Clean Water Council

2023 Field Tour Draft as of September 14, 2023

Dates:

Monday, September 18th (Meeting/Presentations) and Tuesday, September 19th (Tour)

Program on Monday, September 18th

MPCA Offices, 520 Lafayette Road, St. Paul, MN 55155

PARKING: Please park at the spaces with the hoods on the signs that read "board meeting"

9:00 General Agenda Items

9:30 **State of Water Quality in the Seven-County Metro**

- **Stormwater: Accelerating compliance with MS4 permits**
  - Ryan Anderson, Stormwater Technical Support Supervisor, MPCA (confirmed)
- **Chloride: "Smart Salting" training**
  - Brooke Asleson, Product Sustainability and Partnerships, MPCA (confirmed)
- **PFAS: Clean Water Fund's role in the state's response**
  - Paul Pestano, Manager MPCA Environmental Analysis & Outcomes Division (confirmed)

10:30 **Break**

10:45 **Metropolitan Council's role in Water Sustainability Planning for the Metro**

- Judy Sventek, Manager, Water Resources, Metropolitan Council (confirmed)
- Emily Ressenger, Environmentalist and Project Manager, Metropolitan Council (confirmed)

11:40 **Municipalities and Metro Stormwater Quality**

- Nico Cantarero, Minnesota Cities Stormwater Coalition

12:00 Lunch

12:30 **BWSR**: **How Metro Watershed Planning & Grants Differ from One Watershed One Plan**

- Different planning models
- Watershed Based Implementation Funding and competitive funding by BWSR in the metro
  - Barb Peichel, BWSR (confirmed)

1:00 **Health and Water in the Metro**

- Metro Source Water Protection Plans
  - Lanya Ross, Metropolitan Council (confirmed)
  - Steve Robertson, Minnesota Department of Health (confirmed)
- Contaminants of Emerging Concern

    - Sarah Fossen Johnson, MDH (confirmed)
    - Stefan Saravia, MDH (confirmed)
    - Mary Navara, MDH (confirmed)
- Private Well Water Quality in Dakota County
    - Vanessa Demuth, Dakota County (confirmed)(virtual)

2:00 **BREAK**

2:15 **Department of Natural Resources Use of the CWF in the Metro**

- Groundwater Management Area (GWMA) in North and East Metro
    - Jason Moeckel, DNR (confirmed)
- Well Interference (Blaine/Ham Lake examples)
    - Ellen Considine, DNR (confirmed)
- Other Nonpoint Source Implementation support (like metro area stream restorations)
    - Nick Proulx, DNR (confirmed)

3:00 **Metro Area Agriculture and the Clean Water Fund**

- Groundwater Protection Rule
- Metro-based AgBMP Loans, MAWQCP certified farms in metro
- Pesticide monitoring
    - Margaret Wagner, Pesticide & Fertilizer Management, MN Department of Agriculture

3:45 **Open**

4:15 **Group Discussion: Take Note**

5:00 Adjourn

6:30 **Dinner** at Jimmy's Food & Drink, 1132 County Road E East, Vadnais Heights, MN 55110

8:00 Free social time

Tour Tentative Schedule on Tuesday, September 19th

8:00 a.m. Meet at MPCA

PARKING: Please park on the far end of the parking lot at MPCA away from the building. Then please sign in with MPCA staff (Brianna or Kelly) before boarding the bus.

8:15 a.m. Leave on bus for MPCA (33 minutes to Afton)

8:45 a.m. **Trout Brook in Afton Alps/Afton State Park** (6600 Peller Ave S, Hastings, MN 55033; follow signs for Afton Alps, and turn right at the sign to the chalet; drive down the hill, around the chalet, and park in gravel lot)

Trout Brook in Afton: Southern Washington County Watershed District has been working to re-meander the previously ditched stream. The portion that flows through Afton Alps was completed in 2019, has interpretive signs installed, and is easy to walk along and view. It received funding from Clean Water Fund and Outdoor Heritage Council. SWWD is also re-meandering a second stretch in Afton State Park this spring. See the old straight channel and new meandered channels side by side. This year's project is getting funding from the Lower St. Croix Watershed Partnership, via WBIF grant funding. An explosion in the trout population in the stream is happening.
Story Map: Trout Brook Restoration (arcgis.com)

- John Loomis, Deputy Administrator, South Washington Watershed District, www.swwdmn.org (confirmed)

9:45 a.m. Get on Bus (33 minutes)

10:15 a.m. **Target parking lot retrofit,** 2199 Highway 36 E, North St. Paul, MN 55109

The local watershed district has specialized in major stormwater retrofits on private parking lots.

- Tina Carstens, Administrator, Ramsey-Washington Metro Watershed District (RWMWD) (confirmed)
- Paige Ahlborg, Ramsey-Washington Metro Watershed District (RMWMD) (confirmed)

Good opportunity for a bathroom break in Target

10:45 a.m. Get on Bus

11:15 a.m. **Forest Lake/Sunrise River Highway 61 Wetland Enhancement Project**, 5868 245th St., Forest Lake, MN (private driveway); **first**, stop at Lakeside Memorial Park to pick up any separate drivers (95 East Broadway Ave. Forest Lake**,** MN 55025.)

Comfort Lake – Forest Lake Watershed District has received several very large Clean Water Fund grants in recent years to restore large wetland complexes near Forest Lake that were ditched in the early 1900s. The Sunrise River Highway-61 Wetland Enhancement Project us under construction right now and should be complete by the fall. View the project from the Hardwood Creek Trail or park along the access road parallel to Hwy 61.

IMPORTANT! For anyone driving separately from the bus, PLEASE park at Lakeside Memorial Park, 95 East Broadway Avenue, Forest Lake. The wetland site is on a very busy highway and we need to avoid

additional vehicles. The bus will pick you up around 11:10 a.m. and drop you off again after seeing the wetland.

- Mike Kinney, Comfort Lake-Forest Lake Watershed District (confirmed)
- Beth Carreno, Senior Program Manager, CLFLWD (confirmed)
- Also discussion of Moody Lake (BWSR Snapshot coming) Moody Lake Wetland Rehabilitation - Comfort Lake Forest Lake Watershed District (clflwd.org)

12:00 noon Get on Bus

12:15 p.m. **Picnic Lunch** Shelter 2/Lions Park, Long Lake Park, 1500 Old Highway 8, New Brighton

12:45 p.m. **Presentation by Rice Creek Watershed District on CWF projects in RCWD**

- Matt Kocian, Lake and Stream Program Coordinator (confirmed)

1:15 p.m. Get on Bus

1:45 p.m. **Rosland Park Filtration Vault ,** 4300 West 66th Street, Edina, MN 55435 (proceed to second parking lot)

The Rosland Park Filtration vault is an experimental best management practice (BMP) located in Rosland Park between Swimming Pool Pond and Lake Cornelia in Edina. It treats polluted water from Swimming Pool Pond before cleaner water is discharged into Lake Cornelia. This project is part of a larger Lake Cornelia Improvement Project which aims to reduce the amount of phosphorous, nitrogen, and solids entering Lake Cornelia. This specific project will also contribute to the scientific community by providing data on different filtration media.

- Randy Anhorn at Nine Mile Creek WSD ranhorn@ninemilecreek.org (confirmed)
- Ross Bintner at the City of Edina RBintner@edinamn.gov (confirmed)
- Barr Engineering

2:30 p.m. Get on Bus

3:00 p.m. **Highland Bridge Development** at old Ford Motor Company site, turn on Cretin Avenue from Ford Parkway and unload at Bohland Avenue and Falls Passage E. [**Bus driver please proceed** to Hidden Falls Overlook on Mississippi River Boulevard for pickup.]

Highland Bridge is a new community in Saint Paul at the site of the former Ford Assembly Plant. The City of Saint Paul, master developer Ryan Companies, and partners like Capitol Region Watershed District took the time to carefully plan energy, waste, transportation, landscape, and water needs for the new community.

The Highland Bridge community is a beautiful landmark atop a once-industrial stretch of our precious Mississippi River bluffs. Treated stormwater fills the central water feature, flowing to the re-imagined Hidden Falls Creek before emerging at the new Mississippi Boulevard Crossing, tumbling over its namesake falls, and ending at the Mississippi River. The water is surrounded by paths, rain gardens, and inviting nature stretches. All are enhanced with expansive vistas from the river bluffs.

In 2021, the Public Facilities Authority made a Point Source Implementation Grant (PSIG) of $7,000,000. The grant supported construction of a stormwater management system to meet total maximum daily

load allocations (TMDL) for the 122-acre site, which treats 64 million gallons a year of water before it enters the Mississippi River and reduces phosphorus by 145 pounds a year.

- Bob Fossum, Capitol Region Watershed District staff (confirmed)
- Saint Paul staff (invited)

3:45 p.m. Get on Bus at Hidden Falls Overlook on Mississippi River Parkway south of Montreal

4:00 p.m. **Allianz Field**, 400 Snelling Avenue North, St. Paul, MN 55104 [From Snelling Avenue, turn right on Shields and unload in front of the stadium]

When the City of Saint Paul and Minnesota United FC – the Twin Cities' newest professional sports franchise – announced plans for a soccer stadium on a 35-acre brownfield site at Snelling and University Avenue, Capitol Region Watershed District (CRWD) saw an opportunity to demonstrate stormwater innovation for thousands of District and metro area residents. The project would be the City's first District comprehensive stormwater management system that treats runoff from multiple parcels with new shared green infrastructure practices, including rainwater harvesting and reuse. This project would be essential to advancing CRWD's mission of improving the District's water resources and the joint goal of the City and CRWD to use rainwater as a resource. The project received CRWD 2019 Watershed Project of the Year award.

SAFETY NOTE: Tour participants will need to descend a ten-foot ladder into an underground vault to view the treatment and pumping components of the rainwater harvesting and reuse system. Staff can describe the system above ground if you wish.

- Anna Aleria and Forrest Kelly, Capitol Region Watershed District (confirmed)

4:30 p.m. **Get on bus**

Allow for rush hour traffic, extra buffer in case we run late

5:00 p.m. **Arrive MPCA**

MS4 Permitting

Background, tools and assistance, results

Ryan Anderson, Manager, Stormwater Program

MINNESOTA POLLUTION CONTROL AGENCY

CLEAN WATER ACT MINNESOTA 50 YEARS

- **Municipal stormwater**

- **Industrial stormwater**

- **Construction stormwater**

Minnesota’s Stormwater Program

Minnesota's MS4s

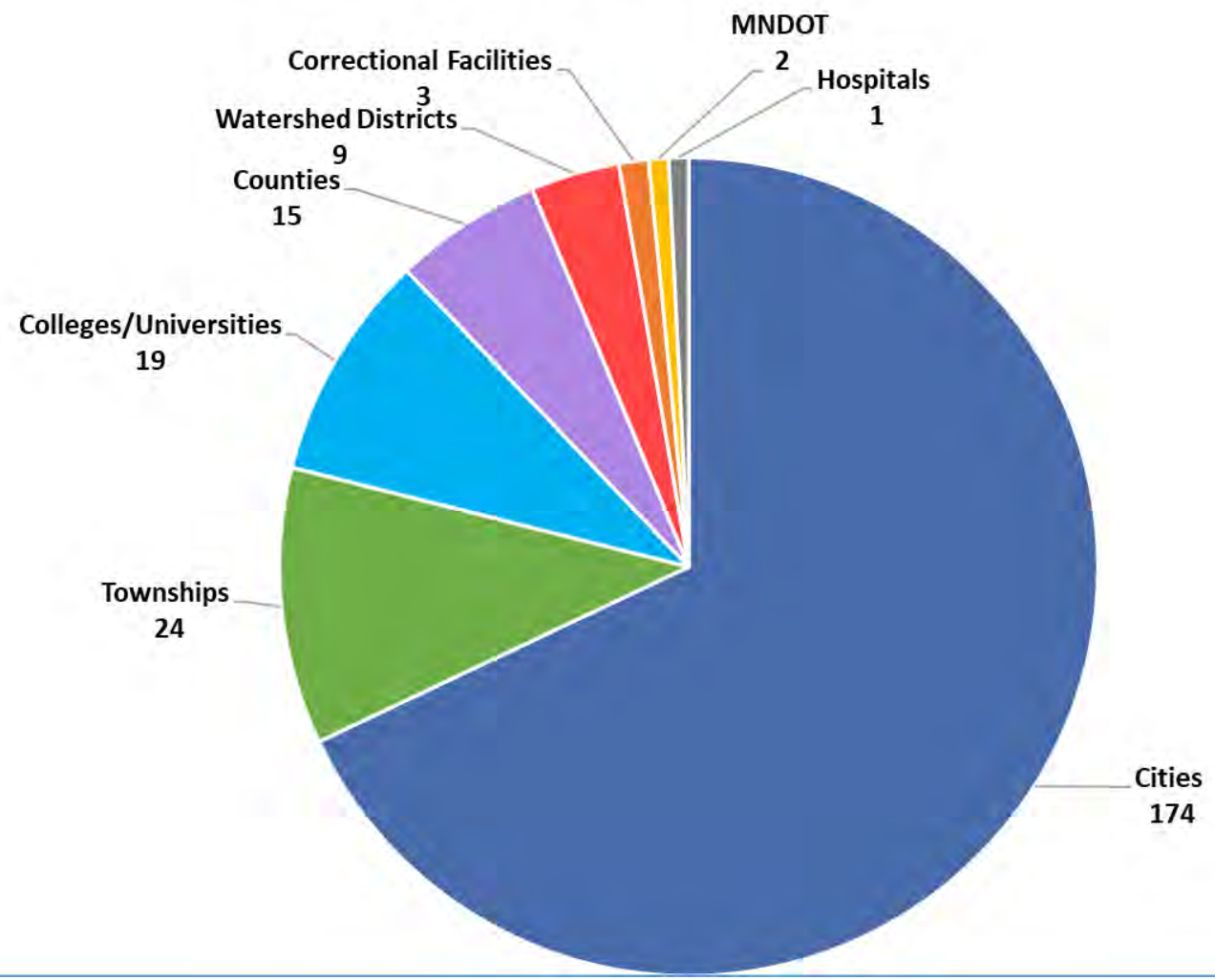
2 Phase I's

247 Phase II's

WHO NEEDS AN MS4 PERMIT?

- Municipalities That:
  - Have Urbanized Area as defined by the latest Decennial Census, or
  - Exceed a population of 10,000 people, or
  - Exceed a population of 5,000 people and discharges to a “special” water (e.g., trout streams, trout lakes, impaired waters, etc.,).

247 REGULATED SMALL MS4S



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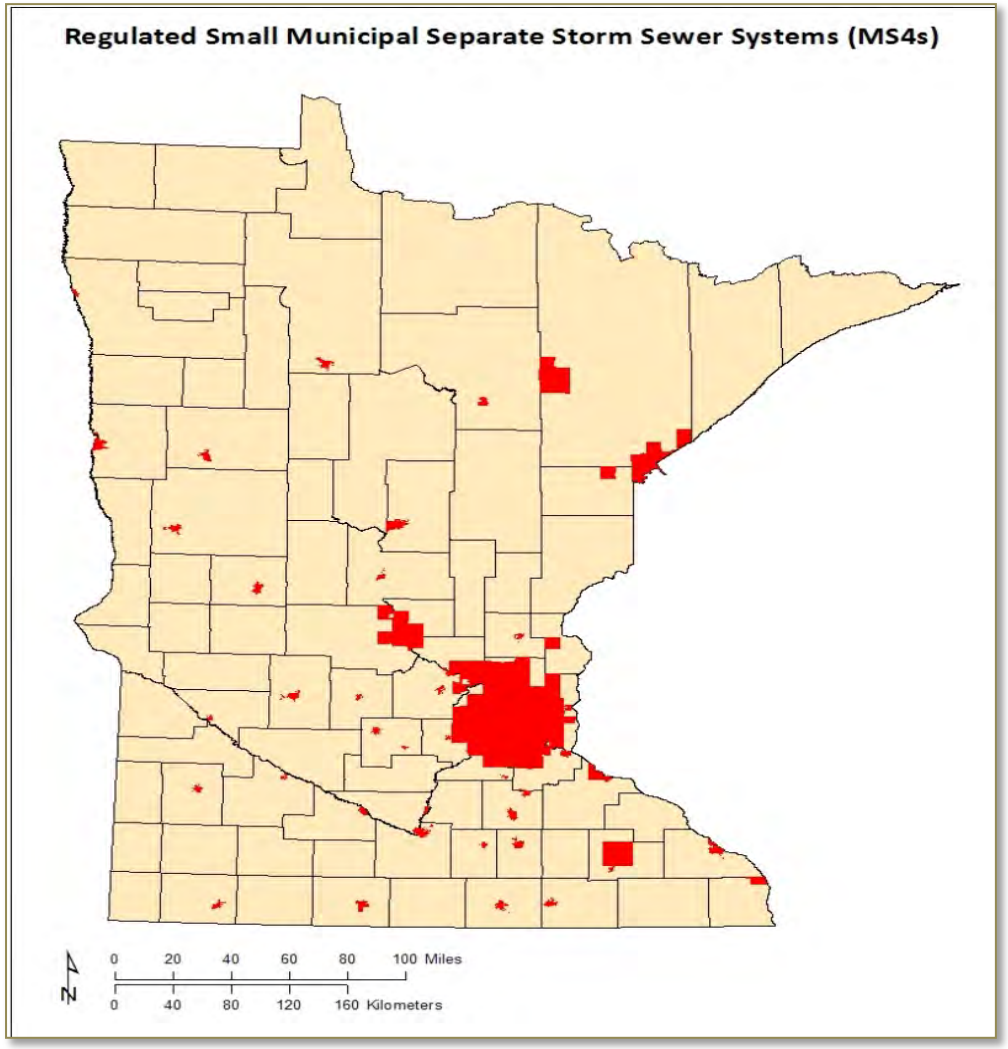


CHANGES TO THE MS4 PERMIT IN 2020

- Made existing language more “clear, specific, and measurable”
- Added documentation requirements
- Added requirements that help MPCA better substantiate MS4 claims of meeting WLAs
- New requirements to address chloride, bacteria, and temperature impairments
- Increased standards for long-term stormwater management related to redevelopment

HOW DOES CWF MONEY HELP WITH COMPLANCE?

