

Minnesota's Nutrient Reduction Strategy



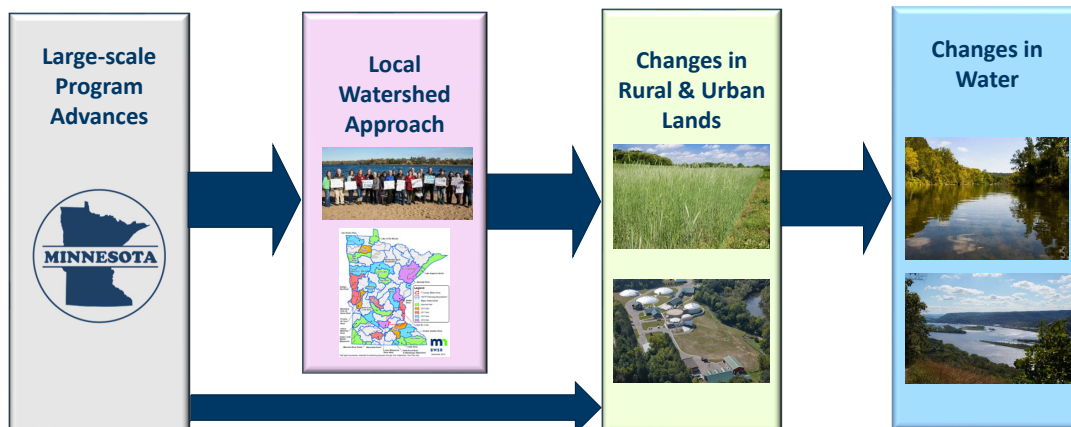
Tracking Progress in the Mississippi Headwaters State

m MINNESOTA POLLUTION
CONTROL AGENCY

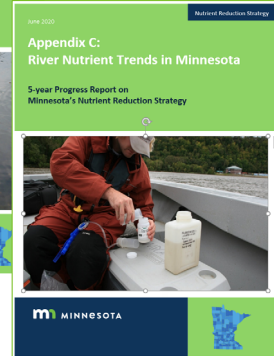
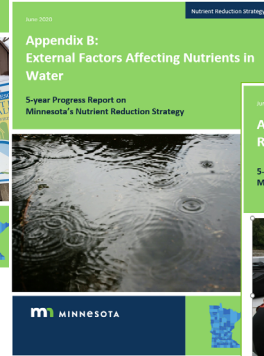
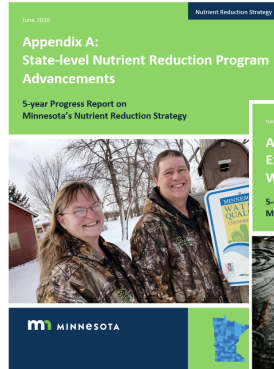
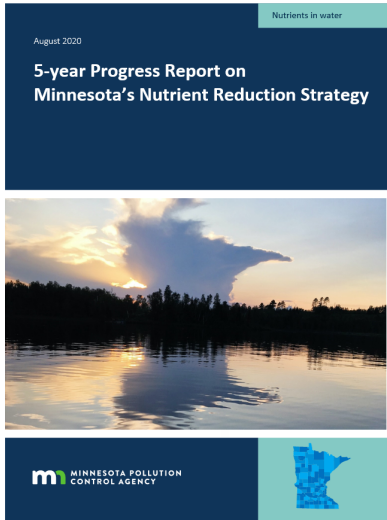
Photo by Karla Lundstrom

