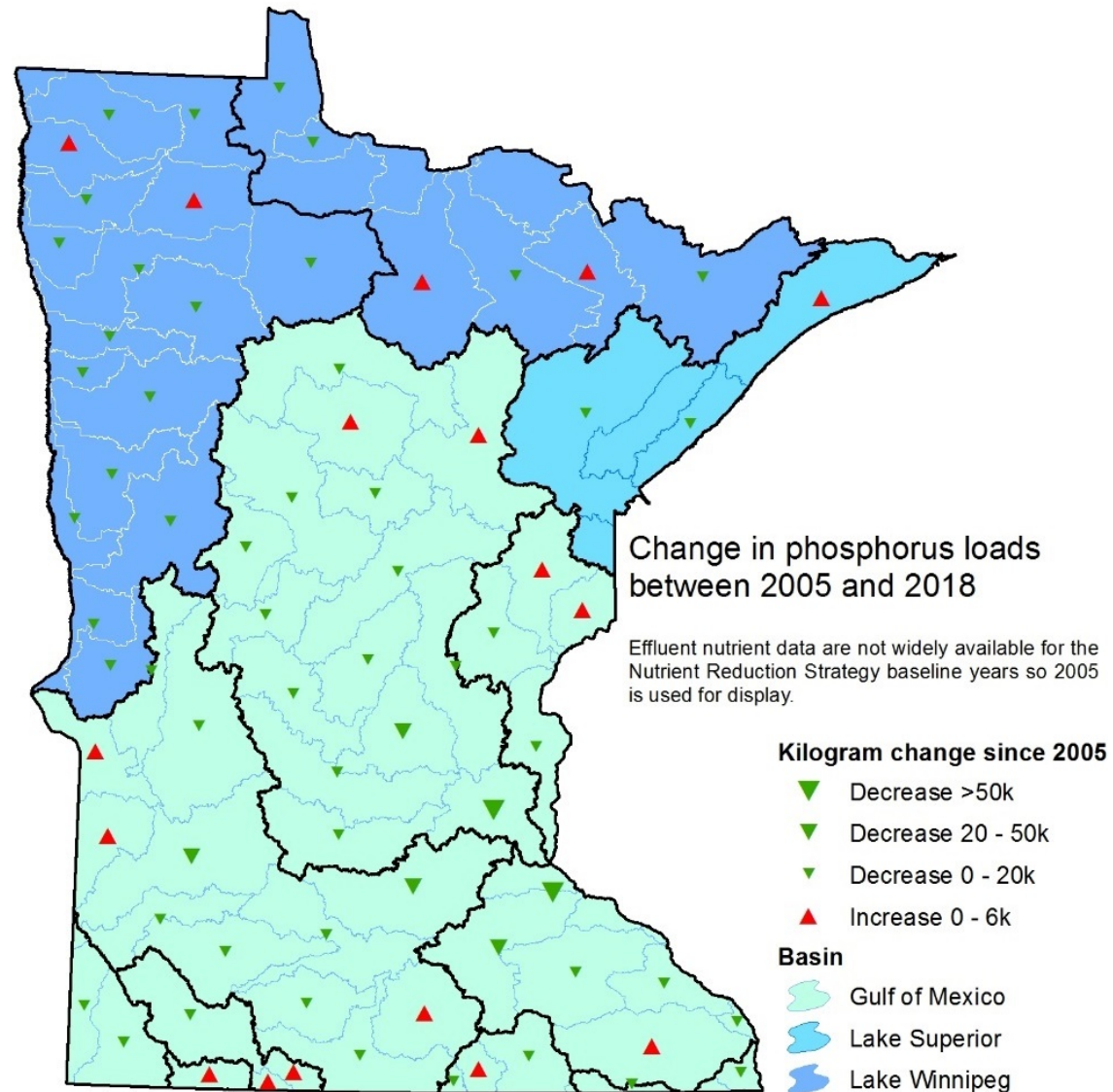
# The largest WWTF



- Treats ~200 million gallons per day
- Serves 2 million users



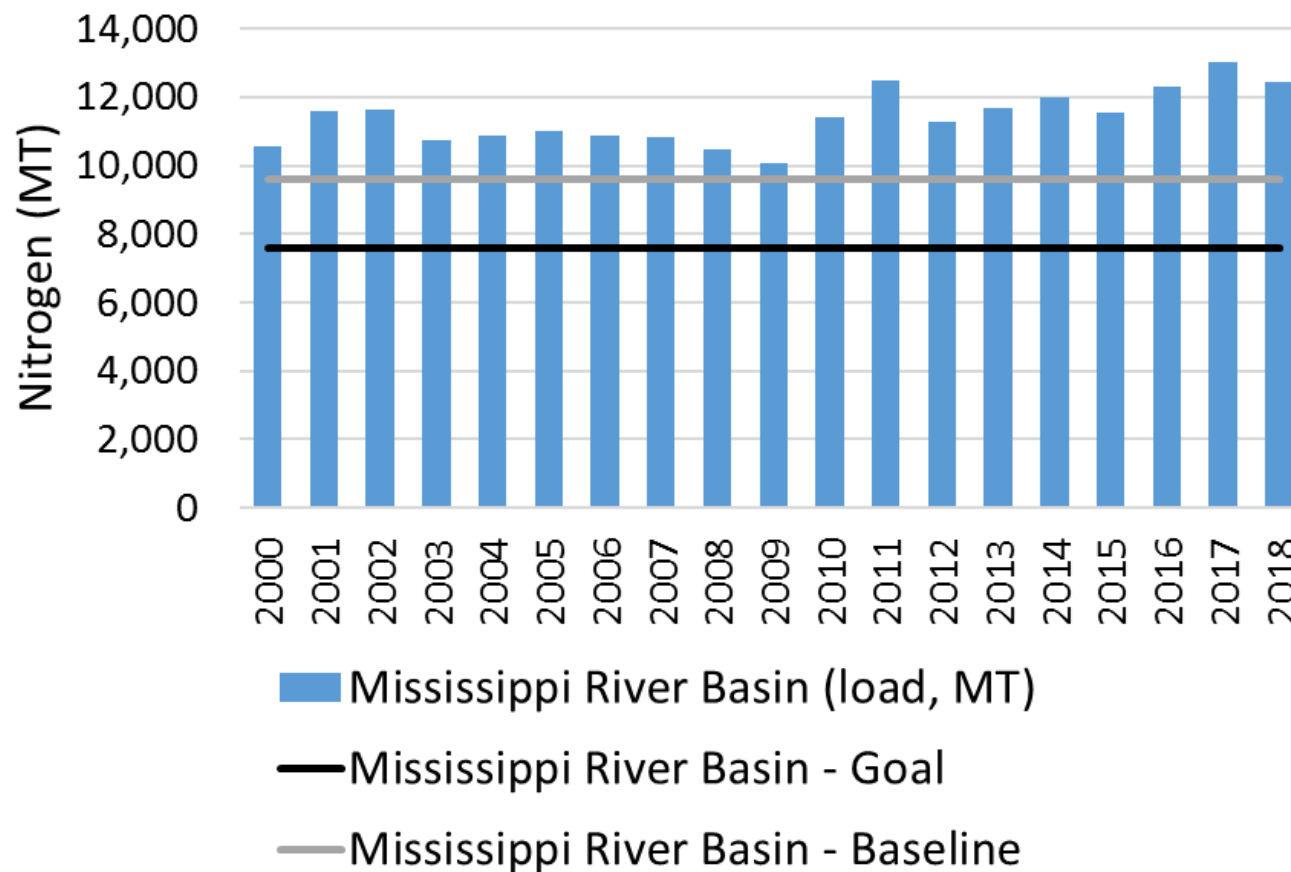
# Phosphorus loading in major watersheds





# WWTF Progress on N Goal

## 2014 Nutrient Reduction Strategy establishes nitrogen reduction goals



**2% increase statewide  
from point sources**

# Nitrogen reductions needed from WWTFs

## Nitrogen monitoring requirements

- Every permit has monitoring requirements
- Pond effluent low in nitrate
- Need additional denitrification