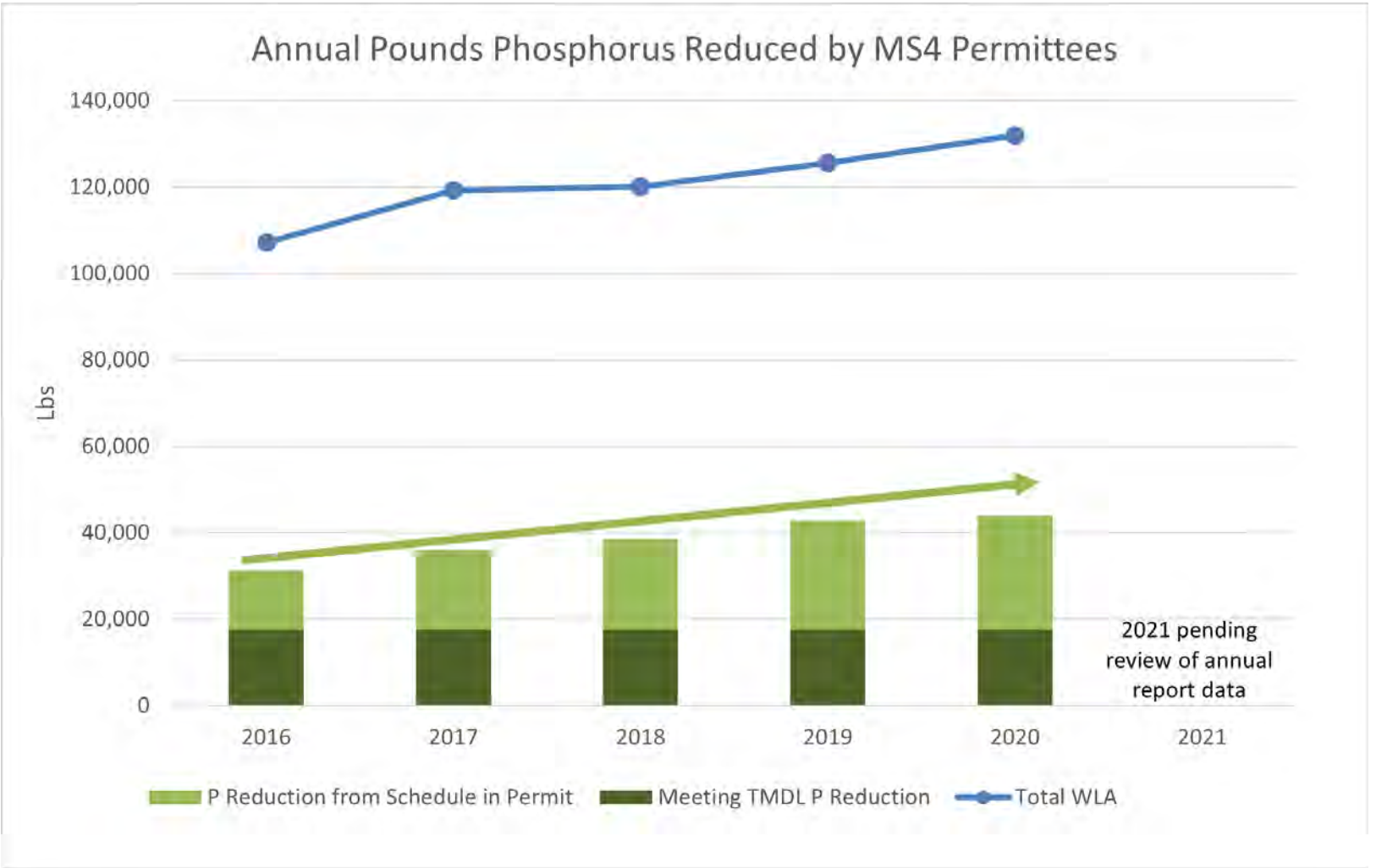
Wide variety of guidance and tools

- Many items are found in the MN Stormwater Manual
  - TMDL guidance, pond assessments, iron-enhanced treatment
  - Pretreatment, street sweeping, bioretention, green infrastructure
  - MIDS calculator, street sweeping credit, rainwater harvest and reuse
  - Manufactured device crediting, vegetation guidance
  - Green roofs, MS4 toolkit, green roofs, tree trenches

SPECIALIZED ASSISTANCE FOR PERMITTEES

- Informational seminars and workshops to assist with application and permit requirements
- Development of permittee-specific materials
- Assisting with water quality trading programs
- Evaluating and assisting with modeled reductions
- Internal agency coordination in developing TMDLs

HOW WELL DOES THIS WORK?



Thank you!

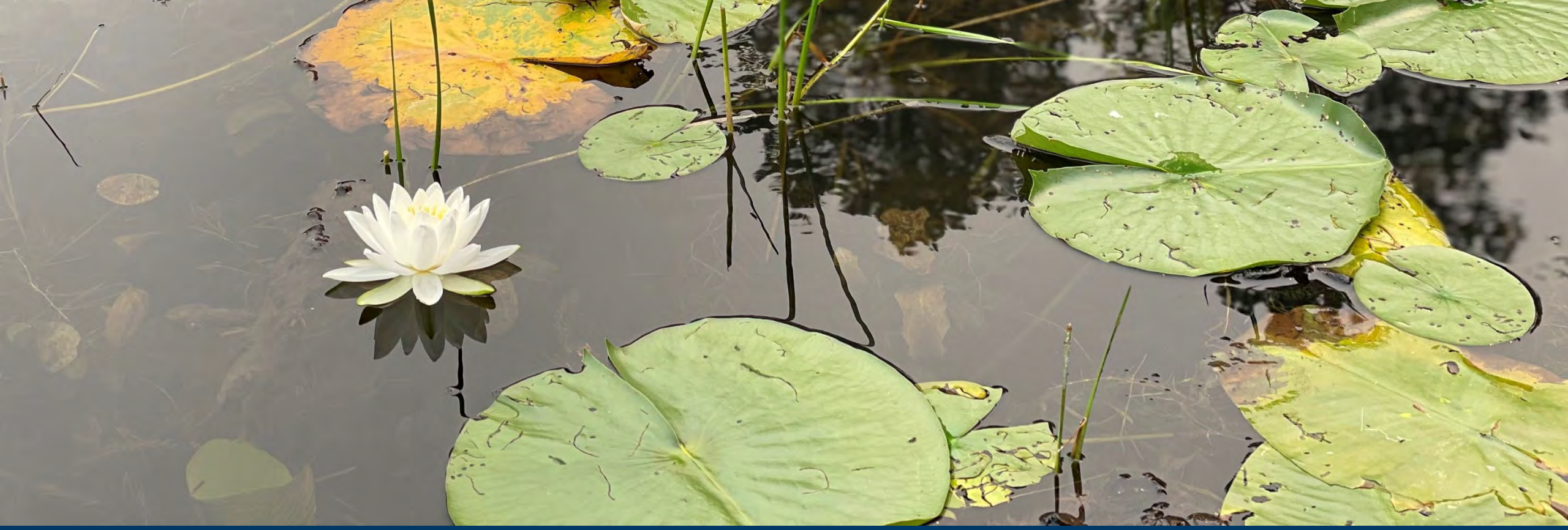
Ryan Anderson

Ryan.anderson@state.mn.us

651-757-2222

MINNESOTA POLLUTION CONTROL AGENCY

CLEAN WATER ACT MINNESOTA 50 YEARS

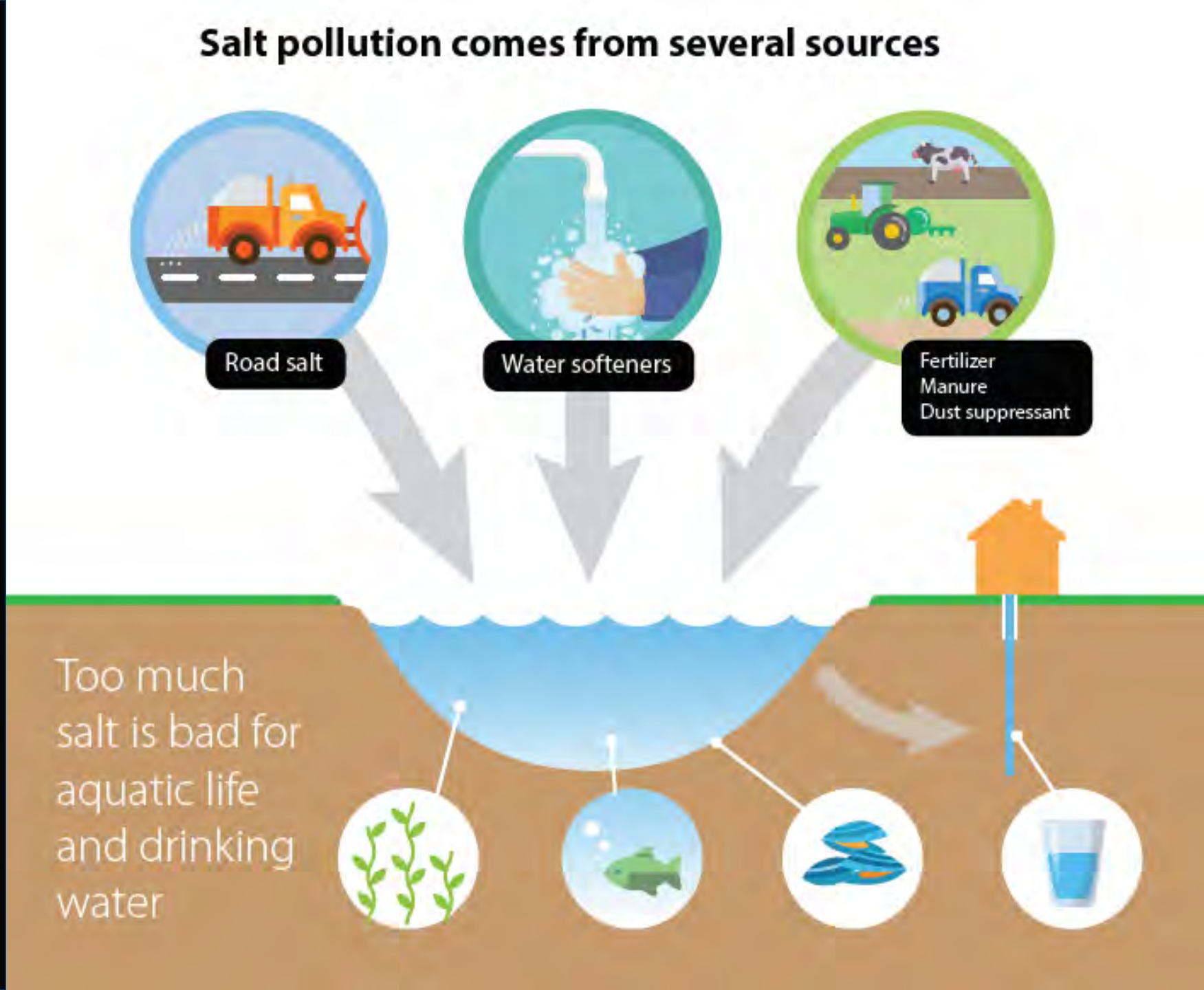


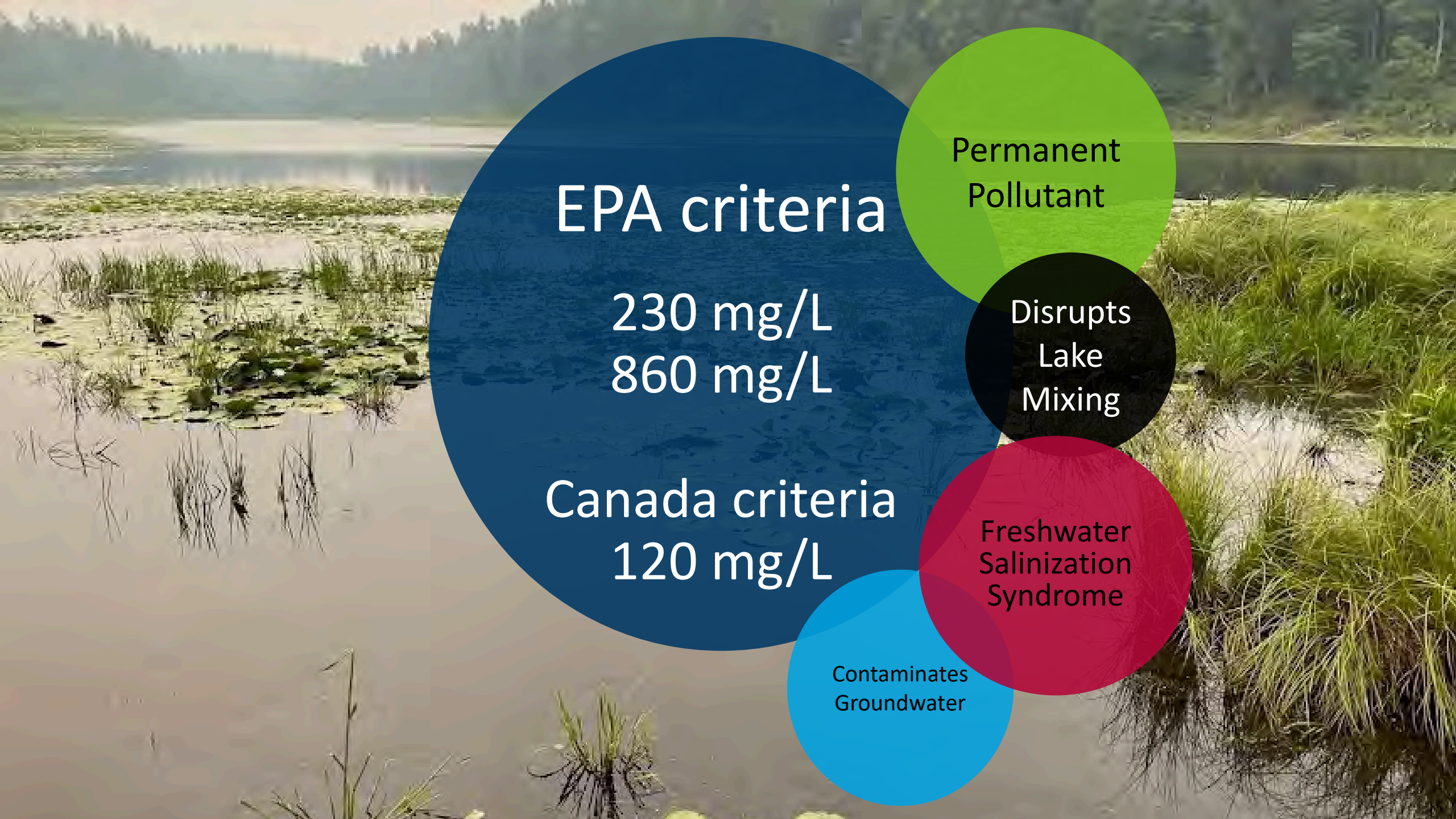
MPCA Chloride Reduction Program

MINNESOTA POLLUTION CONTROL AGENCY

Brooke Asleson| MPCA Chloride Program Administrator

Where is all this salt coming from?




EPA criteria
230 mg/L
860 mg/L
Canada criteria
120 mg/L
Permanent Pollutant
Disrupts Lake Mixing
Freshwater Salinization Syndrome
Contaminates Groundwater

RESEARCH ARTICLE | BIOLOGICAL SCIENCES

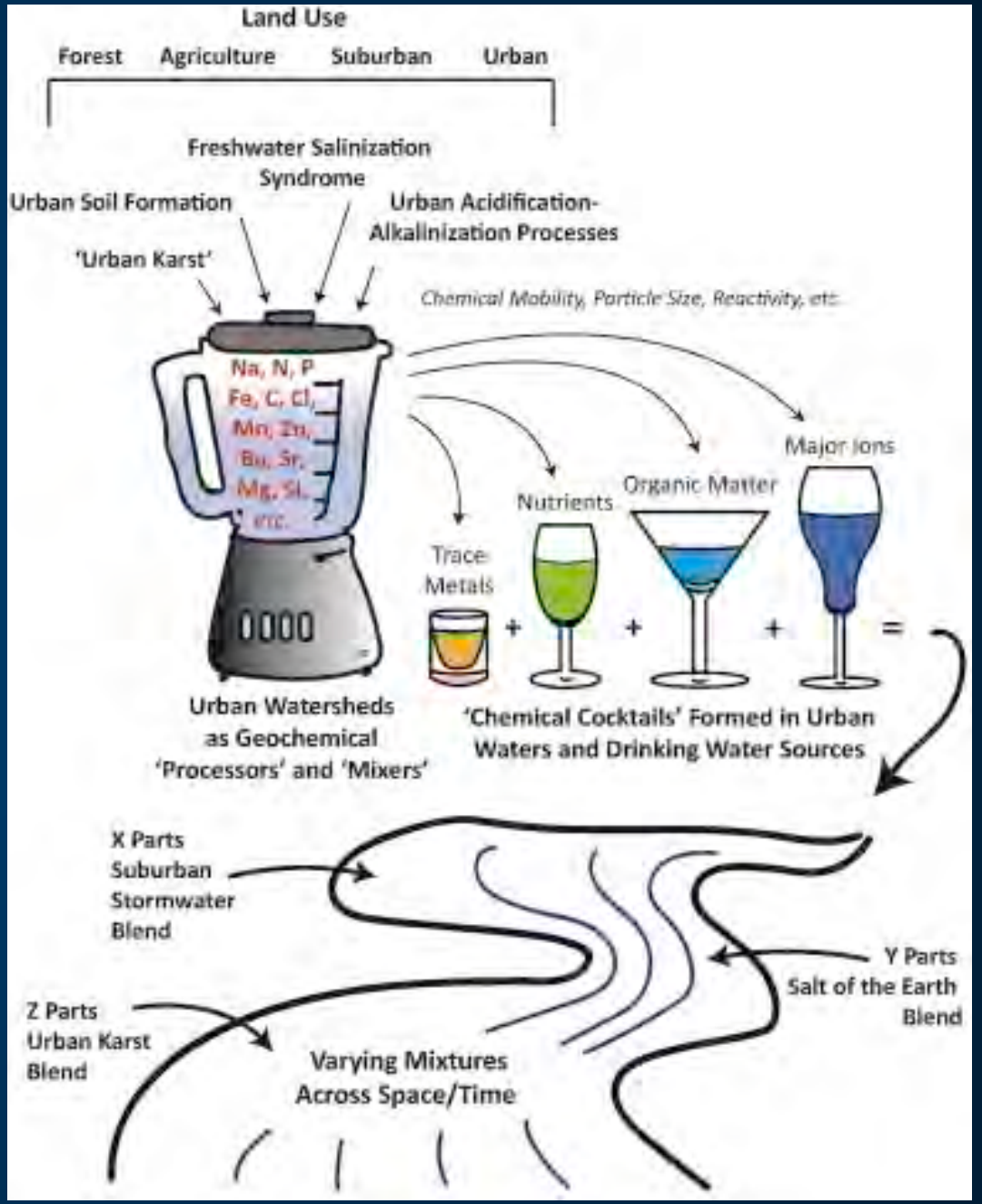
Freshwater salinization syndrome on a continental scale