Katrina Kessler | MPCA Assistant Commissioner

Strategy implementation to reduce nutrients in water

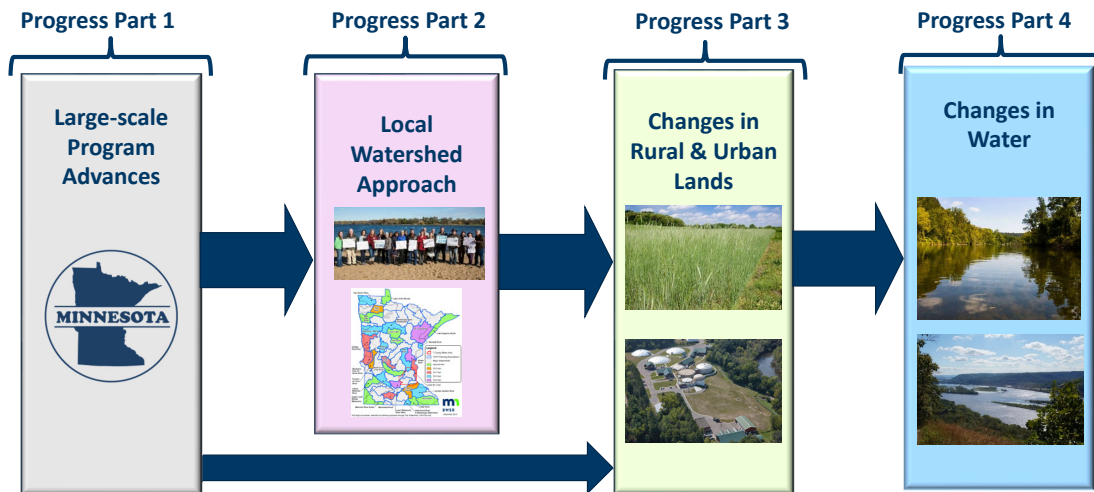


Nutrient Reduction Strategy 5-year Progress Report

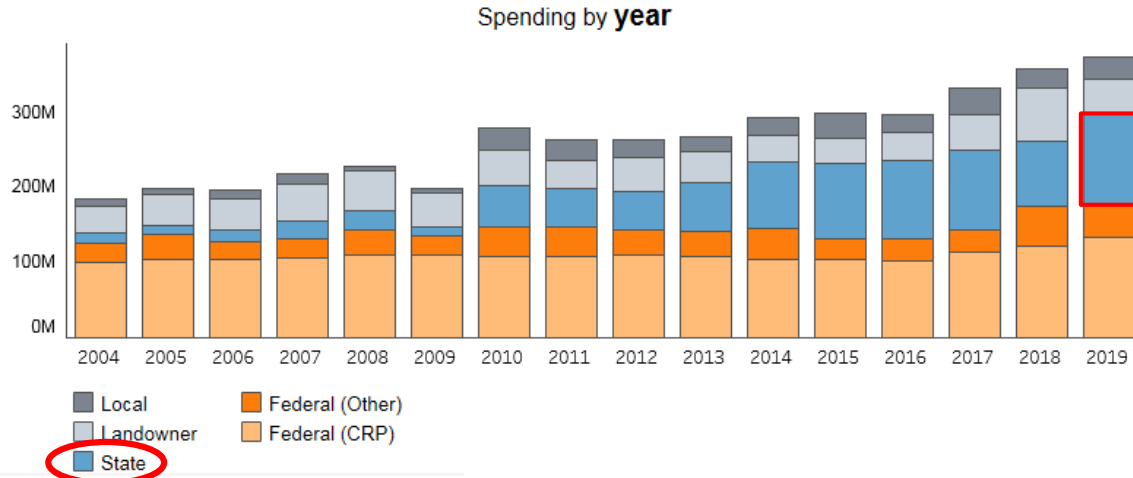


<https://www.pca.state.mn.us/water/nutrient-reduction-strategy>

Presentation Outline



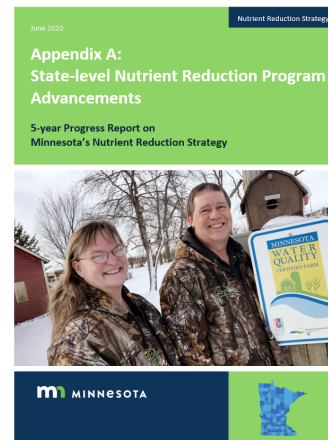
Minnesota Clean Water Fund – boosted state BMP \$\$\$



More than 30 program advances since 2014

Education, Outreach and Research	Voluntary Programs	Regulatory Programs	Watershed Partnerships and Tools
<ul style="list-style-type: none"> Nitrogen Smart training for farmers and farm-advisors Annual nutrient management and conservation tillage conferences Forever Green Initiative Discovery Farms Minnesota Office of Soil Health Guidance manuals for agricultural best management practices, drainage, urban stormwater management Conservation professionals training and certification Nutrient Management Initiative Center for Changing Landscapes 	<ul style="list-style-type: none"> Minnesota Agricultural Water Quality Certification 4R Certification led by private industry (cropland nutrient management) Red River Basin Initiative and Red River Valley Drainage Water Management Minnesota Conservation Reserve Enhancement Program Board of Water and Soil Resources Cover Crop Demonstration Program Clean Water Fund – increases for BMP implementation Point – nonpoint trading Reinvest in Minnesota Multi-purpose drainage water management 	<ul style="list-style-type: none"> Municipal and Industrial Wastewater Program Groundwater Protection Rule (Nitrogen Fertilizer) Minnesota Riparian Buffer Law Feedlot and land application of manure rules and program Urban Stormwater Runoff Program Subsurface Sewage Treatment Program 	<ul style="list-style-type: none"> Watershed Restoration and Protection Strategies (WRAPS) in over 50 HUC-8 watersheds One Watershed, One Plan (1W1P) Program Groundwater Restoration and Protection Strategies Watershed Conservation Planning Initiative Small focus watersheds – Federal Section 319 Program (20 watersheds) Guidance on Lake Protection for WRAPS and 1W1P National Water Quality Initiative and Mississippi River Basin Healthy Watershed Initiative Watershed-based Funding Implementation Program Root River Field to Stream Partnership

All 30+ programs described in:



<https://www.pca.state.mn.us/water/nutrient-reduction-strategy>



Minnesota Agricultural Water Quality Certification



Photo from MDA

Voluntary Partnership:

- Producers
- Government agencies
- Private sector

WQ certified farmers get:

- 10 yrs of regulatory certainty
- Priority \$ for new practices
- Community recognition

Growth since 2015:

- 900+ farms
- 600,000+ acres
- 1800+ new practices
- 46,000+ lbs P reduced

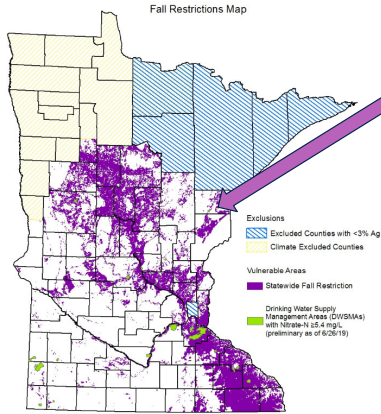
Forever Green Program



- Developing new cropping systems for continuous living cover
 - plant breeding
 - agronomic systems
 - food science
 - economics
- Supply Chain Development
- Market Development