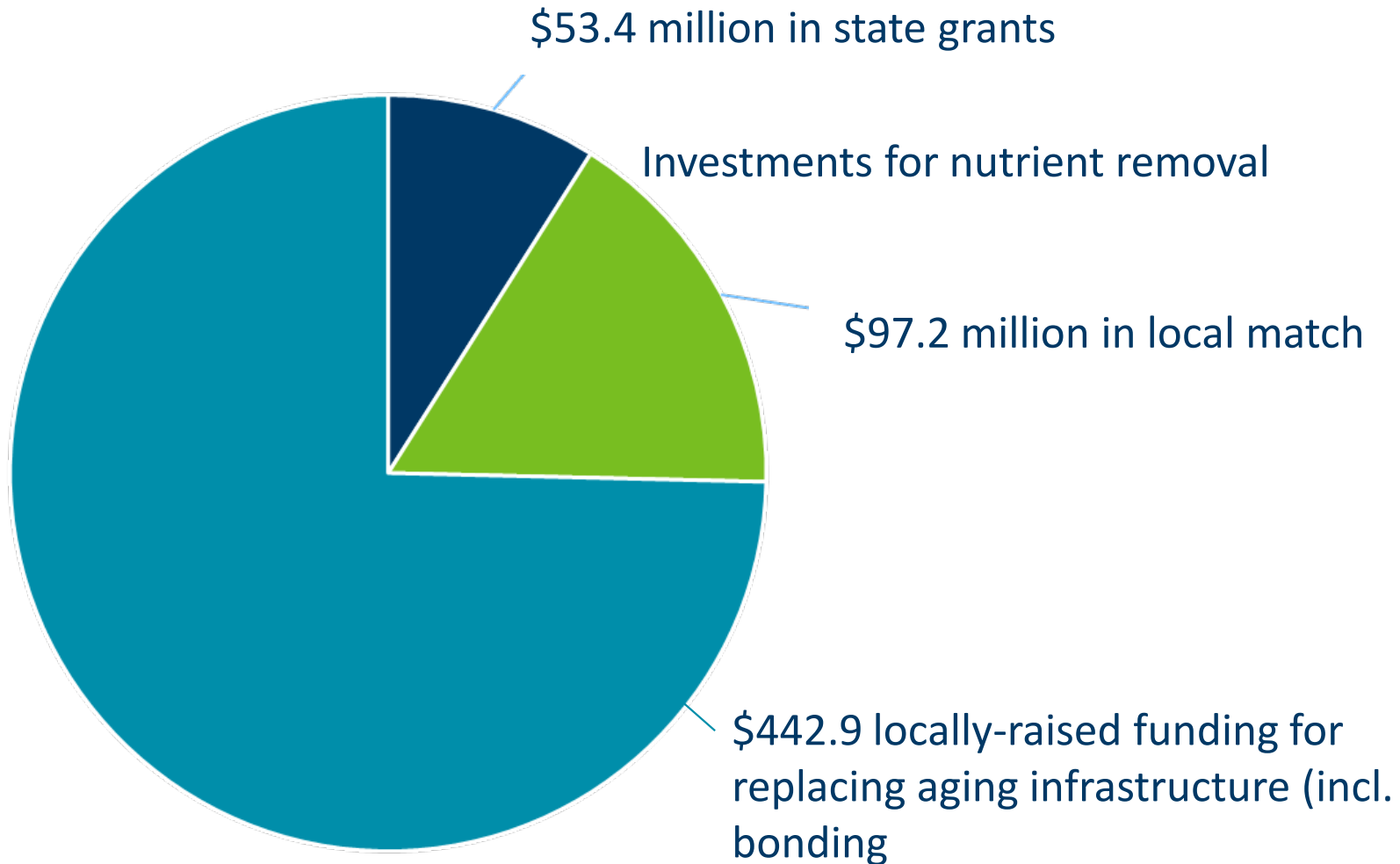
## Wastewater nitrogen reduction strategies in development

- Modified WWTFs can add N treatment voluntarily
- Optimize operations for additional denitrification





# Investments in removing nutrients from wastewater



- 2007-2019: \$593.5 million in phosphorus and nitrogen removal investments
- Next 20 years: \$4.12 **billion** in wastewater infrastructure needs