Sujay S. Kaushal, Gene E. Likens, Michael L. Pace, +3, and Melissa Grese Authors Info & Affiliations

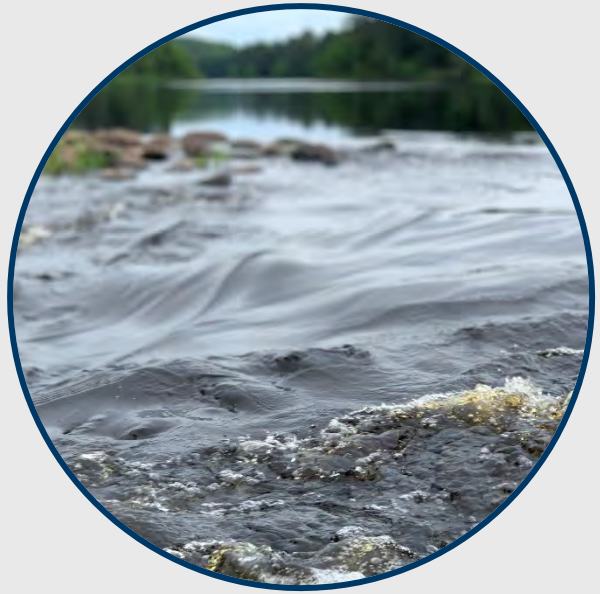
Contributed by Gene E. Likens, November 30, 2017 (sent for review June 28, 2017; reviewed by Jacqueline A. Aitkenhead-Peterson, W. Berry Lyons, Diane M. McKnight, and Matthew Miller)

January 8, 2018 | 115 (4) E574-E583 | https://doi.org/10.1073/pnas.1711234115

- Salts can corrode metals and cause the release of heavy metals in drinking water systems.
- Salts increases heavy metal and nutrient contamination in streams, lakes & wetlands.
- The release of these materials are creating chemical cocktails with unknown toxic effects.
- Salts and the associated chemical cocktails build up in soils, surface water, and groundwater and are not easily remediated.



MPCA Chloride Reduction Program



Agency Water programs

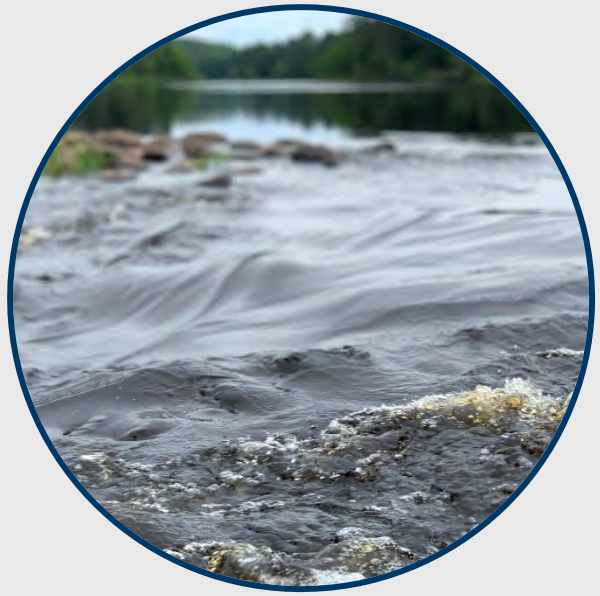
Training

Assistance

Resources

MINNESOTA POLLUTION CONTROL AGENCY

https://www.pca.state.mn.us/water/chloride-salts



Agency Water programs

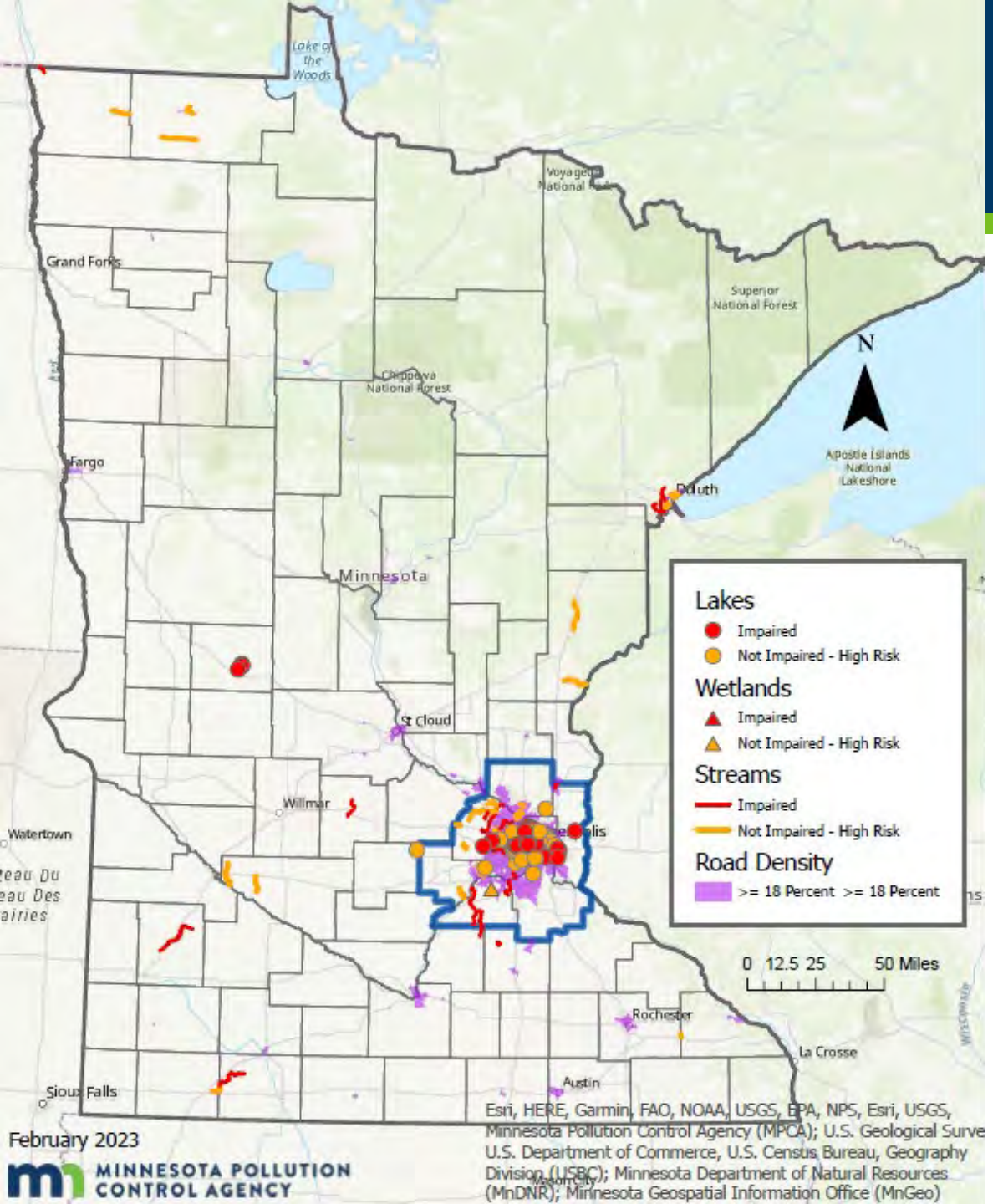
SAFER FOR LAKES & STREAMS
CERTIFIED
SMART SALTER
SAFE FOR PEOPLE

Training

Assistance

Resources

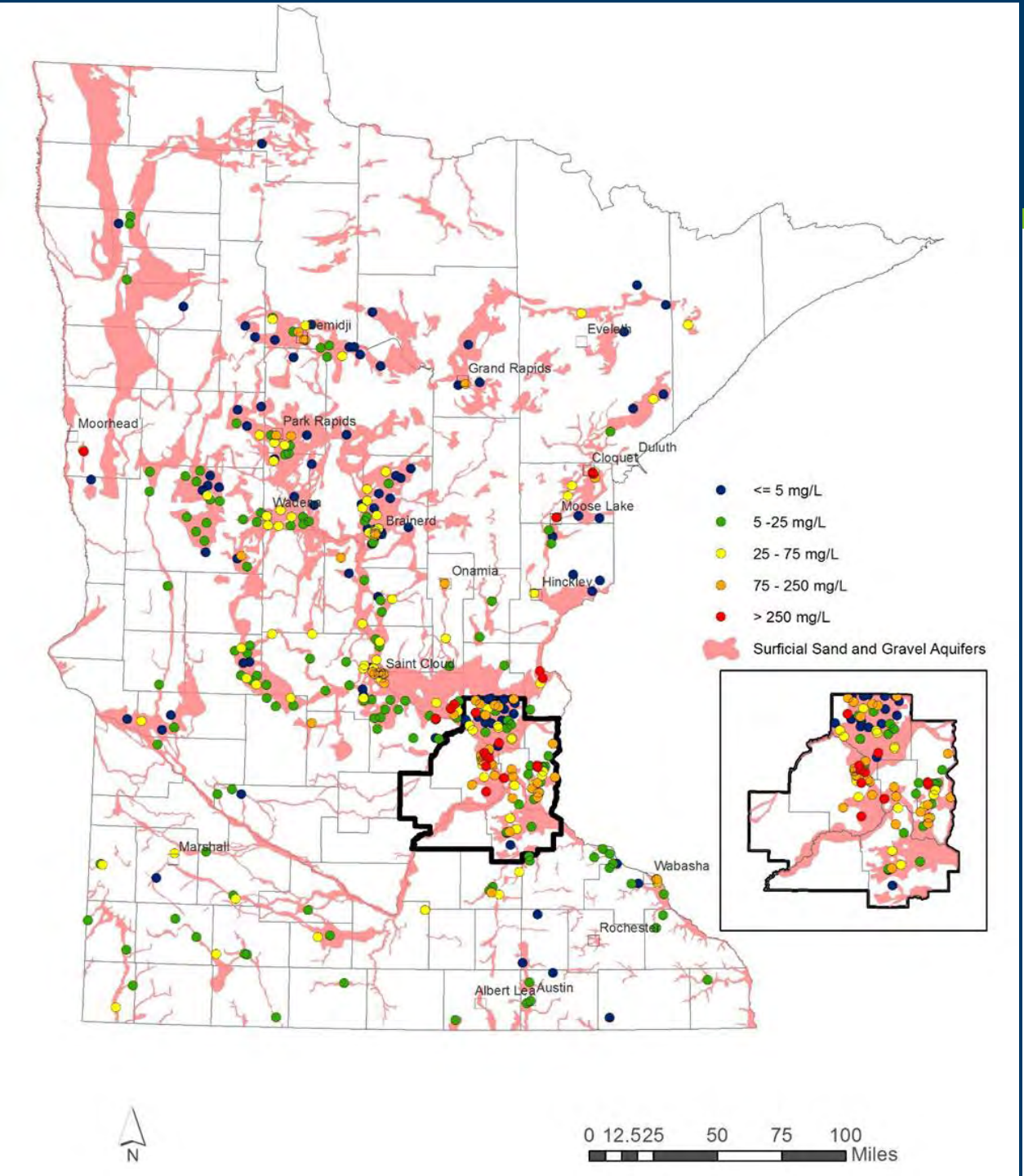
MN Surface Water Chloride



MN water quality criteria = 230mg/L

- 54 chloride impairments
  - 4 new listings added 2022 - 2 in Lower St. Croix River watershed & 2 in the St. Louis River watershed
  - Draft 2024 list indicates 12 additional impairments in TCMA
- 75 High Risk waters
  - Values ≥ 207 mg/L or at least one exceedance
  - 80% of surface water chloride data is in the TCMA

Chloride in Groundwater



2/3 wells with chloride concentrations exceeding the SMCL were located in the TCMA, rest were in urban areas

40% of wells tested across the state are increasing in chloride

Land Use	Chloride (mg/L)
Sewered Residential	45 mg/L
Unsewered Residential	16 mg/L
Commercial/Industrial	82 mg/L
Agricultural	14 mg/L
Undeveloped	1 mg/L

Median chloride concentrations in groundwater based on land use, 2013-2017




Minnesota Statewide Chloride Management Plan

MINNESOTA POLLUTION CONTROL AGENCY

CLEAN WATER LAND & LEGACY AMENDMENT

Purpose

- Highlight chloride impacts on water quality
- Inform and guide best practices
- Demonstrate success and cost savings of improved practices

Scope

- Surface and groundwater trends
- Chloride sources identified
- Goals for protecting MN waters

Audience

- State and local government entities
- Winter maintenance workers
- Elected officials and general public

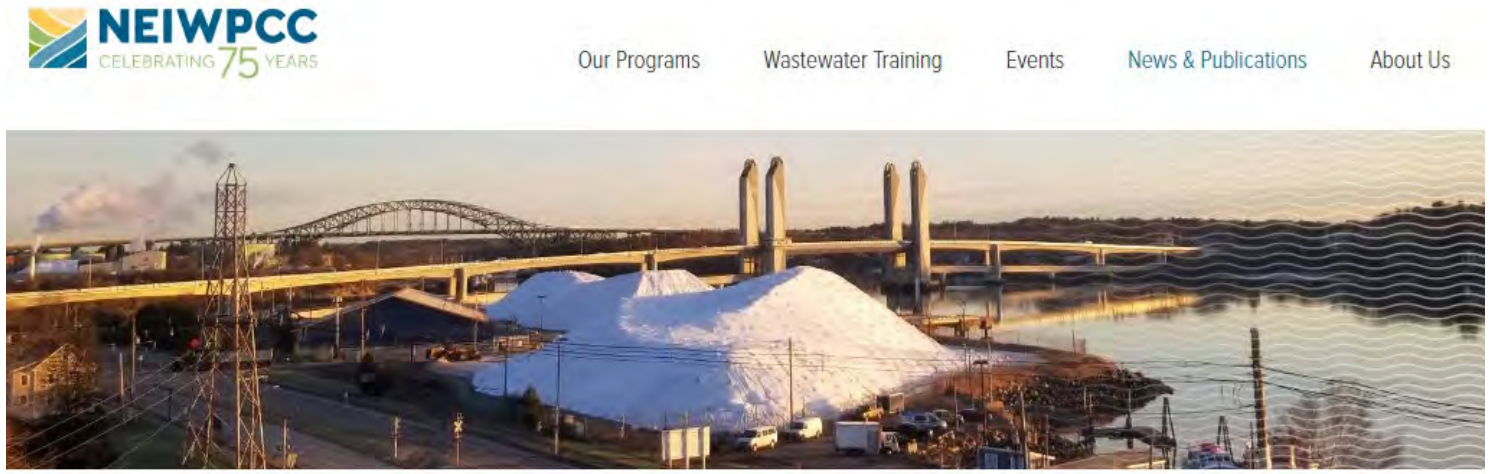
National Chloride Collaborative

Project Team Members:

- **Project Senior Champion:** Tim Elkins
- **Project Sponsor:** Aaron Johnson, Alex Flevarakis, David Pfeifer
- **Project Team Co-Leader:** Sydney Weiss
- **Project Team Co-Leader:** Brooke Asleson

Project Team Members:

- Illinois
- Indiana
- Maine
- Maryland
- Minnesota
- Michigan
- New Hampshire
- Ohio
- Virginia
- Wisconsin
- New England Interstate Water Pollution Control
- Upper Mississippi River Basin Association



MPCA Chloride Reduction Program

Agency Water programs

Training

Assistance

Resources

MPCA Smart Salting Training Certification program

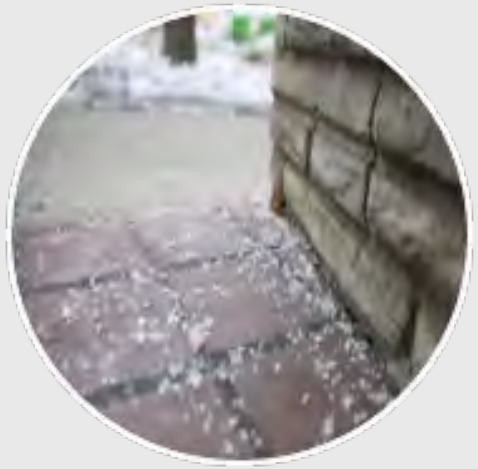
Hands on professionals

Roads

Parking Lots & Sidewalks

Water Professionals*

Managing



Property Management

Level 2 – Organization Certification

*Coming Soon!