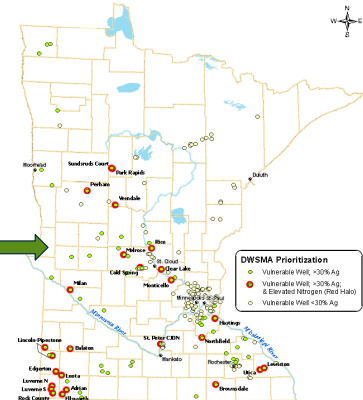
MN Groundwater Protection Rule Nitrogen fertilizer restrictions adopted in 2019



2.6 million acres

Fall N fertilizer restrictions in vulnerable areas

BMPs can phase from voluntary to regulatory in drinking water supply management areas, depending on nitrate levels/trends & BMP adoption rates



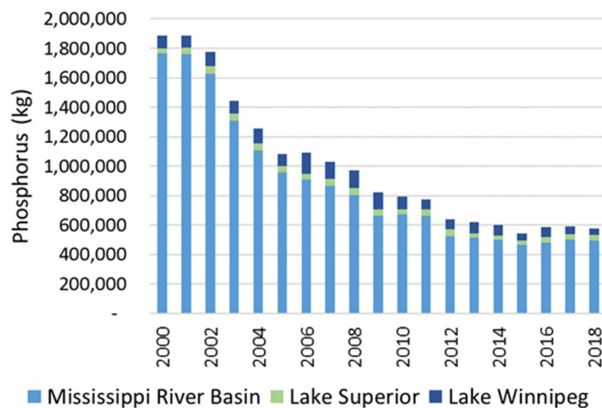
<100,000 acres

<https://www.mda.state.mn.us/nfr>



Wastewater Permitting Program - Phosphorus

P

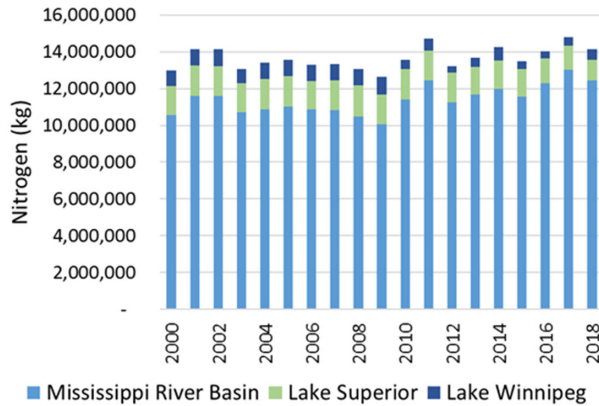


Over 70% reduction from:

- **2000** - 1 mg/L effluent performance standard for new/expanded plants
- **2008** - Lake Eutrophication Standards & wastewater rules
- **2014** - River Eutrophication Standards
- **2014** - Nutrient Reduction Strategy

Wastewater Permitting Program – Nitrogen (N)