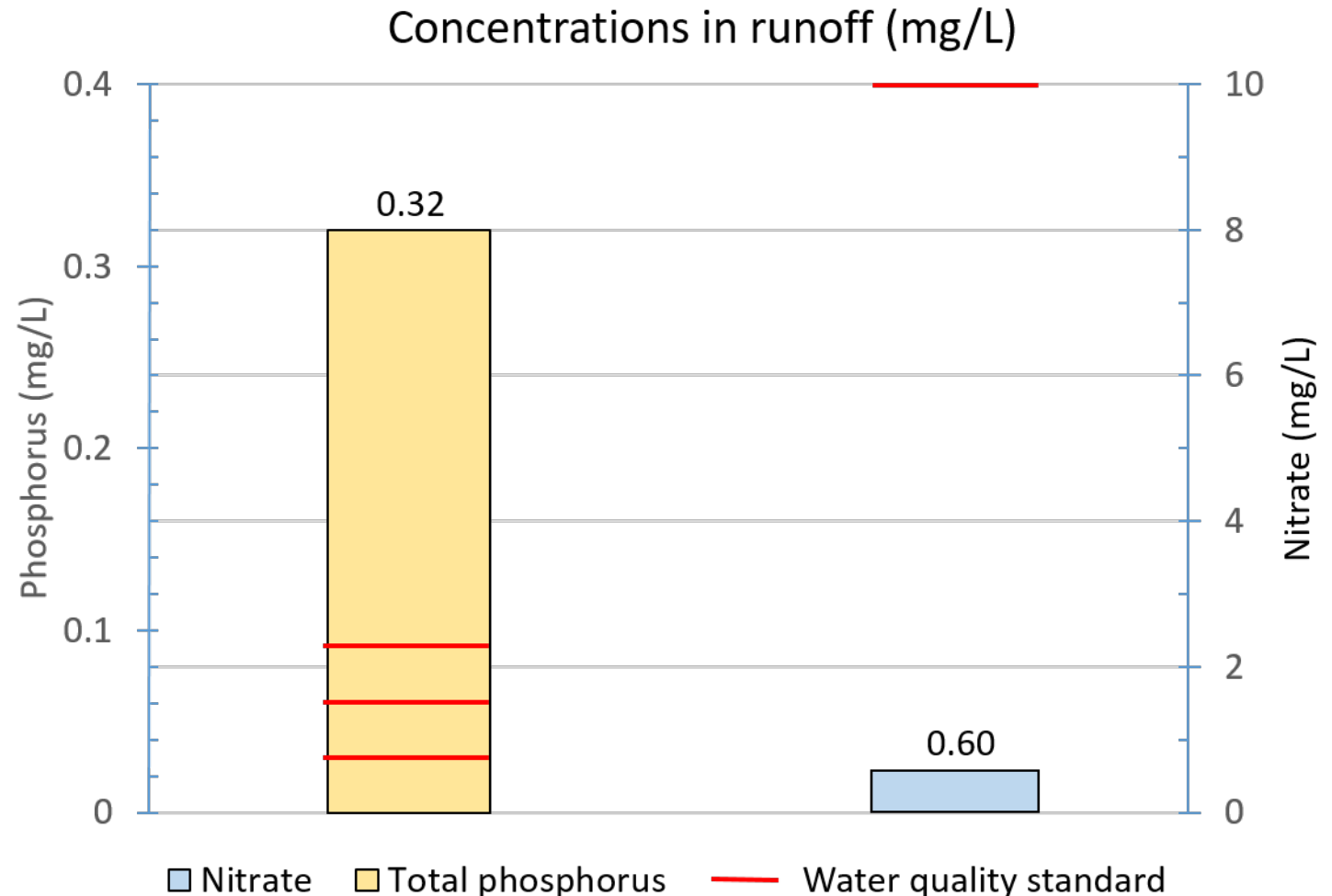
## Stormwater



# Sources of nutrients in stormwater

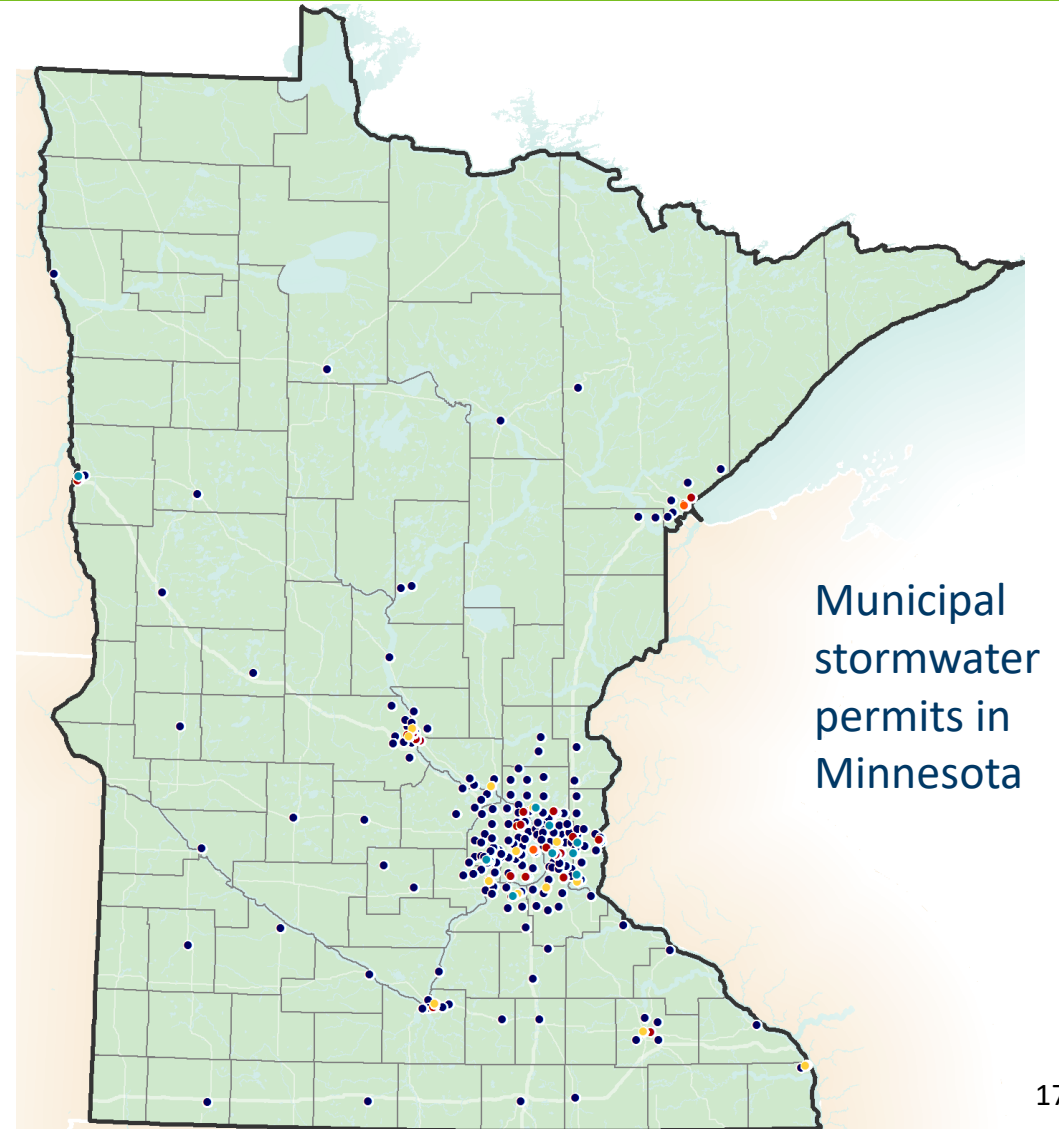
## Primary sources of P & N

- Leaves and grass (80% P input)
- Soil particles
- Animal waste, including pets
- Atmospheric deposition
- Road salt



# Stormwater permitting

- Municipal: 251
- Construction: 2,000-2,500/yr
- Industrial: ~4,000
- Not all cities permitted



# Tools for controlling nutrients: structural practices

- Constructed basins and wetlands
- Infiltration practices
- Filtration practices
- Swales and strips