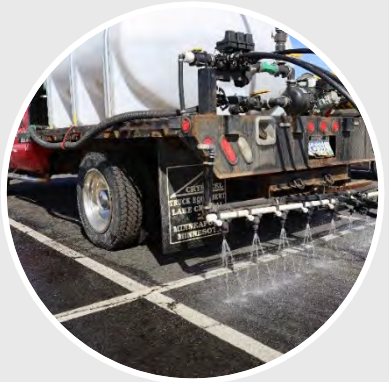
www.pca.state.mn.us/business-with-us/smart-salting-training

NEW Smart Salting Workshop & Refreshers

Community Leaders Workshop

101 Refresher

Weather Refresher



Liquid Deicer Refresher

Salt & Snow Storage Refresher

Agency Water programs

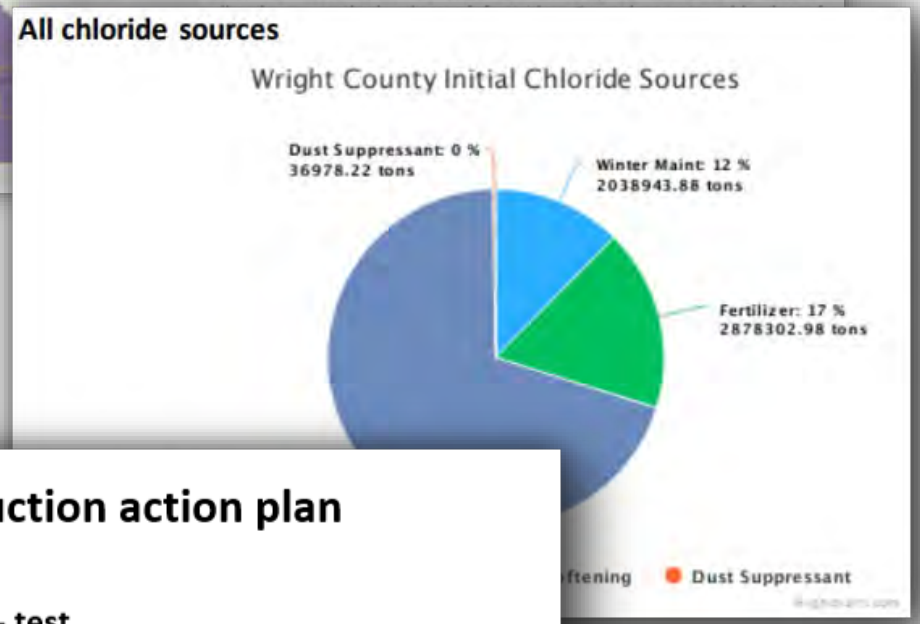
SAFER FOR LAKES & STREAMS
CERTIFIED
SMART SALTER
SAFE FOR PEOPLE

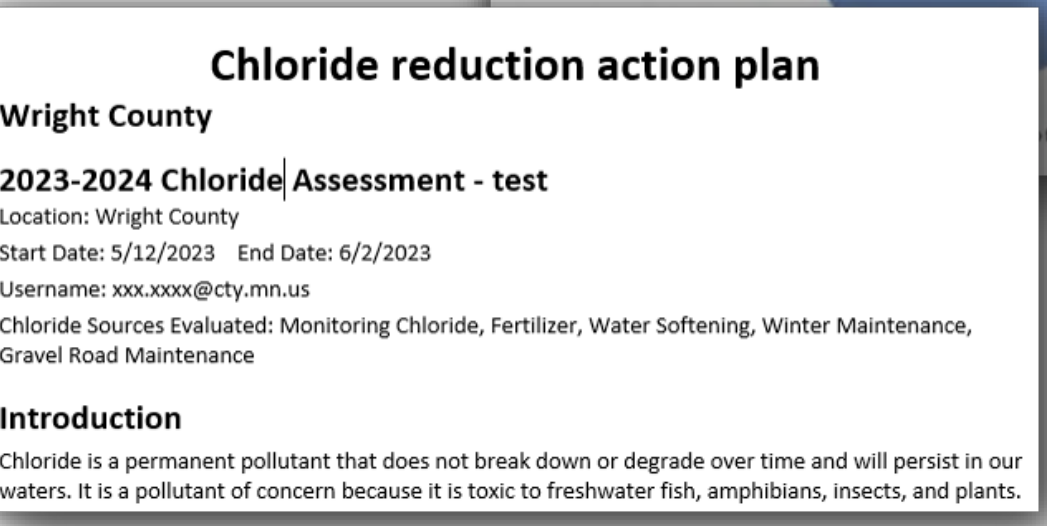
Training

Assistance

Resources

MPCA Smart Salting Tool





- Learn background information and environmental impacts of chloride sources
- Organizations can see and modify estimations of the amount of chloride from sources in their community:
  - winter maintenance
  - water softening
  - fertilizer
  - dust suppressants
- Survey templates
- Create a Chloride reduction action plan for each source
- Still allows winter maintenance operations to evaluate practices for salt reduction

https://smartsaltingtool.com/

MPCA Chloride Reduction Grant Program

- MPCA has created the Chloride Reduction Grant program to assist communities in reducing chloride pollution at the source
- First two grants were focused on water softening
- Additional grants will be offered in 2024!

Project Communities:

City of Altura

MARSHALL
CULTIVATING THE BEST IN US

AVON

Worthington PUBLIC UTILITIES

CITY OF MEDINA

Worthington Public Utilities Water Softener Rebate Program funded through a Minnesota Pollution Control Agency Grant

Project Partners:

BOLTON & MENK

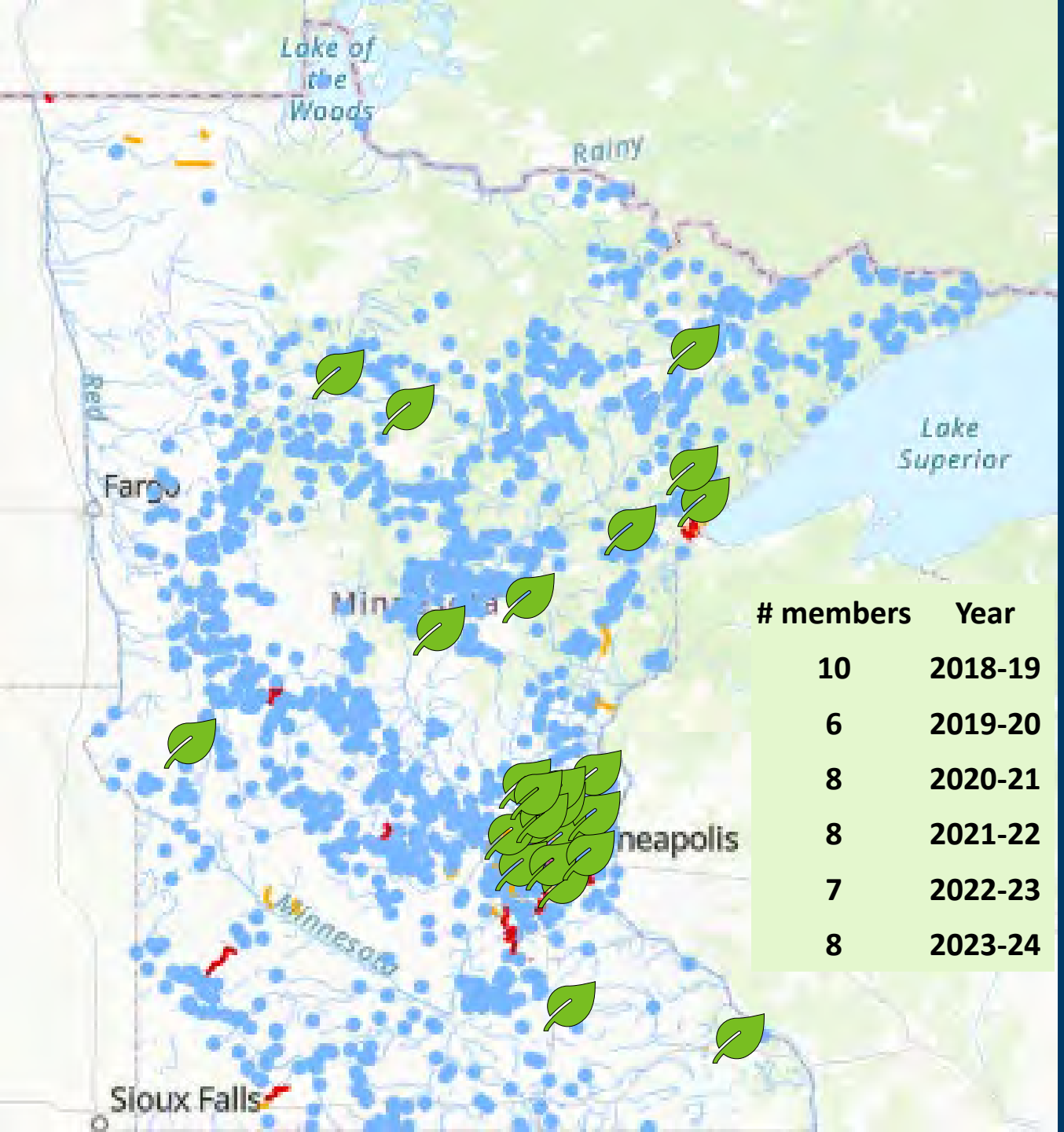
CLEAN WATER LAND & LEGACY AMENDMENT

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

Minnesota Water Quality ASSOCIATION

UNIVERSITY OF MINNESOTA MnTAP MINNESOTA TECHNICAL ASSISTANCE PROGRAM

Madison Metropolitan Sewerage District



# members	Year
10	2018-19
6	2019-20
8	2020-21
8	2021-22
7	2022-23
8	2023-24

Minnesota GreenCorps

- Minnesota GreenCorps is an environmentally focused AmeriCorps program coordinated by the MPCA.
- **Chloride reduction** components in the program
- Members serve approximately 40 hours a week for 11 months from September through August.
- Eligible organizations include public entities, school districts, not for profit institutions of higher education, and 501 (c)(3)

Loans

Small Business Assistance

www.pca.state.mn.us/grants-and-loans/small-business-environmental-improvement-loans

Agency Water programs

Training

Assistance

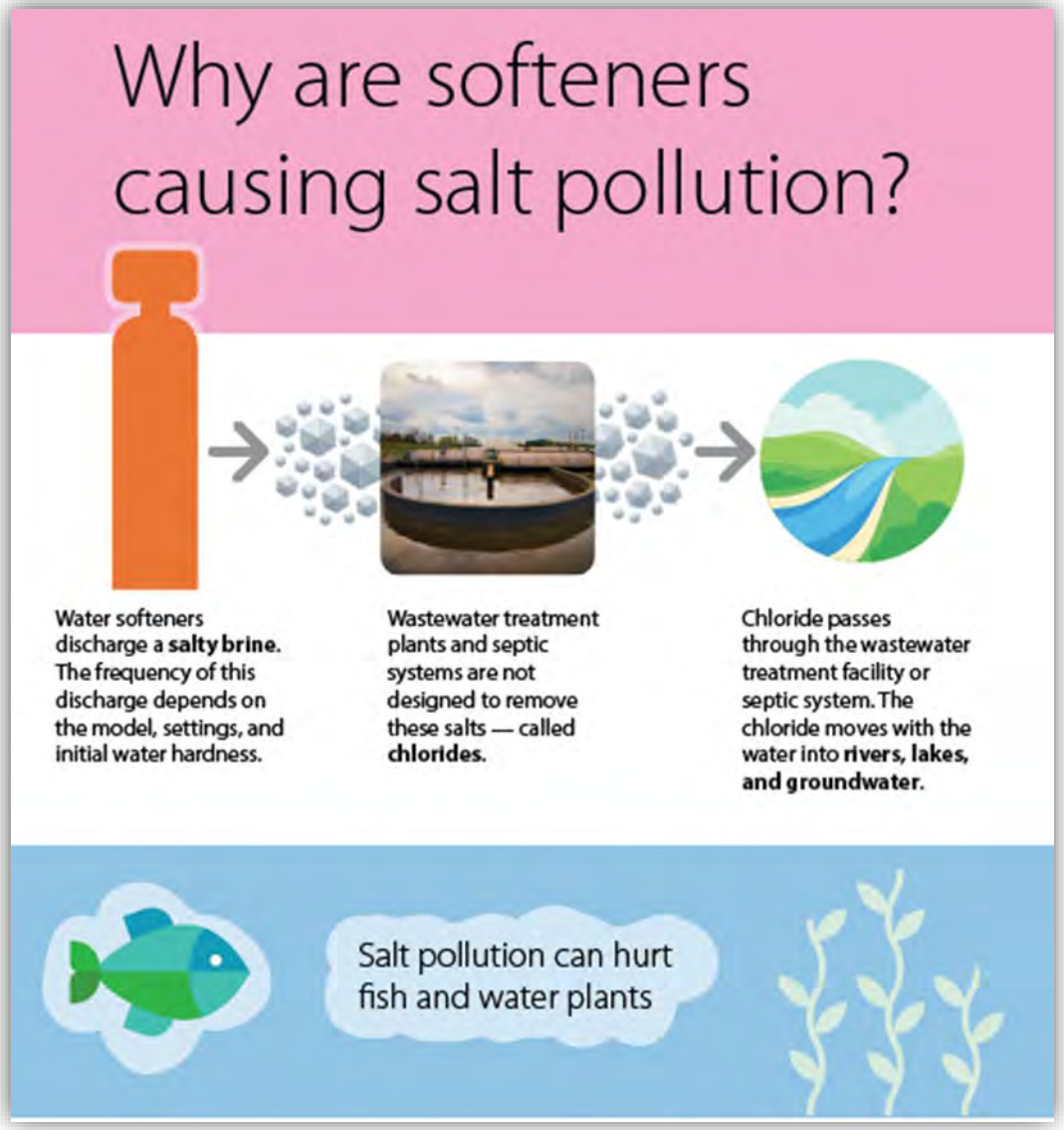
Resources

Chloride Resources

- Model ordinances for chloride reduction
- Water softening rebate guide
- Model snow and ice policies
- Model winter maintenance contract
- Educational resources

www.pca.state.mn.us/water/statewide-chloride-resources

Salt Dilemma Display & Water Softener Educational Banners



MINNESOTA POLLUTION CONTROL AGENCY

Thank you!

BROOKE ASLESON

CHLORIDE PROGRAM ADMINISTRATOR

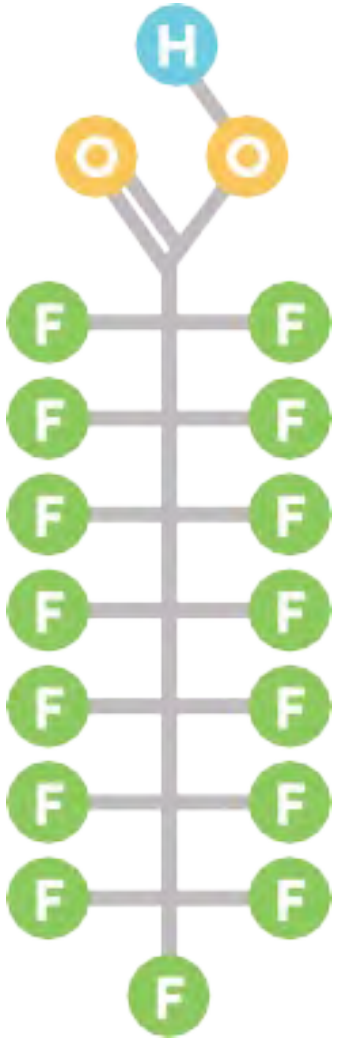
brooke.asleson@state.mn.us

PFAS Blueprint

MINNESOTA

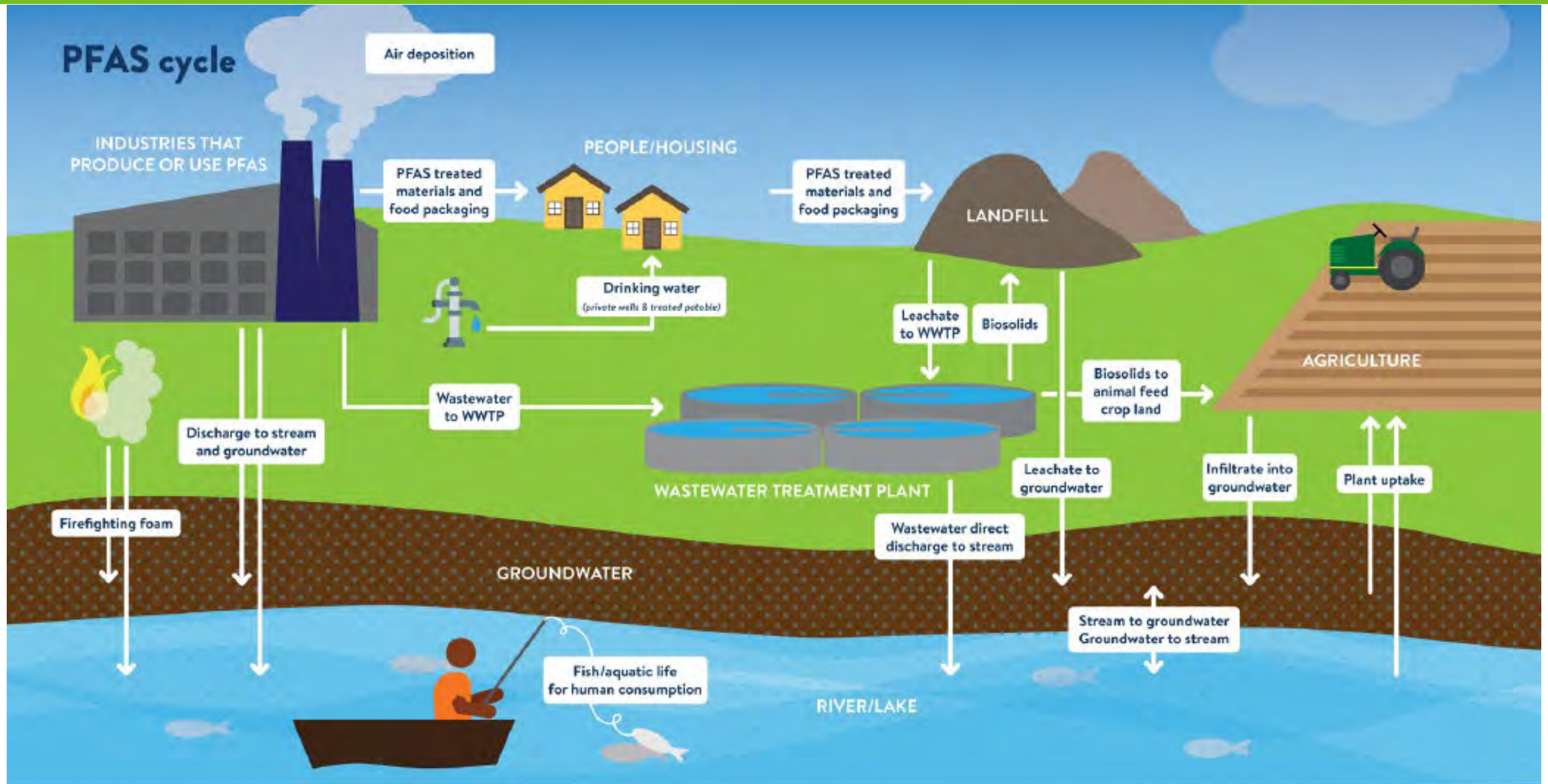
September 18, 2023

What are PFAS?