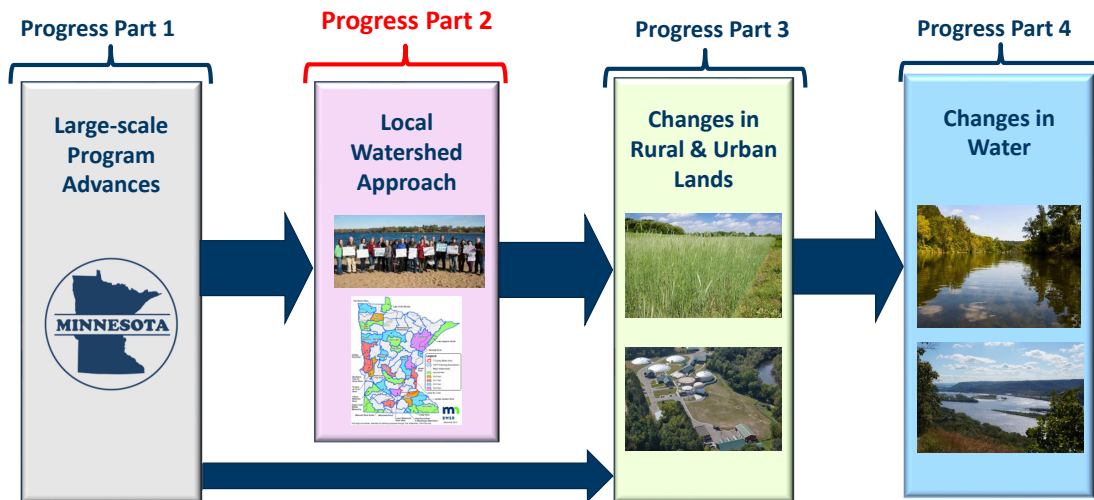
N



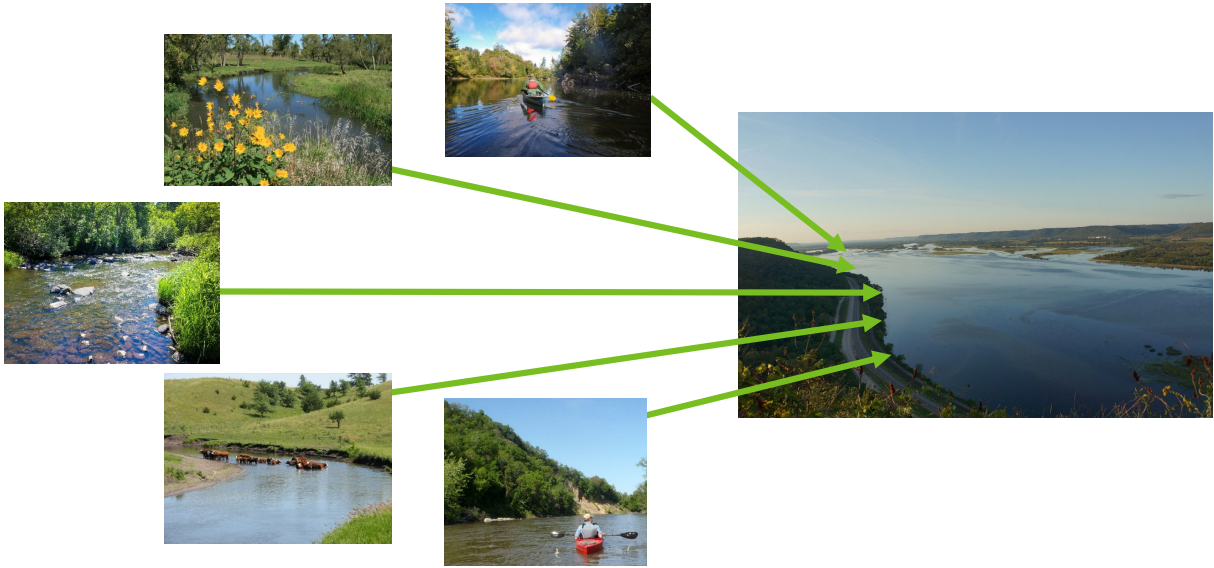
Wastewater N strategy - steps:

1. Monitor influent & effluent nitrogen
2. Evaluate N reduction optimization
3. Develop N management plan templates
4. Encourage voluntary N removal when upgrading facility
5. Establish N effluent limits – after nitrate water quality standards developed
6. Develop point/nonpoint trading options

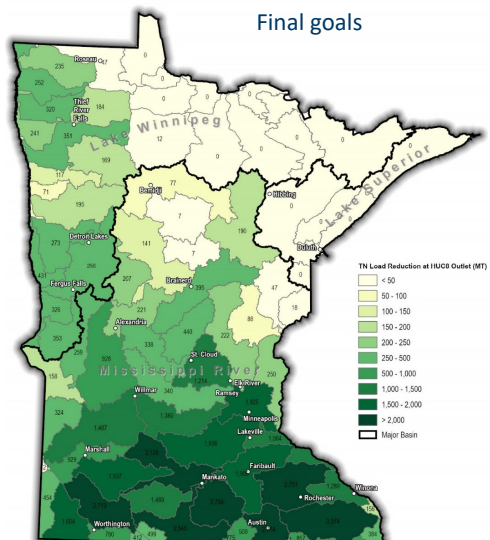
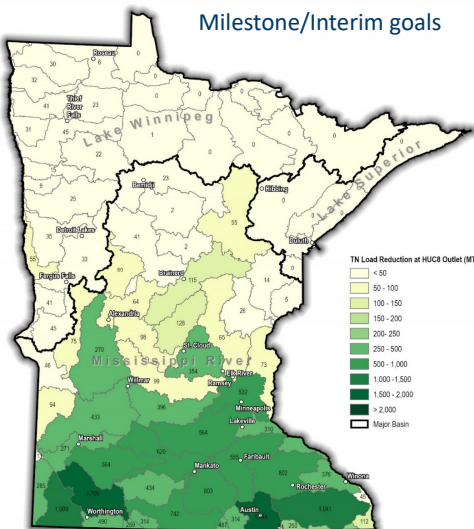
Presentation Outline: Progress with our watershed approach



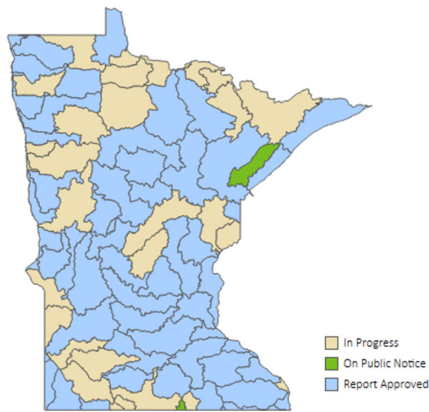
Minnesota's watershed approach aims to meet local & downstream needs



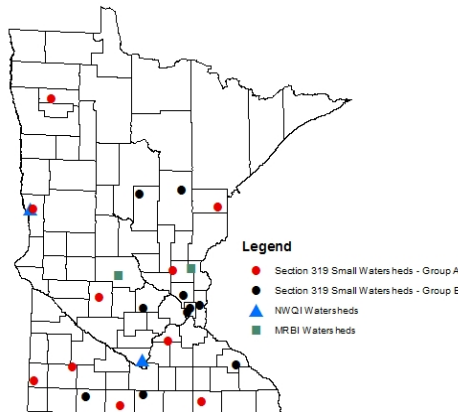
Watershed load reduction targets – to collectively achieve downstream load reduction goals