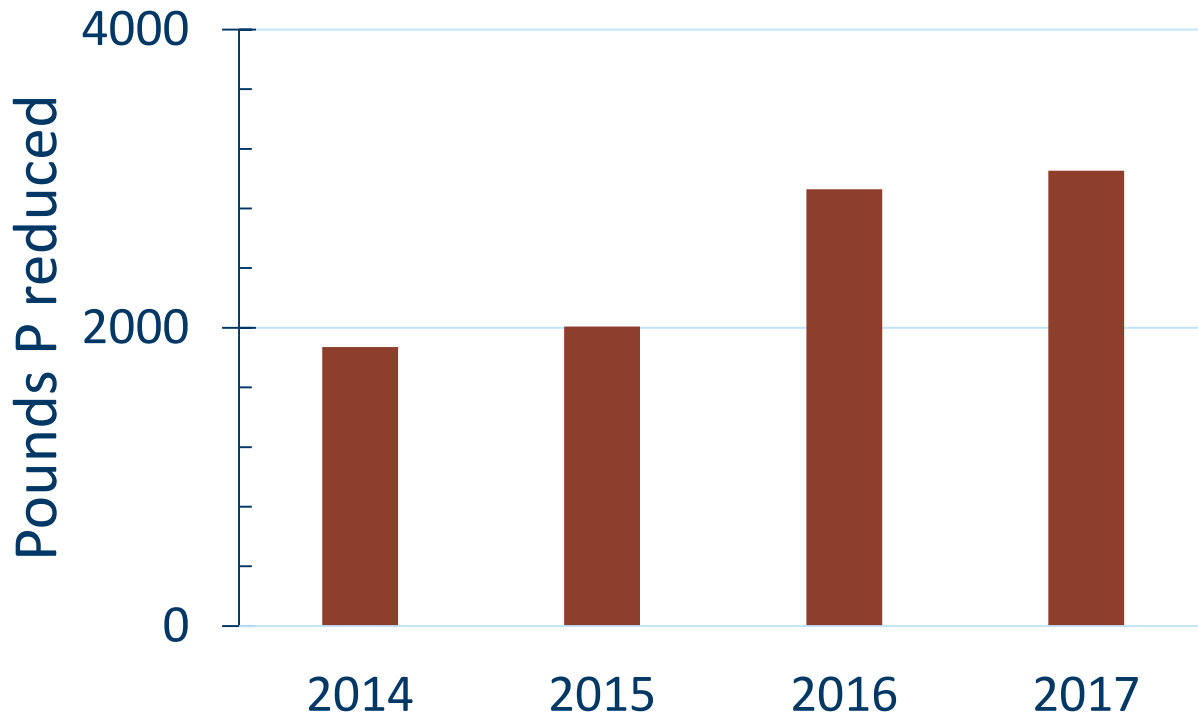
# Tools for controlling nutrients: non-structural practices