- Per- and poly-fluorinated alkyl substances (also called “forever chemicals”
  - Contain carbon-fluorine bonds that do not break down in the environment
  - Build up in our bodies over time
  - Cause health problems (cancer, immune system disfunction, liver damage, and others)
- PFAS are ubiquitous in products used for non-stick coatings, stain proofing, cleaning, and much more

Managing PFAS is challenging -- mobility and persistence



Statewide strategic response

Minnesota's PFAS Blueprint supports a holistic and systematic approach to address PFAS.

PFAS response actions:

Prevent
PFAS pollution wherever possible

Manage
PFAS pollution when prevention is not feasible or pollution has already occurred

Clean up
PFAS pollution at contaminated sites

MPCA PFAS Monitoring Plan

Gather Minnesota-specific information in order to craft effective policies around PFAS and their incorporation into MPCA programs

Identify areas of particular concern that warrant quick action

Gather data that galvanizes support for PFAS source reduction and pollution prevention

2023 Legislative Session

- **$2.07M to MPCA for staffing to implement the PFAS Blueprint**
- **Policy items**
  - PFAS water quality standards
  - PFAS ban in nonessential uses
  - PFAS in firefighting foam and equipment
  - PFAS manufacturer’s fee
  - PFAS in pesticides

2023 Legislative Session – Clean Water Fund

MPCA

- Monitor PFAS in Class 1 waters (drinking water supply)

DNR

- Monitor PFAS in fish

MDH

- Risk assessment and laboratory capacity

MetCouncil

- Implement projects to address emerging threats to drinking water supply

Questions?

Water Sustainability Planning for the Metro Region

METROPOLITAN COUNCIL

Presented to Clean Water Council on September 18, 2023

Contents

METROPOLITAN COUNCIL

Metropolitan Council

The Metropolitan Council is the regional **policy-making body, planning agency, and provider of essential services** for the Twin Cities metropolitan region.

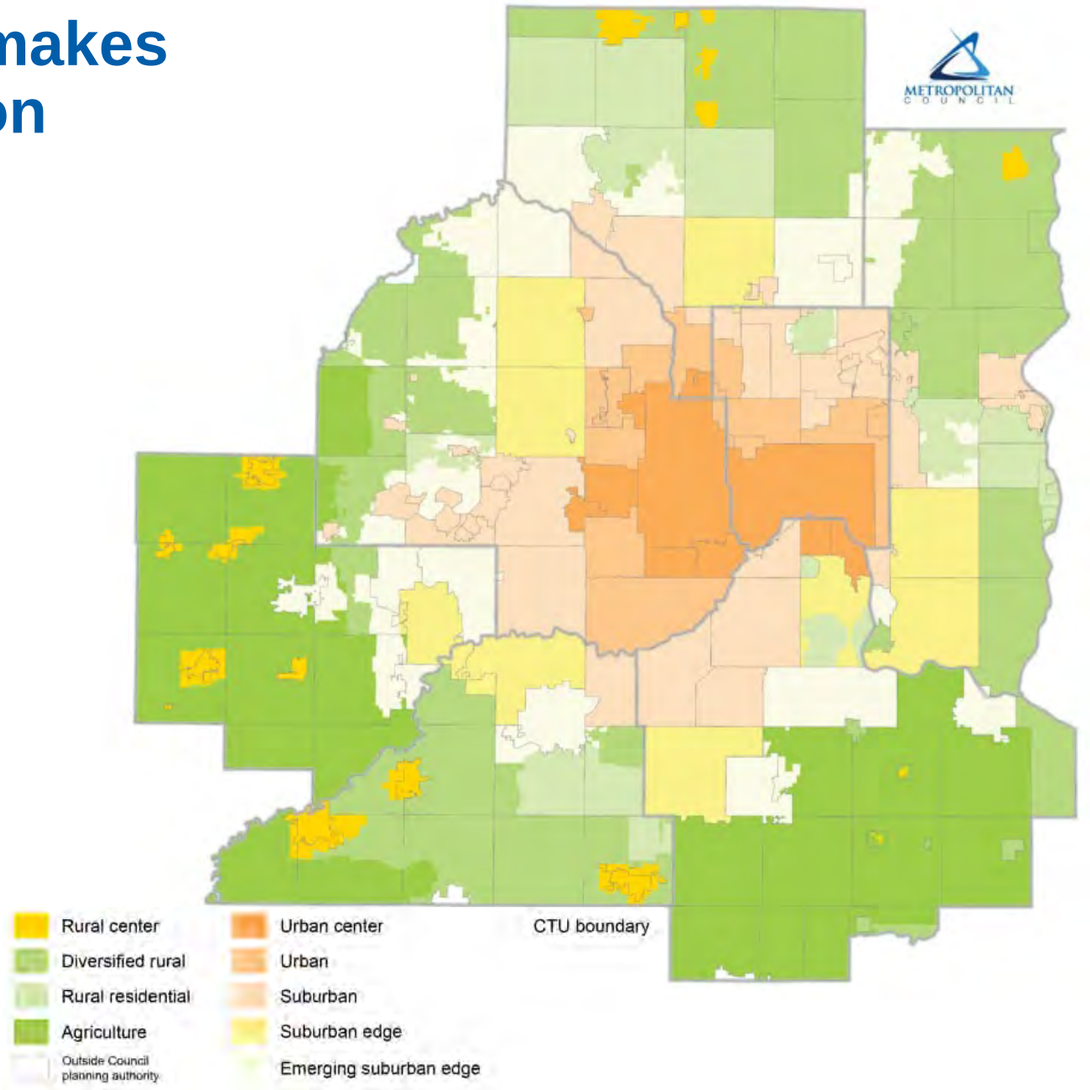


The Council's mission is to foster efficient and economic growth for a prosperous region.

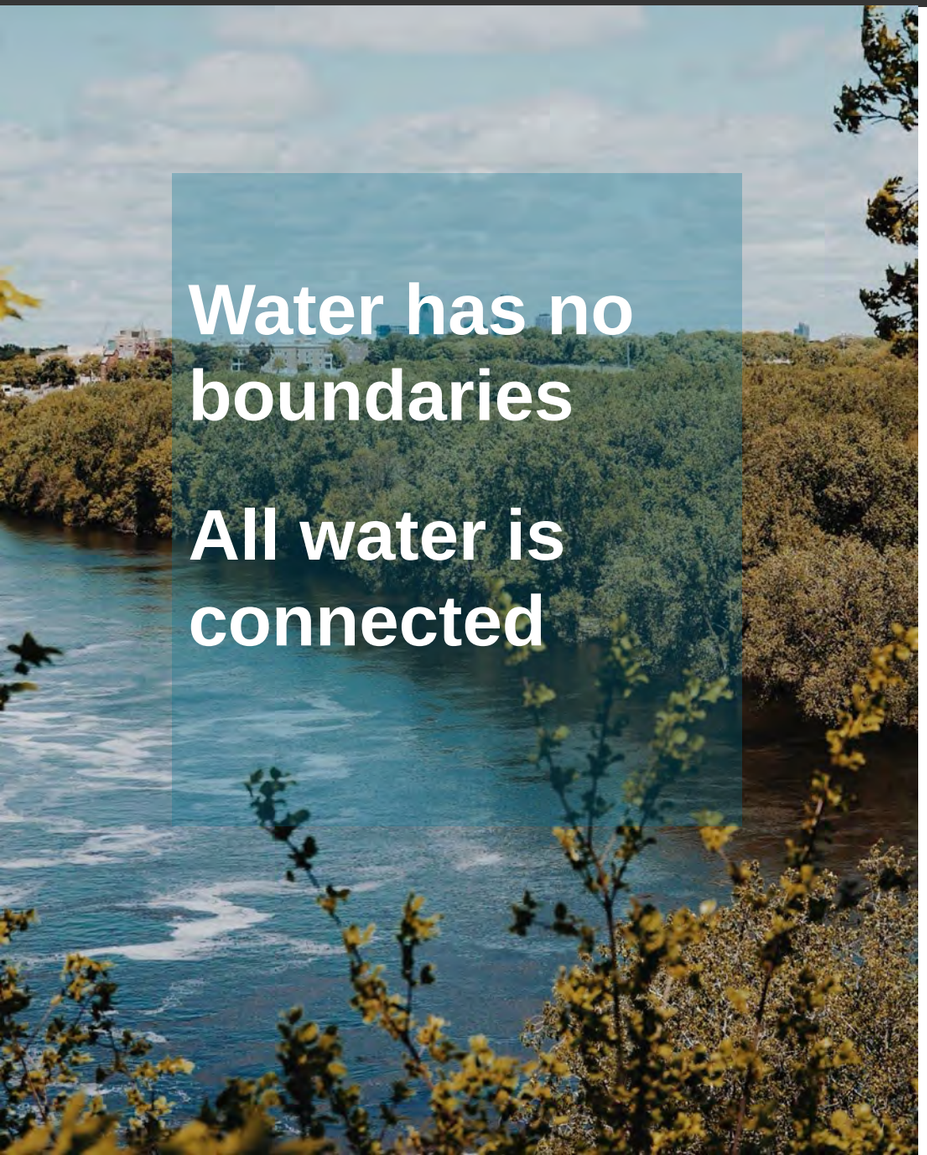
No one community can do it alone

Every single person and community makes up the fabric and essence of the region

- 7 counties
- 182 cities and townships
- More than 3 million residents, ~65% of MN population
- Native people from 11 recognized Minnesota tribes and many other tribal communities
- Growing diversity representing wide-ranging racial and ethnic people, with about 300 languages spoken at home
- Land uses similar to many landscapes statewide



Environmental Services core areas of responsibility



- Wastewater collection and treatment
- Wastewater planning
- Water quality
  - Surface water monitoring
  - Watershed planning
  - Water resources protection
- Water supply planning
  - Metro Area Water Supply Plan
  - Subregional groups
  - Efficiency grants

Environmental Services: Clean water for future generations

Partner

Convene, engage, collaborate, and build solutions with our customers, stakeholders, and partners.

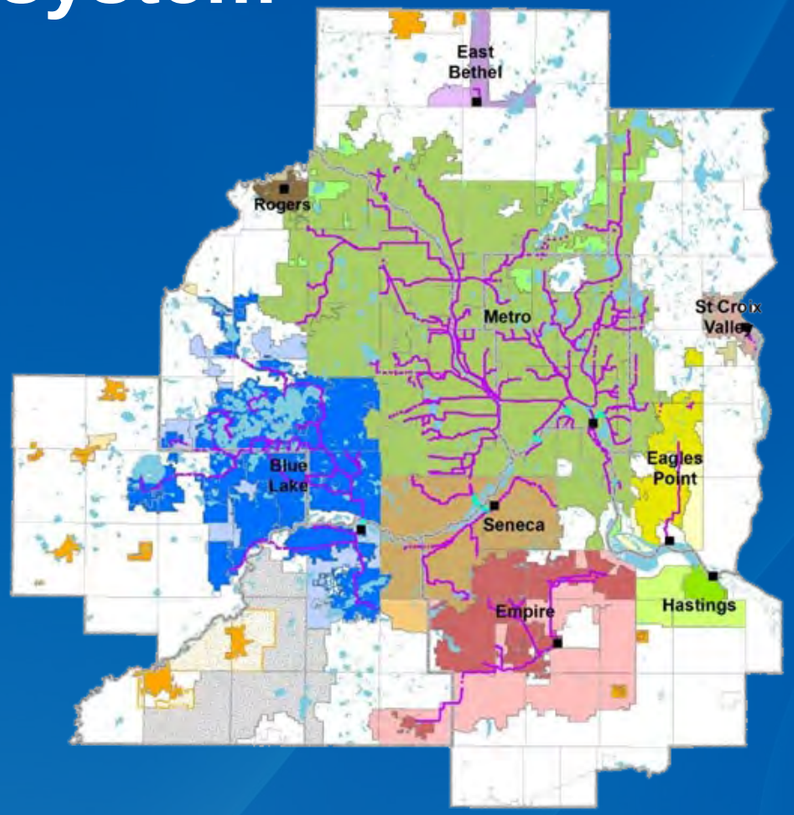
Plan

Assess conditions and identify long-term approaches and infrastructure investments.

Provide

Deliver critical services, tools, and resources.

Regional wastewater system

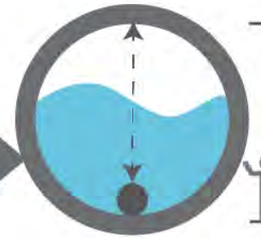


moves and treats
250 million gallons
of wastewater each day

serving **2.7 million**
people in 111 communities in the
7-county Twin Cities metro region

That wastewater moves through privately owned and city sewer pipes into

637 miles
of regional interceptor sewer mains



ranging in size from **9 inches** to **14 feet** in diameter and in age from 140 years old to brand new!

The wastewater also passes

229 meters
measuring how much water is flowing through the pipes.

60 lift stations
pumping water from lower elevation to higher elevation so gravity can help us move it.

on its way to

9 treatment plants
cleaning the water before it is returned to the environment.

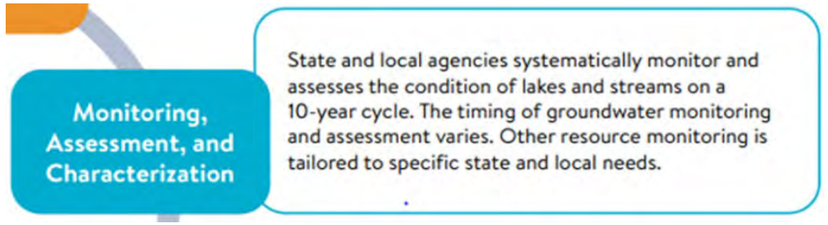
Minnesota's watershed framework

Metropolitan Council participates in each step, often in collaboration with state agency partners

Met Council and the watershed framework

Monitoring, assessment, and characterization

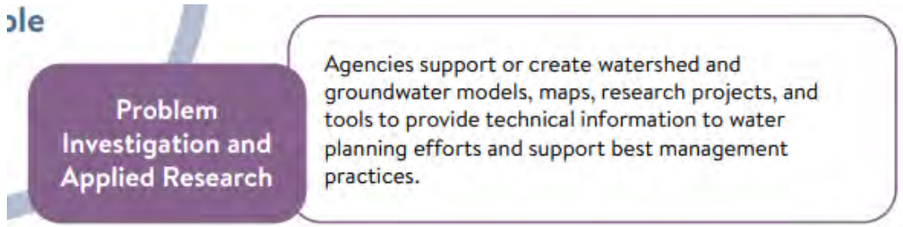
- Take the lead on quality and quantity monitoring for the metropolitan area (agreement with MPCA)
  - Lakes
  - Rivers and streams
- Wastewater effluent impacts
- Fill gaps in assessments of lake, stream, river, and groundwater data
- Maintain regional database, Environmental Information Management Systems (EIMS), to provide access to information from our monitoring programs

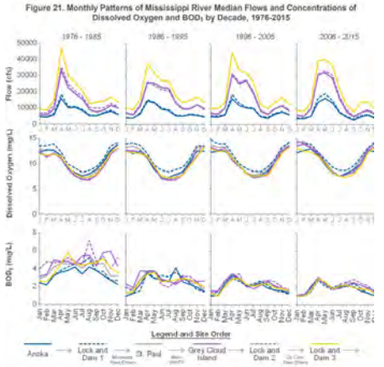


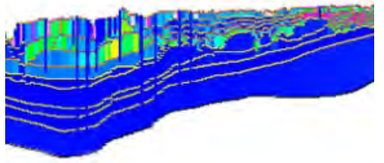
Met Council and the watershed framework

Problem investigation and applied research

- Assess and evaluate long-term water quality trends for the region's lakes, streams, and rivers
  - For example, chloride trends
- Development of Water Supply Atlas
- Metro Model 3
- Stormwater Research Council participation
- Turfgrass and Lawns
- Pollutant load investigation (point and nonpoint)



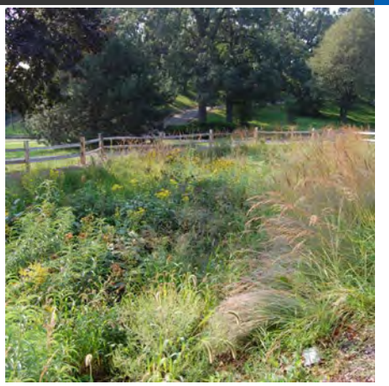


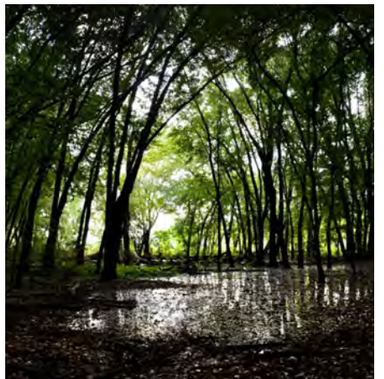


Met Council and the watershed framework

Restoration and Protection Strategy Development

- Primarily, our work for identifying strategies comes from:
  - Applied research (previous slide)
  - Or planning (next slide)
  - Data sharing and technical assistance