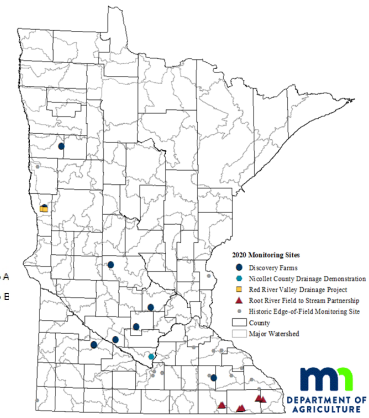
Minnesota's watershed approach works at multiple scales



Watershed science informing local planning across the entire state



Smaller-scale focus watersheds



Farm and field-scale implementation & monitoring

New private-public collaborative watershed partnerships developing

Cannon River Agricultural Collaborative



Headwaters Agricultural Sustainability Partnership (central Minnesota)

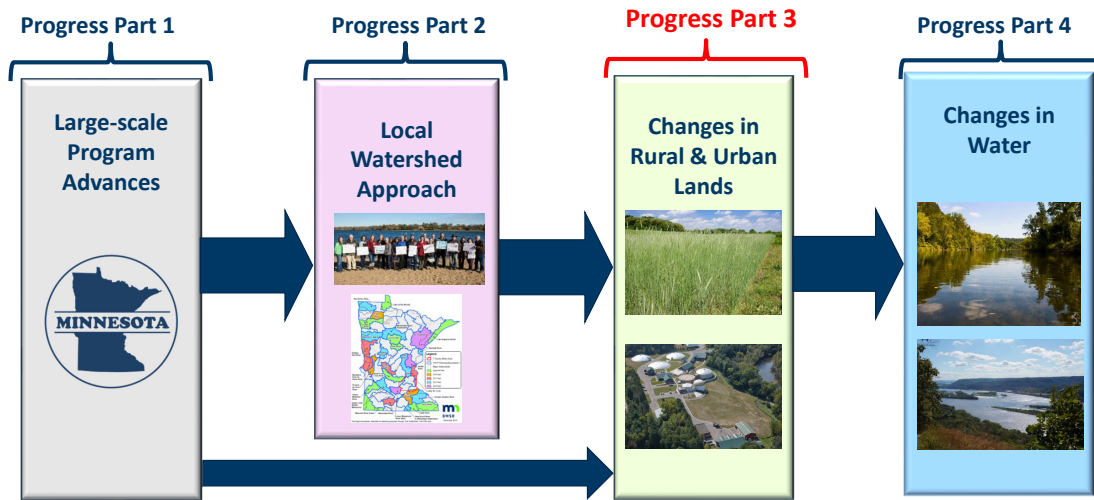


Cedar River Watershed Partnership



	Central Farm Service		MN Dept. of Agric. MAWQCP
	Hormel Foods		Mower County SWCD
	Land O'Lakes SUSTAIN		Environmental Initiative

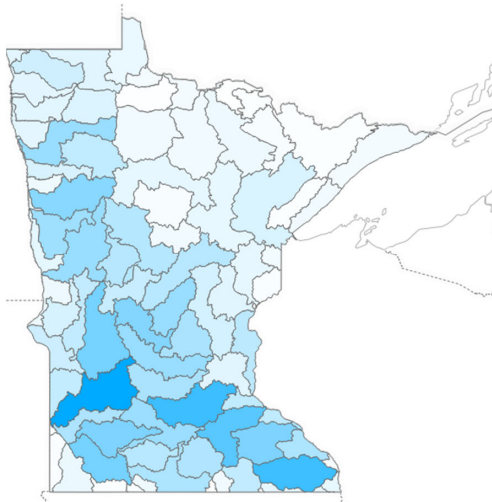
Presentation Outline: progress with BMP adoption



New on-line BMP tracking System at multiple scales subwatersheds to statewide

BMPs adopted through Gov't Programs

- **NRCS** - federal EQIP, CSP, RCPP
- **BWSR** - eLINK tracks state cost-shared BMPs
- **BWSR** - CREP and RIM tracking
- **MDA** - Ag BMP Loan Program, Ag Water Quality Certification
- **MPCA** - Clean Water Partnership & 319 program