- Street sweeping
- Sumps
- Rain barrels
- Road salt management
- Education

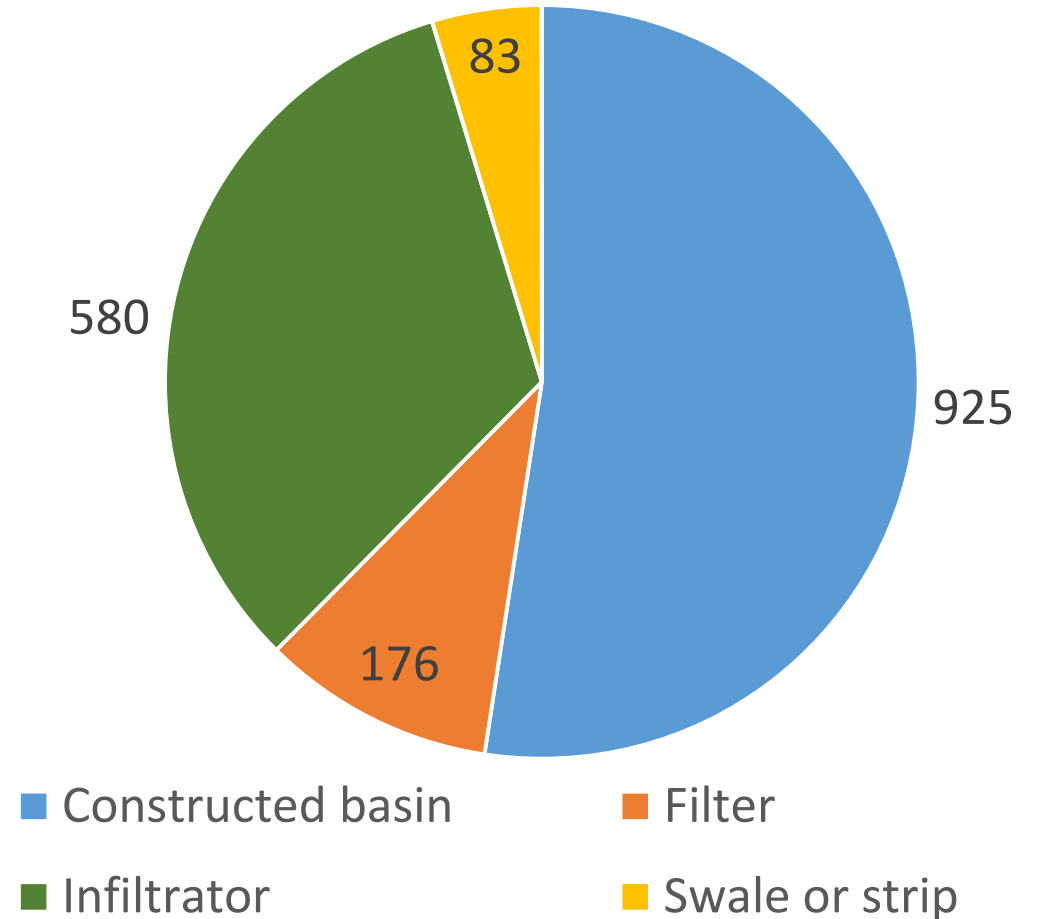


# Protecting degraded waters from stormwater runoff

## Structural BMPs

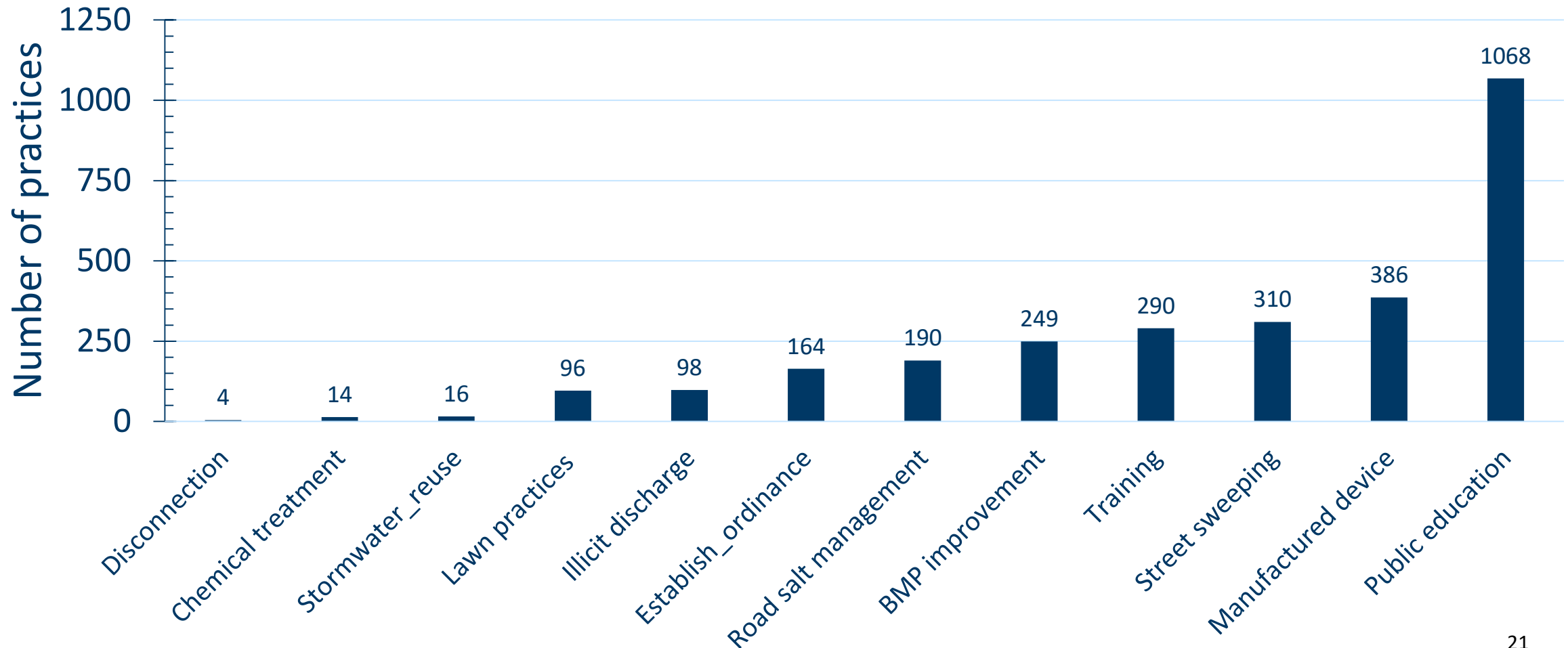


1,764 installations total



# Protecting degraded waters from stormwater runoff

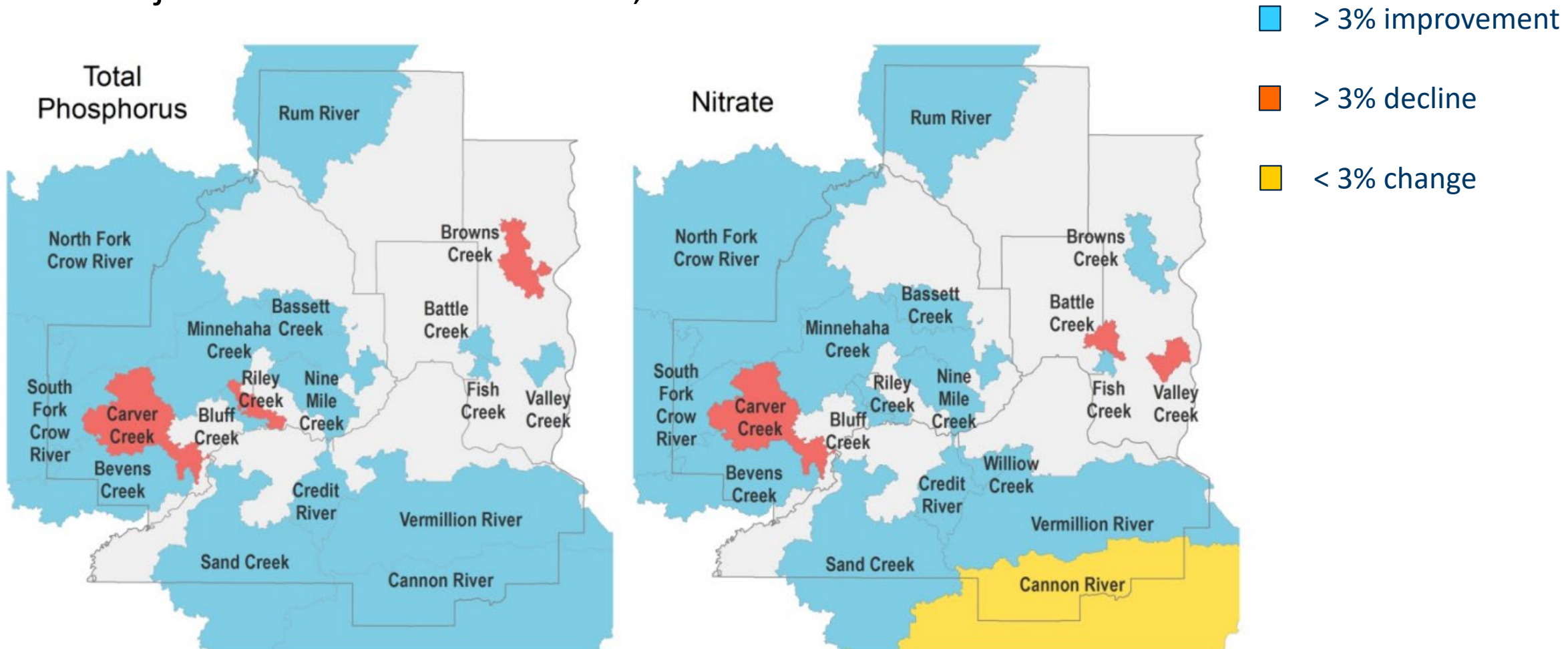
## Non-structural BMPs 2013-17





# Seeing improvement in stormwater discharges

## Flow-adjusted concentration trends, 2008-12



# Phosphorus trends in major rivers in Twin Cities

- Flow-adjusted total phosphorus trends 1976-2015
- Met Council study shows decreases in phosphorus in Mississippi, Minnesota and St. Croix Rivers in Twin Cities metro area
- Reflects success of both urban and upstream ag practices

 Trend Shape  Decrease  Increase  
*With overall percent change*

# Concluding thoughts, future focus

## Focus moving forward

- Continue to incorporate phosphorus limits in WWTF permits, where applicable
- Develop urban-ag partnerships
- Develop Nitrogen Management Plan
- Greater accountability for stormwater to impaired waters
- Requirement to install stormwater controls when redeveloping



# Questions?



## Septic systems



# Septic systems and nutrients