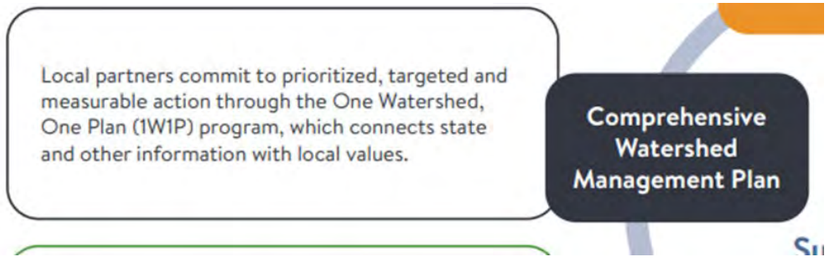


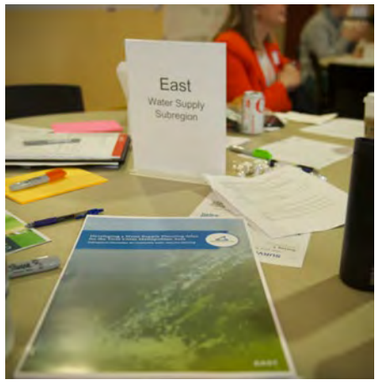


Met Council and the watershed framework

Planning

- 10-year comprehensive plan guiding documents
- Regional Development Guide
- Water Policy Plan
- Metro Area Water Supply Plan
- Plan review
- Water supply plans
- Metro watershed plans
- Technical assistance for planning
- 1W1P
- Convene discussions for regional water challenges
- Priority Waters List

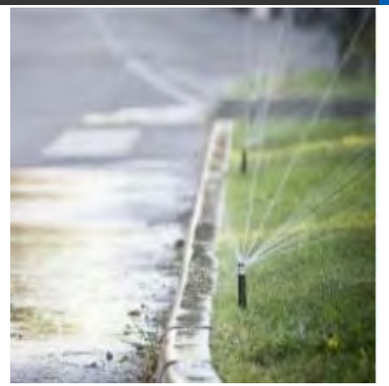




Met Council and the watershed framework

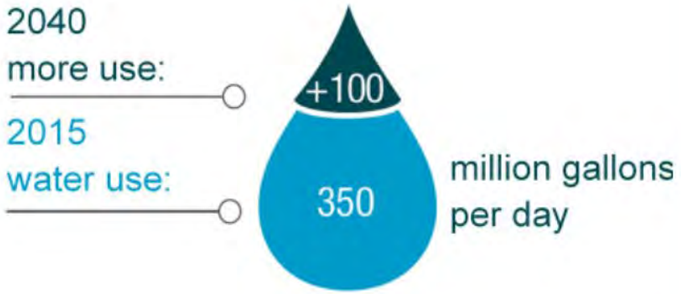
Implementation

- Financial assistance
  - Water efficiency grants
  - MnTAP
  - Inflow and Infiltration Grant Program
  - Past green infrastructure grants
  - Past water protection grants
- Technical assistance
  - Small-site BMP manual
  - Inflow and Infiltration
  - Reuse guide
- Wastewater treatment and emergency response
- Wastewater capital improvement projects



Water supply challenges

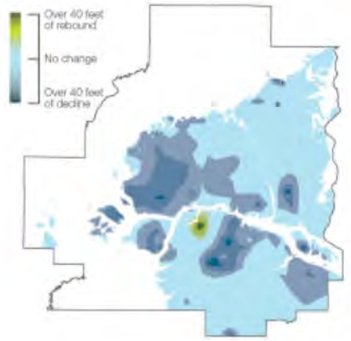
Projected Water



Projected 2040 Growth

500,000 more people
200,000 more households
200,000 more jobs

Metro Model projects aquifer decline from more pumping



environmental permits, registrations & potential contaminated sites

57,600

recorded in MPCA's
What's in My Neighborhood

Climate Challenges

drought
groundwater recharge
flooding

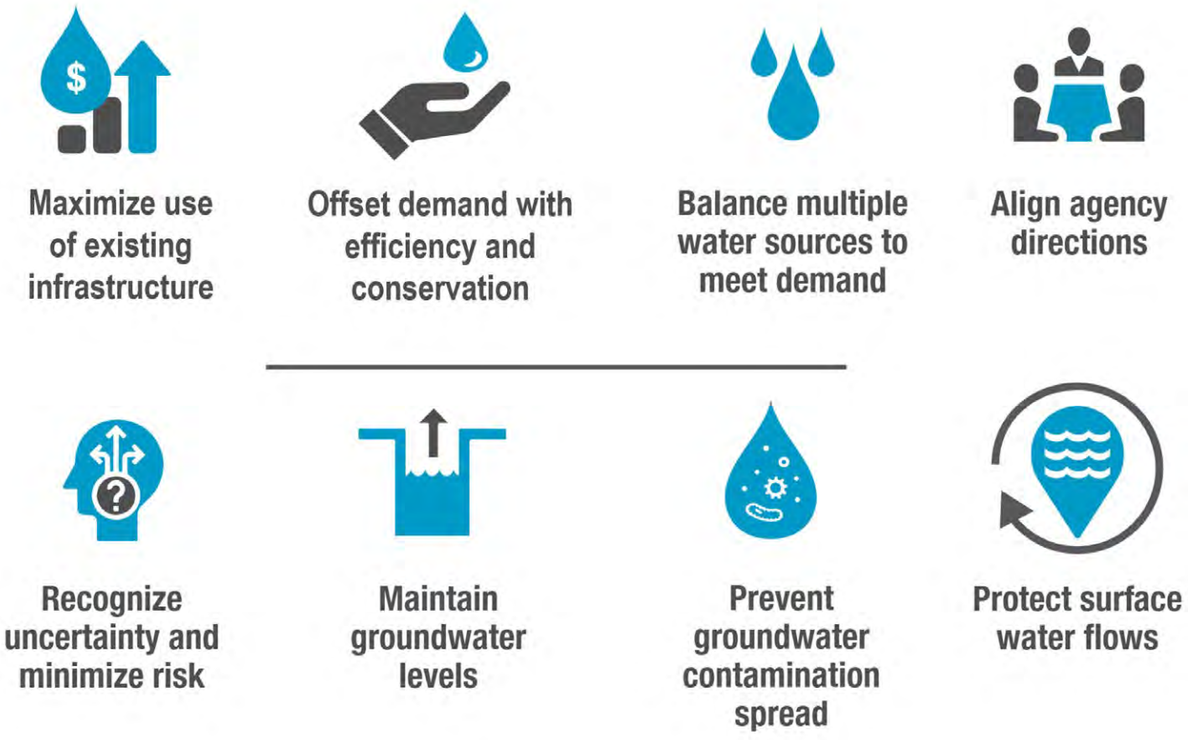
Emerging Issues

economic shifts
new contaminants
COVID-19 pandemic

Metropolitan area water supply sustainability support

Sustainable water supply now and in the future

- All people have access to clean, safe, affordable water and wastewater services
- All water and wastewater systems have sufficient funding to provide affordable services
- All communities share in the economic, social, and environmental benefits of investment in water systems



Clean water-funded sustainability work

Supports local decision making and project implementation to:

- Address emerging drinking water supply risks, threats, and water supply reliability
- Provide cost-effective regional solutions
- Leverage inter-jurisdictional coordination
- Prevent degradation of groundwater resources

Clean water-funded sustainability work

Collaborative & cost-effective solutions

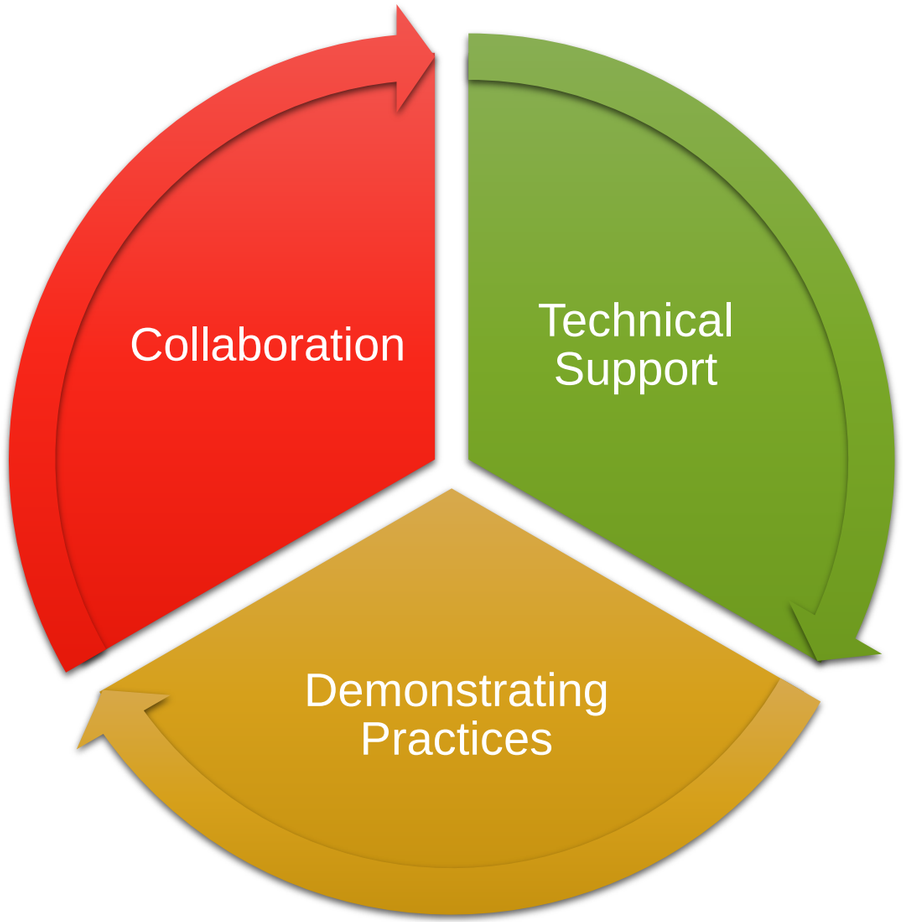
- Feasibility analyses of alternatives
- Water supply system resiliency

Technical support

- Groundwater modeling
- Water demand projections

Best management practices

- Lawn irrigation efficiency (U of M)
- Industrial water efficiency (MnTAP)



Clean water-funded sustainability work

Results:

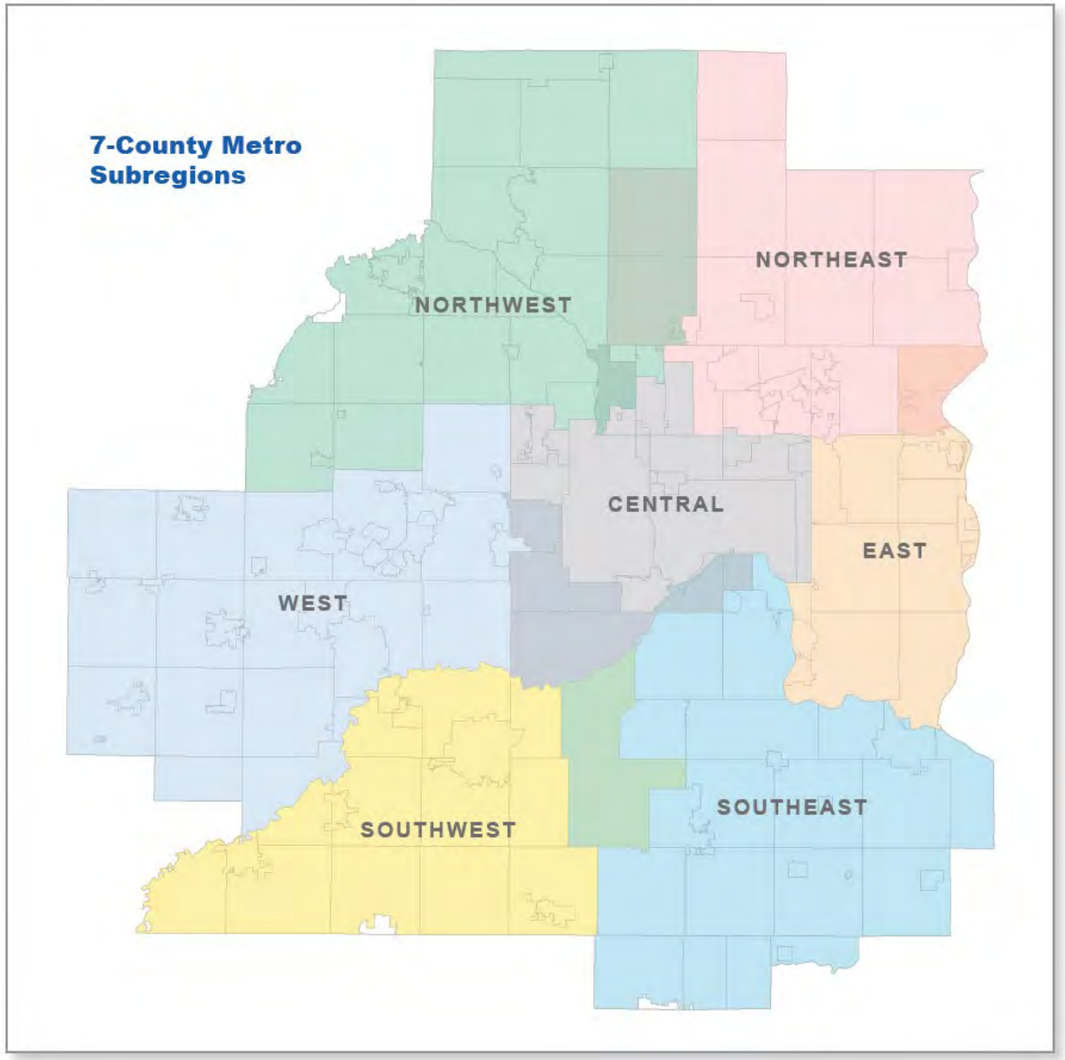
- Increased collaboration
- Implementation of sustainable approaches
- Water efficiency
- Improved project implementation
- Informed decisions

> 500 MGY total water savings

Metro Area Water Supply Planning Atlas

Purpose

- Compile and summarize water supply data for the region
- Provide information that better connects local and regional planning
- Develop a tool that can inform water supply planning conversations and help communities to collaborate
- Promote a shared understanding of water and water supply planning
- Better identify and understand local and regional water challenges



Metro Area Water Supply Planning Atlas

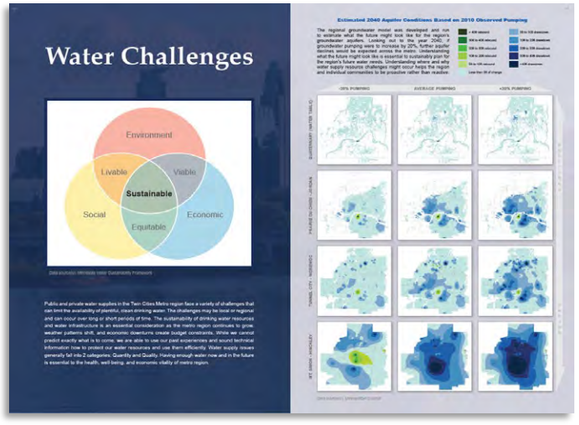
A Planning and Engagement Tool

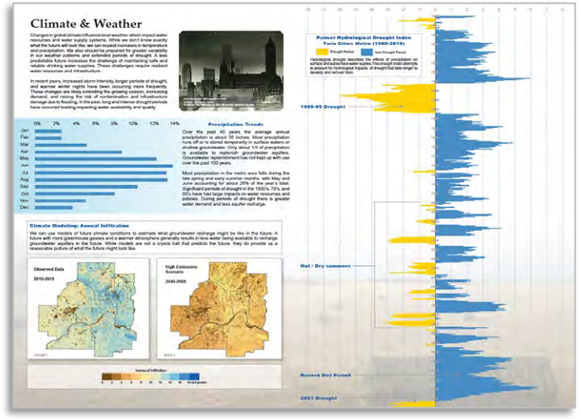
Council

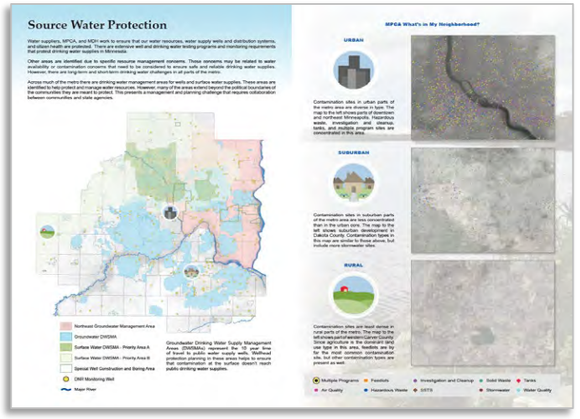
- Engage communities around their local perspectives and challenges
- Engage internal audiences to better connect water planning to other Council planning efforts
- Reach out to new and non-technical audiences
- Develop sound information that reflects the region

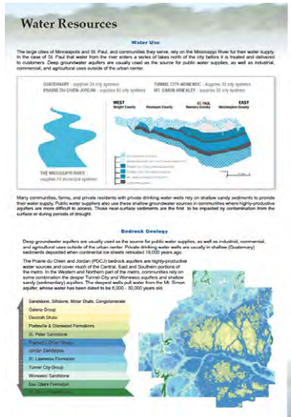
Communities and Other Stakeholders

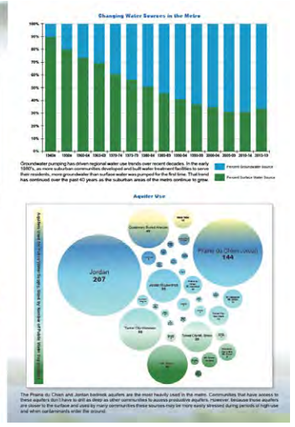
- Engage with neighboring communities
- Communicate with residents, city staff, and local representatives about water issues and services
- Build support (value) for water and water services
- Inform regional and subregional planning goals and strategies