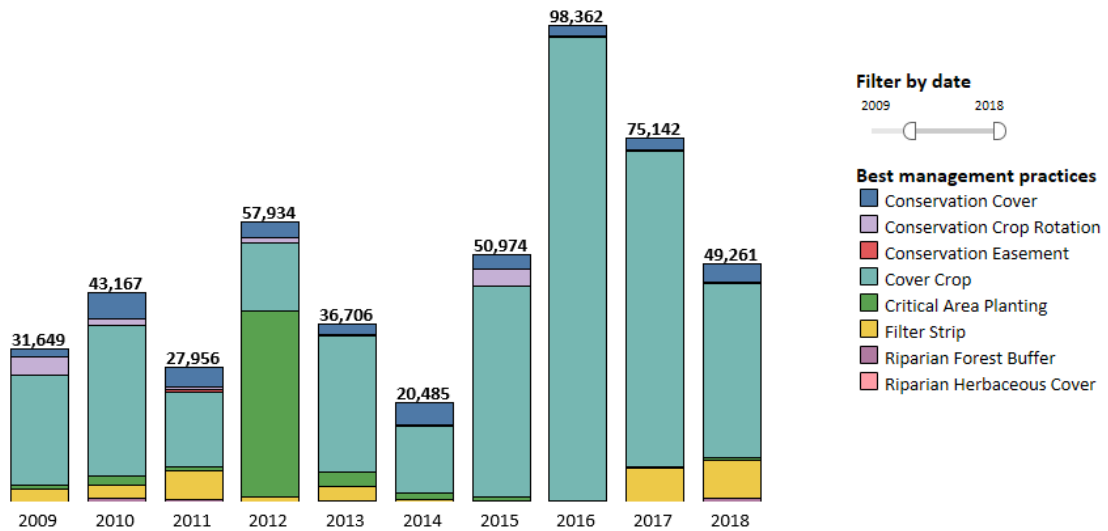


<https://www.pca.state.mn.us/water/nutrient-reduction-strategy>

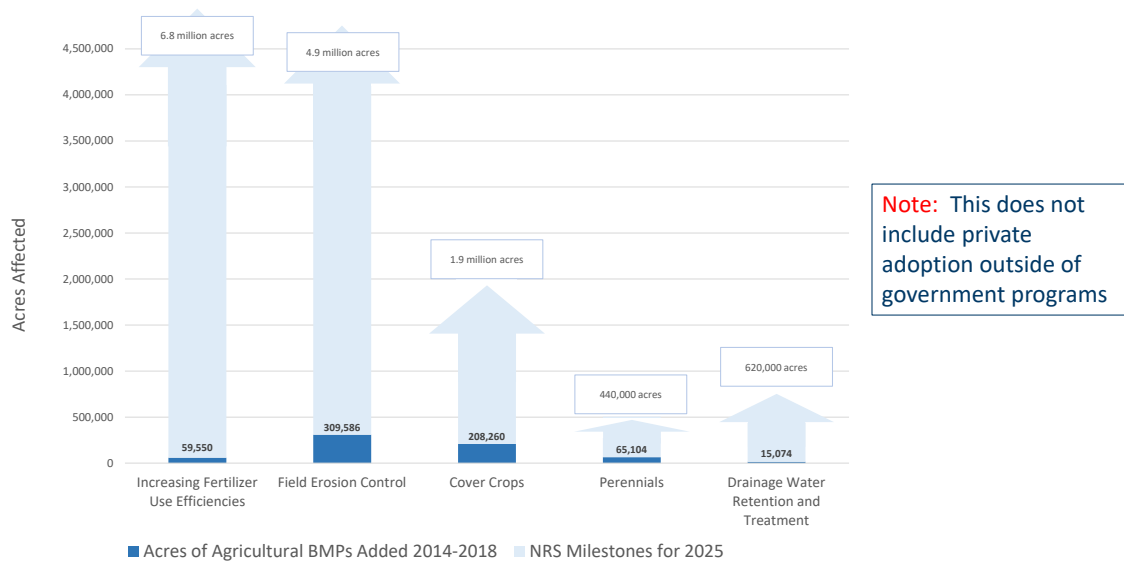
www.pca.state.mn.us/water/healthier-watersheds

BMPs Installed 2004-2018	BMP Count
Tillage/residue management	11,382
Designed erosion control & trapping	10,236
Nutrient management (cropland)	9,992
Septic System Improvements	7,874
Converting land to perennials	7,696
Open tile inlet & side inlet improvements	7,136
Stream banks, bluffs & ravines protected/restored	6,073
Buffers and filters - field edge	5,348
Add living cover to annual crops in fall/spring	4,508
Habitat & stream connectivity management	4,026
Pasture management	3,087
Drainage ditch modifications	2,715
Agricultural tile drainage water treatment/storage	1,184
Urban Stormwater Runoff Control	1,114
Changing rotations to less erosive crops	455
Feedlot runoff controls	173
Forestry Management	138
Wetland restoration/creation	104
In Lake Management	4
Other	51,878
Grand Total	135,123

Statewide tracking example: New acres of living cover added each year through gov't programs



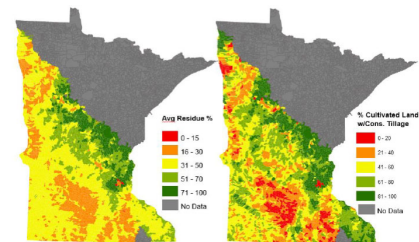
Government Program BMP adoption 2014-18 compared to scale of adoption goals for 2025