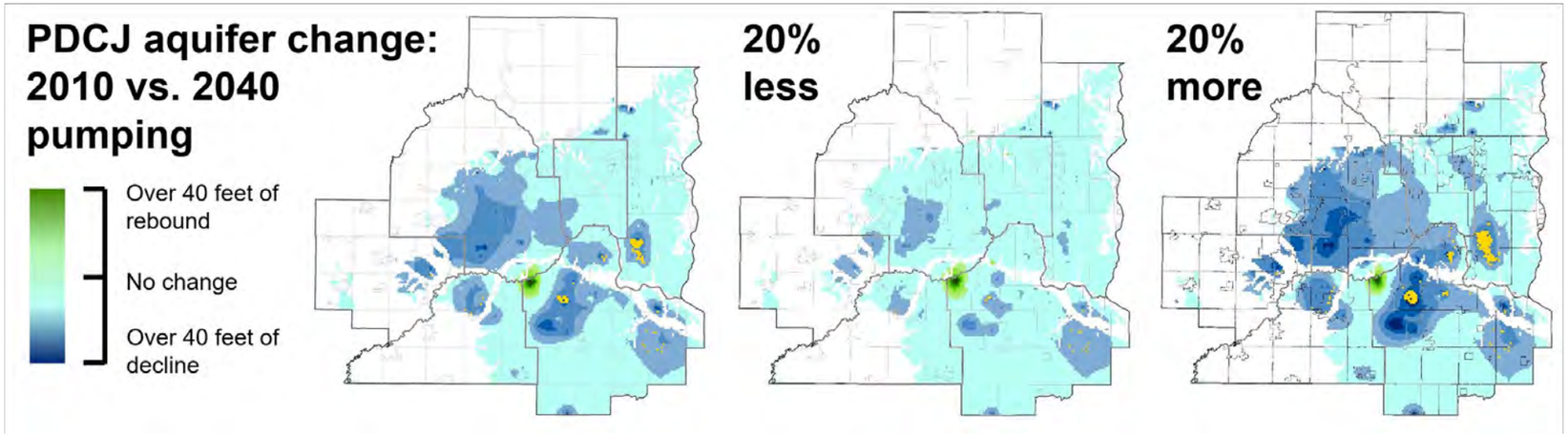


Highlight: Regional groundwater modeling

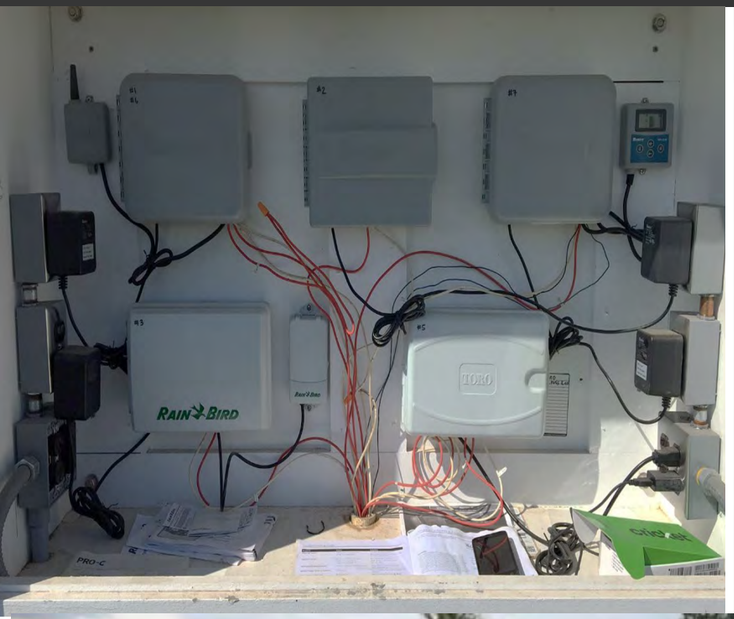
- Supports regional policy
- Many communities use as a starting place for wellhead protection, saving time and money

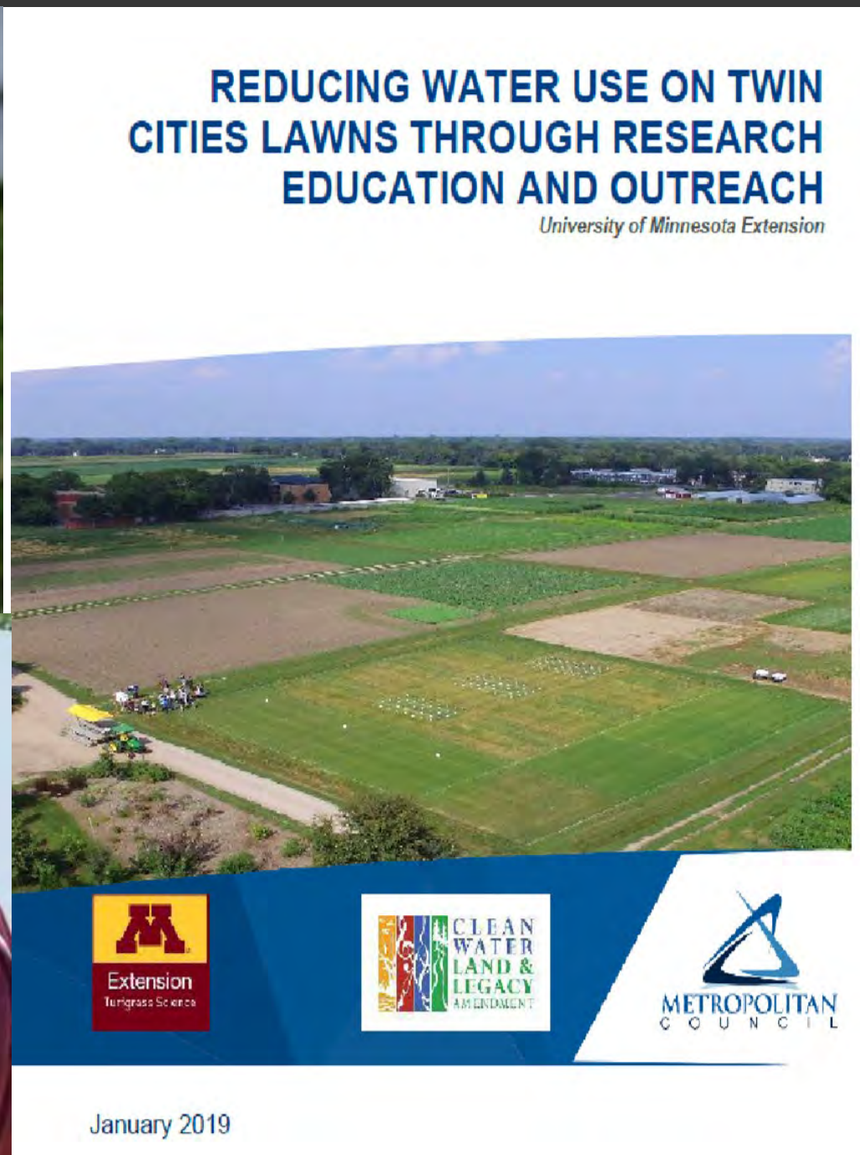
"Encourage the continued development of a metropolitan groundwater model, as a tool to define aquifers and aquifer recharge areas and as a basis for aquifer protection and management."

Bloomington 2040 Comprehensive Plan Update



Highlight: Turfgrass research

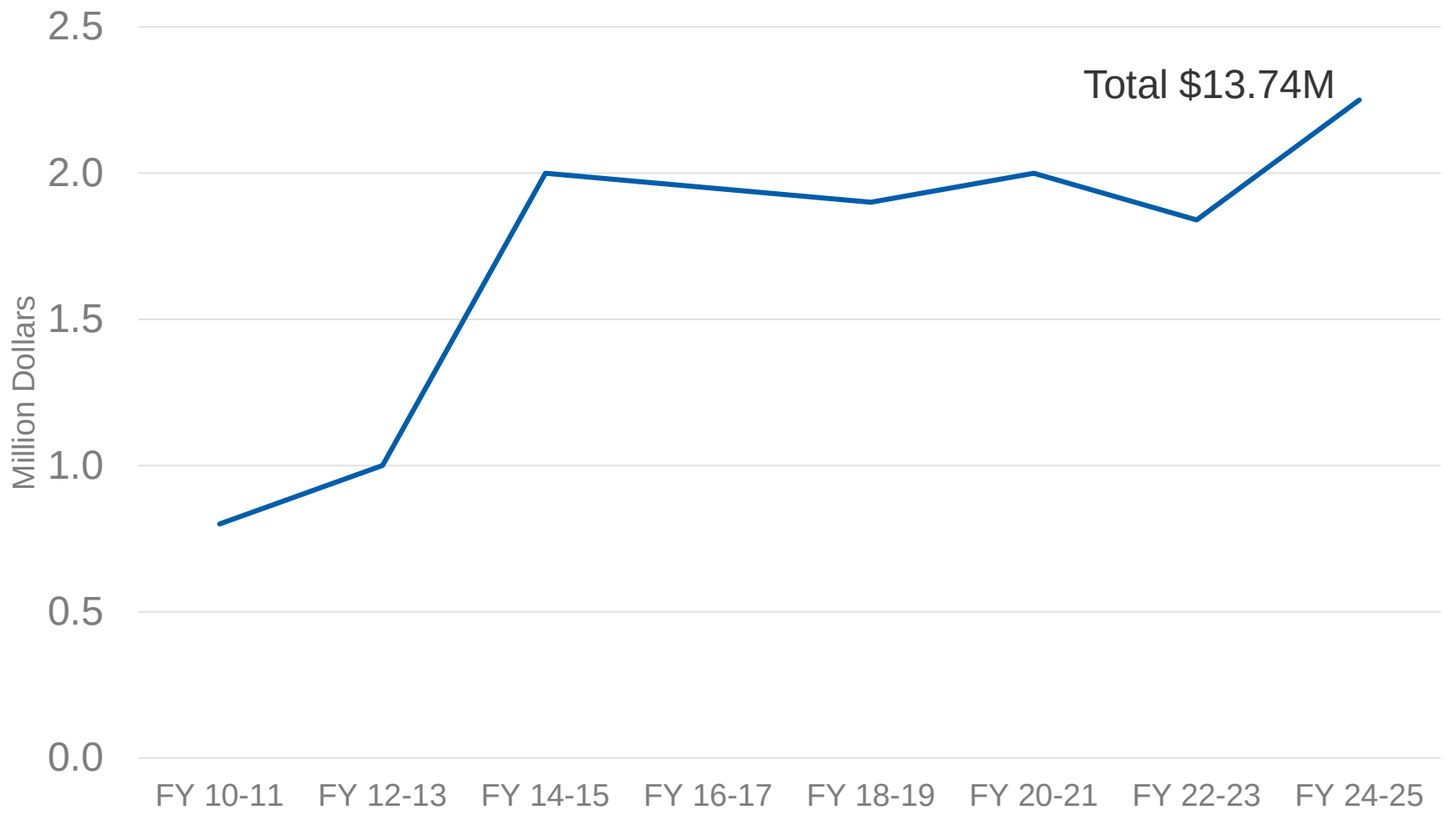




Highlight: MnTAP

- MnTAP founded in 1984
- Water Supply Planning partnership: 2012-2023
- Provide funding to support college summer interns focusing on water efficiency

Metropolitan area water supply sustainability support



Water demand reduction/efficiency grant program

Grants to assist metro municipalities to implement water demand reduction and water efficiency measures:

- Ensure the reliability and protection of drinking water supplies, mainly groundwater
- Support resiliency of water suppliers

Water demand reduction/efficiency grant program

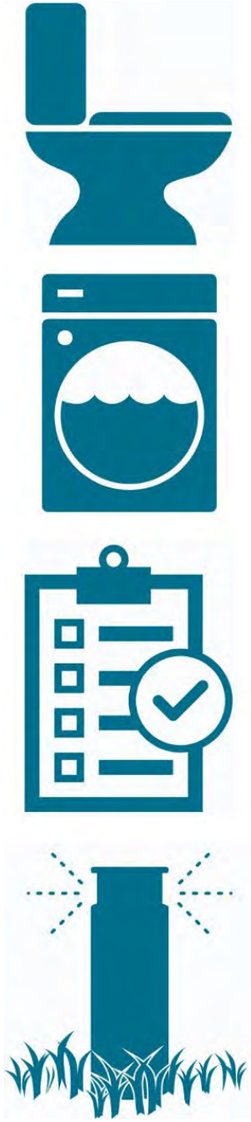
Grants range from $5,000 to $50,000

Cost share grants

- Met Council 80%; municipality 20%
- Grant does not pay full cost of the water-efficient product

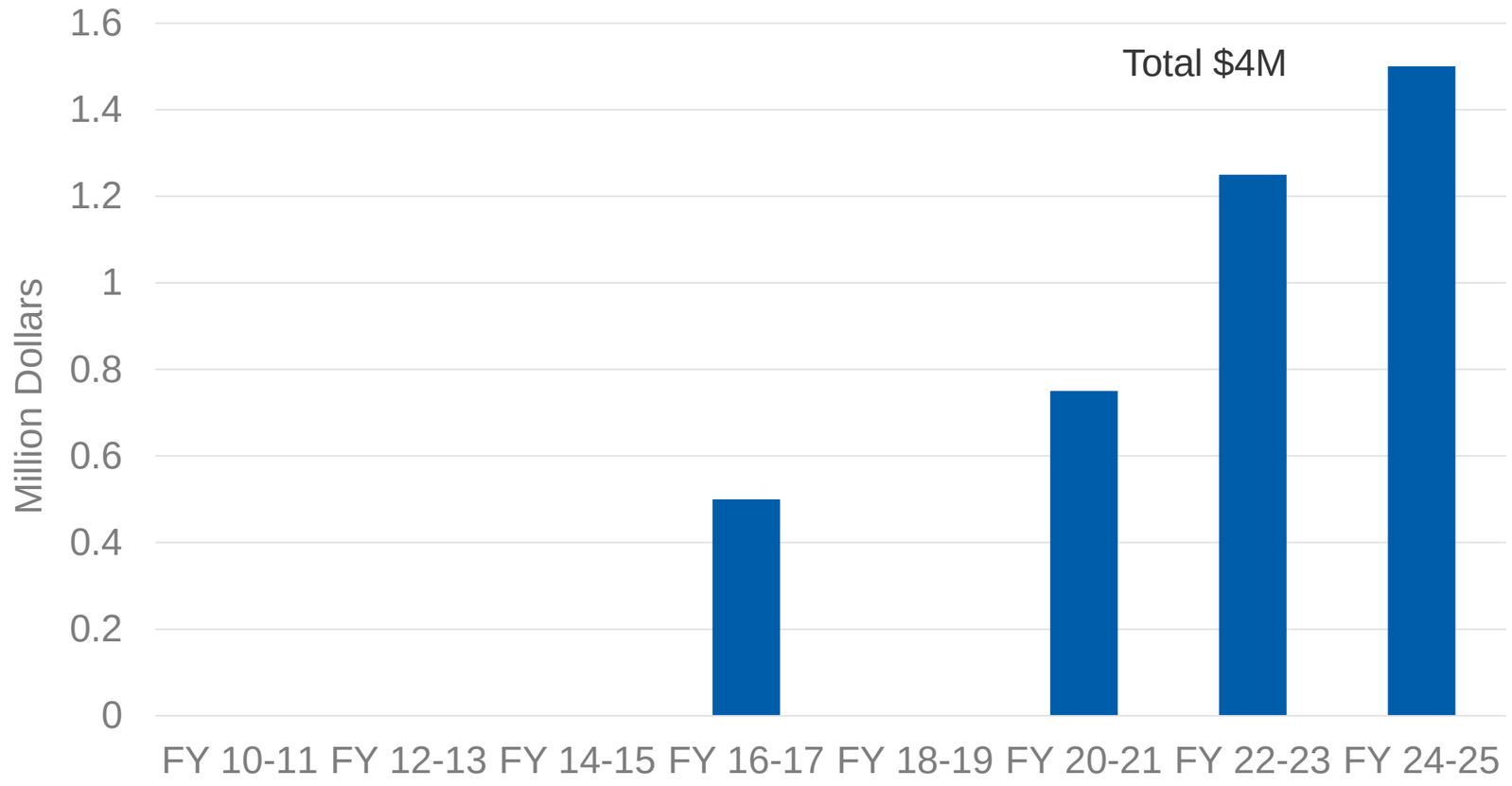
Eligible water-efficient items

- EPA WaterSense-labeled toilets
- Energy Star-rated washing machines
- WaterSense-labeled smart irrigation controllers & sprinkler heads
- Irrigation audits and repairs



Water demand reduction/efficiency grant program

Water demand reduction/efficiency grant program funding



Metropolitan area water supply sustainability support

Looking ahead…

Risk analysis

- Climate change impacts on supply options
- Water sources' reliability and systems' resiliency
- Land use impact on water supply
- Infrastructure challenges

Benefit of new approaches

- Water efficiency and technology

Metropolitan area water supply sustainability support

Looking ahead…

Updating and developing new policies

- Research papers on pressing topics
- Robust engagement effort to understand challenges and opportunities for supply

Drafting 2050 Water Policy Plan

- Ensure sustainable water resources
- Integrated planning approach
- Policies, strategies, and actions
  - For Met Council
  - For 180+ LGUs in the 7-county metro

Questions?