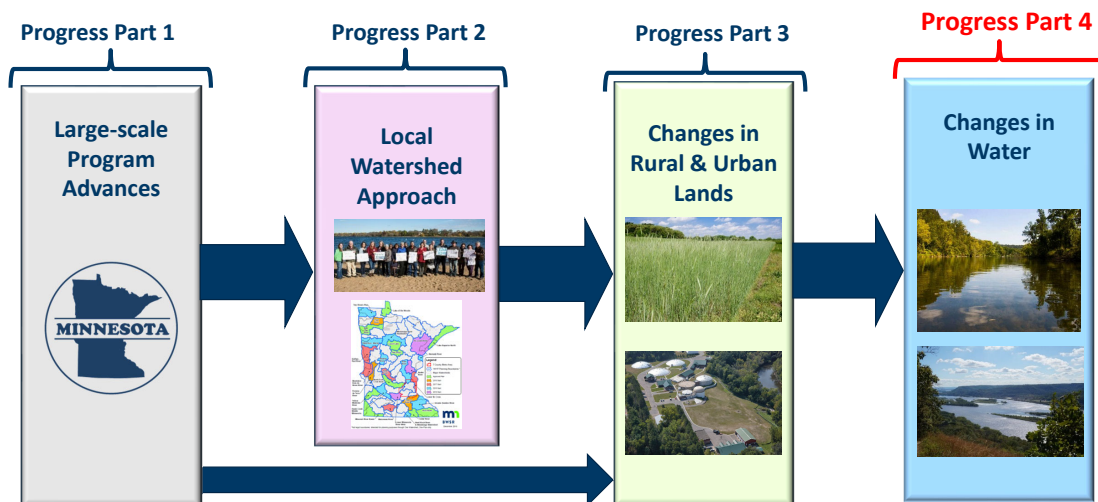
How can we tell if practices are being adopted at needed scales?

- A. Adoption through government support programs (previous 3 slides)
- B. Indicators of broader overall adoption
 1. Census of Agriculture and surveys
 2. Satellite imagery
 3. Fertilizer sales
 4. Nutrient use efficiency trends
- C. Permitting – reporting & inspections

In combination indicates MN is falling short of Nutrient Strategy BMP scenarios



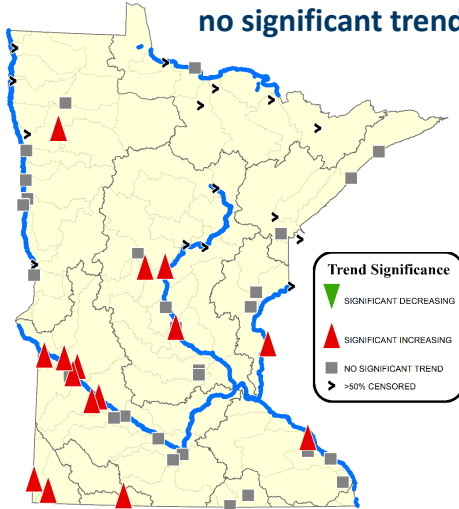
Presentation Outline: trends in the water



10-year nutrient concentration trends

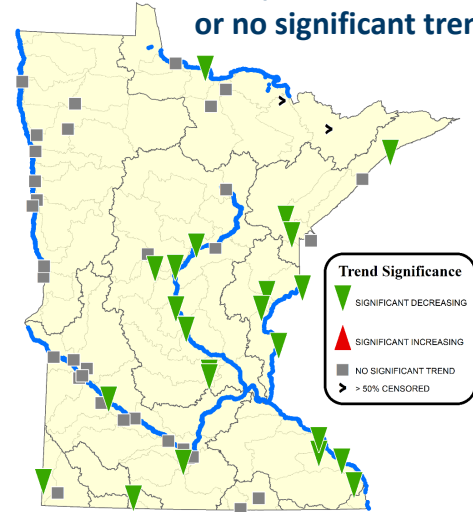
Nitrate + Nitrite
2008-2017

Nitrate – increasing or no significant trend



Total Phosphorus
2008-2017

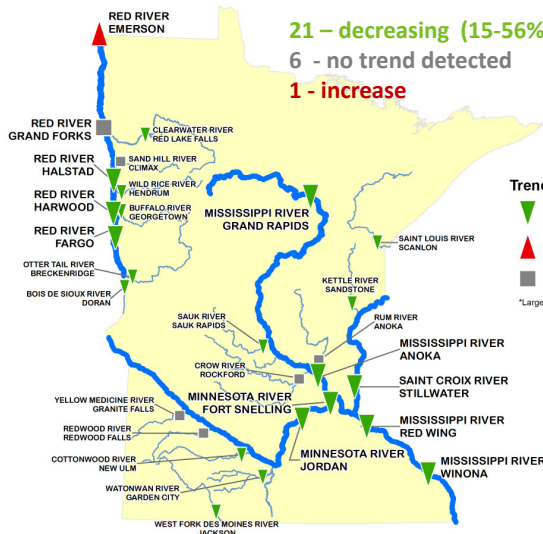
Phosphorus – decreasing or no significant trend



20-year nutrient concentration trends

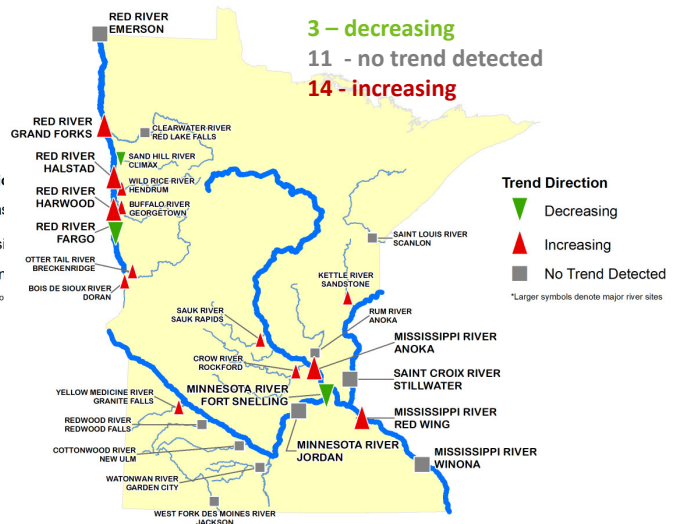
Phosphorus (~1999-2018)

21 – decreasing (15-56%)
6 - no trend detected
1 - increase



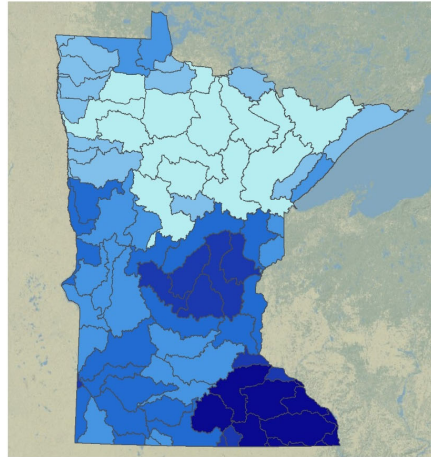
Nitrate (~1999-2018)

3 – decreasing
11 - no trend detected
14 - increasing



More precipitation leading to higher nutrient loads

Annual Precipitation Departure, 2000 - 2019

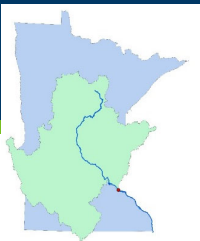


Difference from 20th Century



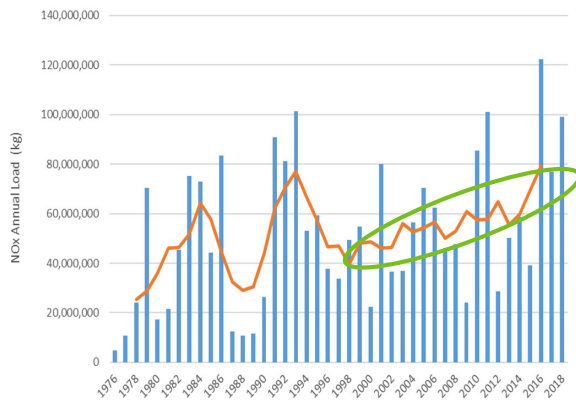
Source:

DNR State Climatology Office and the DNR Watershed Health Assessment Framework

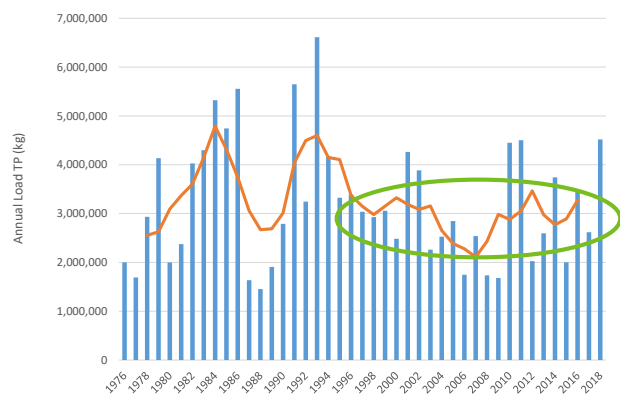


Nitrate and phosphorus loads Mississippi River at Red Wing

Nitrate loads increasing since late 1990's



Phosphorus loads with no detected trend since late 1990's



In Conclusion

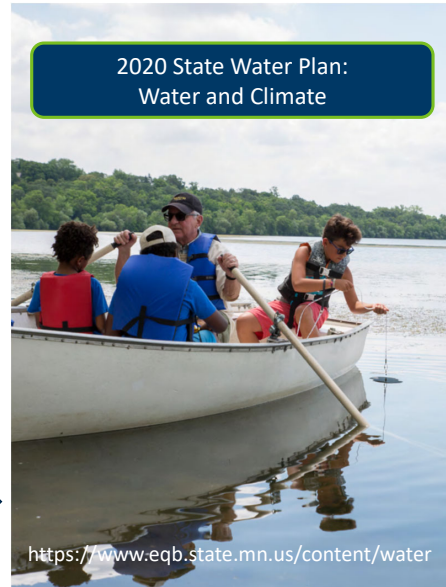
- **5-year progress report recently completed** - found at:

<https://www.pca.state.mn.us/water/nutrient-reduction-strategy>

- Advanced 30+ large-scale programs affecting nutrients
- Agricultural BMP adoption not keeping pace with scenarios outlined in nutrient strategy
- Wastewater – over 70% reduction in phosphorus; nitrogen is now highly-monitored
- River phosphorus concentrations decreased 20-50% (20 yrs) – but increasing river flow offsetting load reductions
- River nitrogen concentrations and loads increasing by over 25% (20 yrs)

- **New in September 2020 – 10-year Minnesota State Water Plan**

- Combining nutrient & climate change practices to reduce and mitigate effects of climate change



Thank You!

www.pca.state.mn.us/water/nutrient-reduction-strategy