Judy Sventek

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METROPOLITAN COUNCIL

Metropolitan Council Priority Waters List

METROPOLITAN COUNCIL

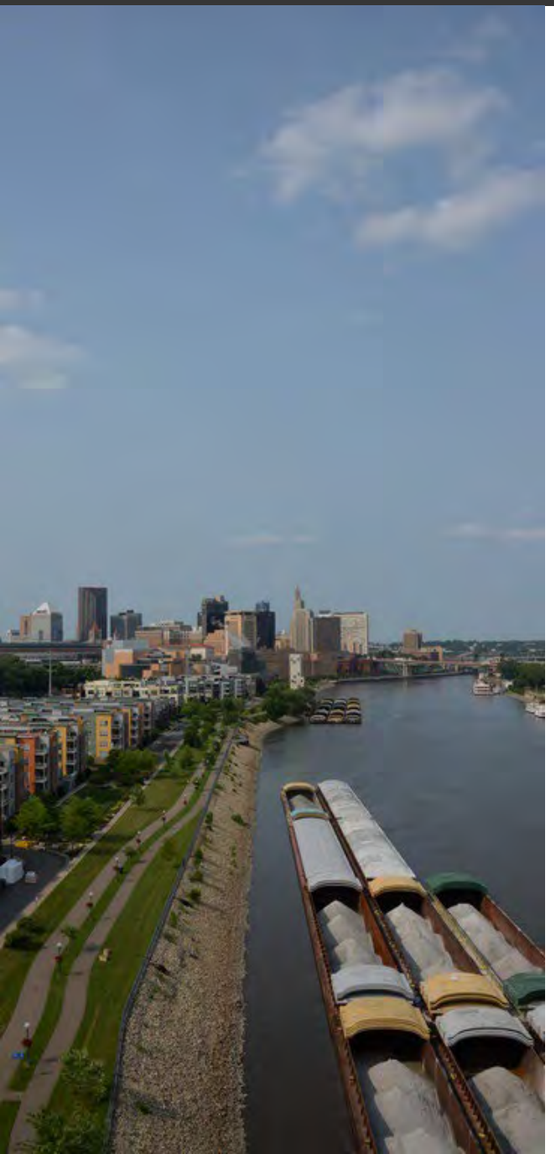
Presented to Clean Water Council on September 18, 2023

What is the Priority Waters List?

Regionally significant waters

- Selected based on their uses and benefits
- Will be used for allocation of resources

Why do we need a Priority Waters List?



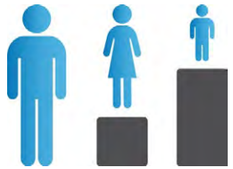
Water is a defining feature of our region

- >950 lakes
- 3 major rivers
- 100s of miles of tributary rivers and streams

We need direction on where to focus our resources.

Creating the List: Uses and Benefits

Drinking Water Protection



Equity

Recreation and Tourism

Industry and Utility

Healthy Habitat

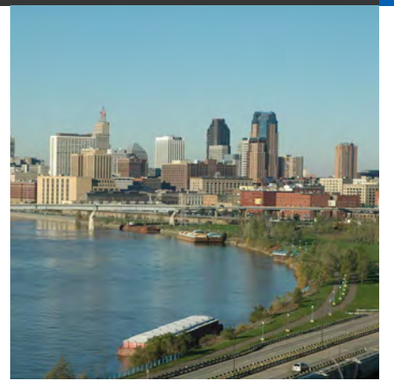
Science and Education

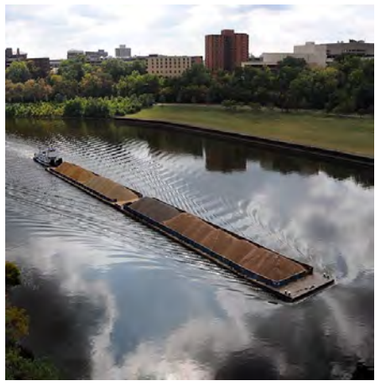
Tranquil Connection

Qualifying for the Priority Waters List

Waters quality for the following reasons:

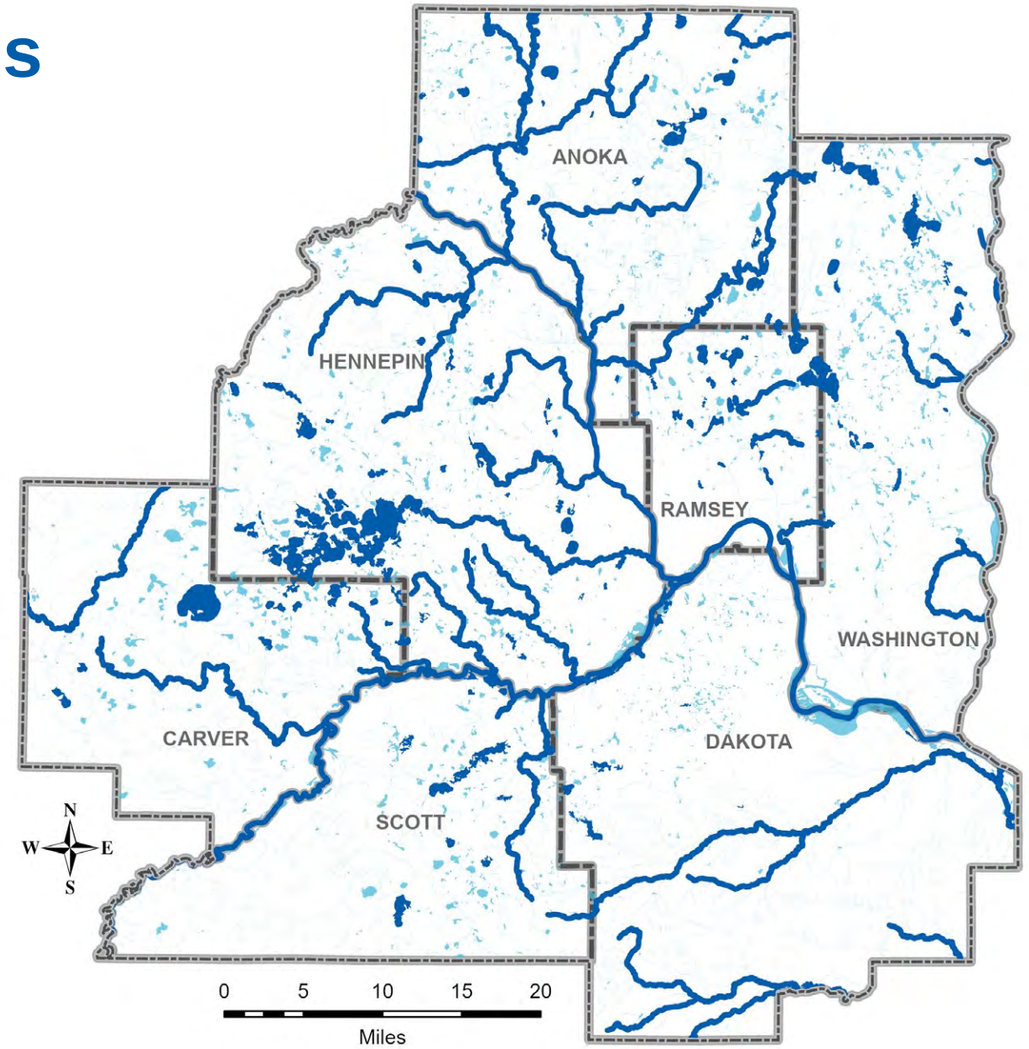
1. A drinking water source
2. High *Recreation and Tourism* score
3. High *Healthy Habitat* score
4. High well-rounded score





Final Priority Waters List

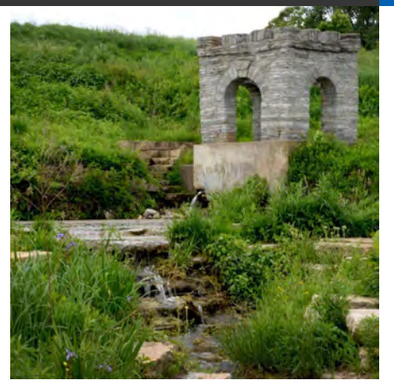
- **141 lakes, 47 rivers and streams**
- **Waterbodies on the list are:**
  - In every county
  - In or touching every watershed organization



How will the Priority Waters List be used?

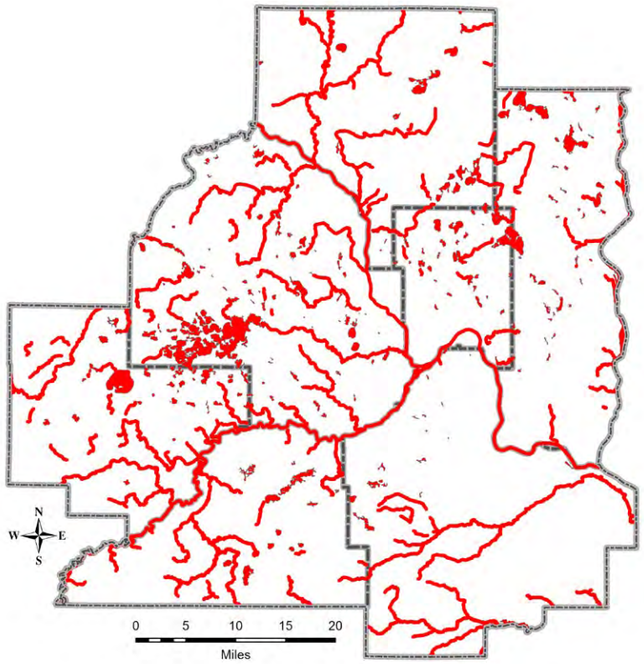
Potential uses are:

- Tool for next Water Policy Plan
- Monitoring program review
- Target assessment of progress in meeting water quality goals
- Environmental review
- Technical assistance to partners
- Grant qualifying criteria
- Additional construction observation
- Education focus
- Resource for other organizations



Improved Resource Targeting Approach

Impaired Waters



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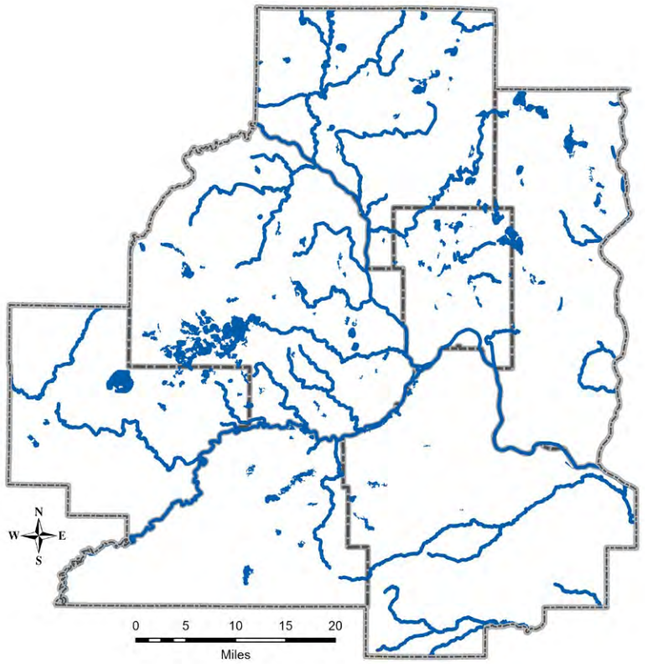
Priority Waters



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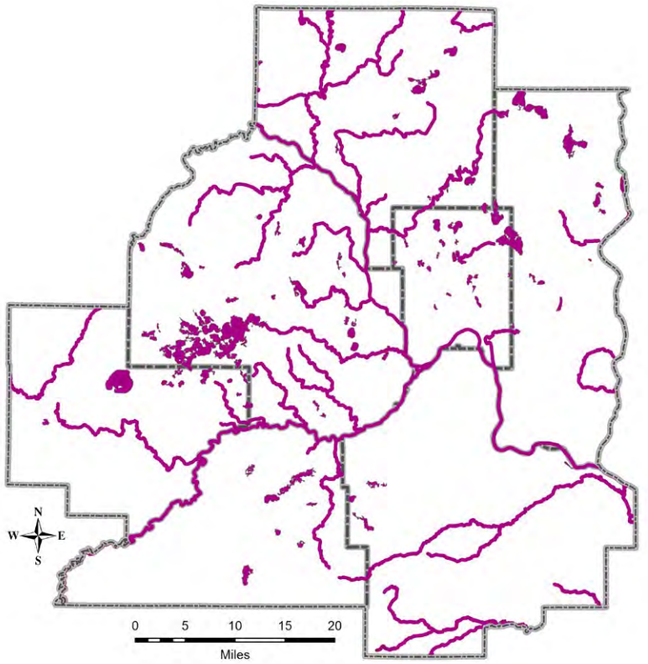
Targeted Selection



Learn More About the Priority Waters List

- **http://metrocouncil.org/prioritywaters**

  OR

  Google “Metropolitan Council”

  & “Priority Waters”

- **Priority Waters List products**
  - Lists of Council priority lakes, rivers, and streams
  - GIS layers
  - Raw scores

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METROPOLITAN
COUNCIL

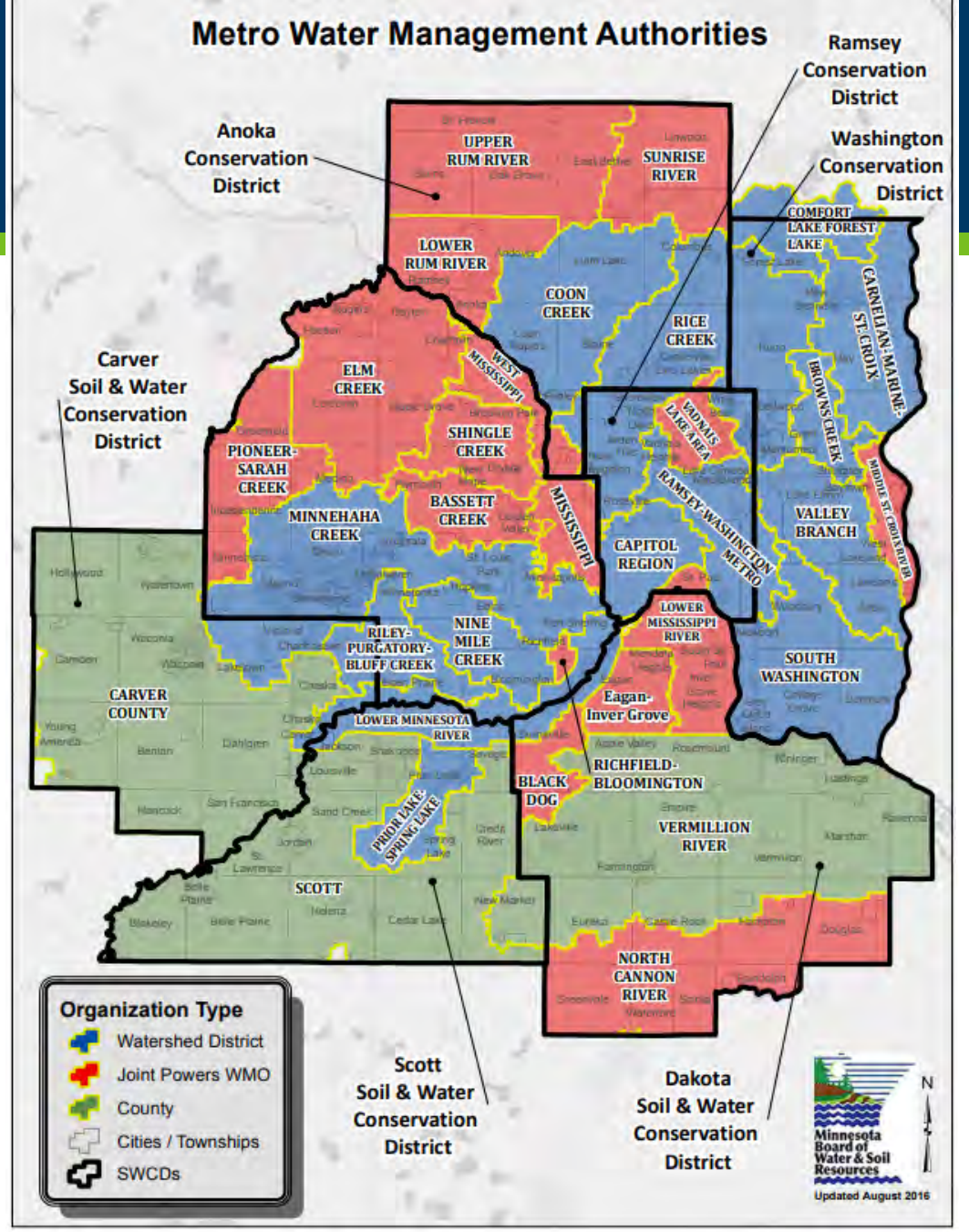
How Metro Watershed Planning & Grants Differ from One Watershed One Plan

Como Lake, St. Paul. Photo credit: Capitol Region Watershed District

Barb Peichel, Clean Water Specialist, Board of Water and Soil Resources (BWSR)

Water Management (Metro)

- 33 Metro Watershed Entities:
  - Watershed Districts within the metro area (14)
  - JPA WMOs (16)
  - County WMOs (3)
- 7 Soil and Water Conservation Districts or CDs
- 7 Counties
- ~182 municipalities (cities and townships)



Metro Water Planning - Why is it different?

1982: Metropolitan Surface Water Management Act

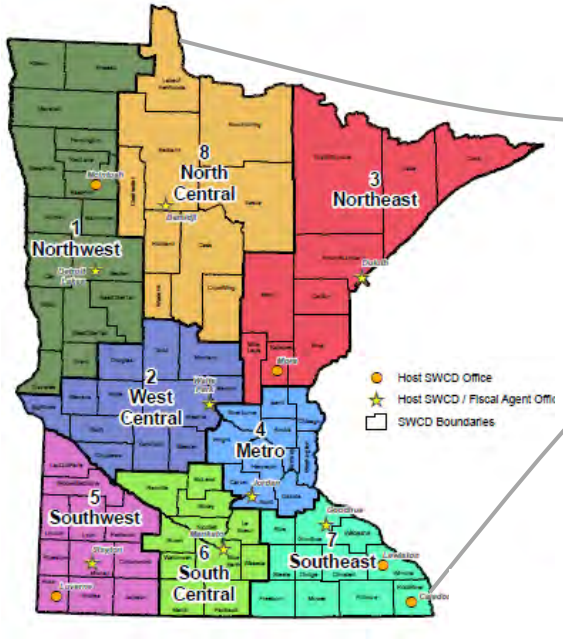
- Required all areas in 7-county metro to prepare and implement watershed management plans
- 103B.231 – *"A watershed management plan is required for watersheds comprising all minor watershed units wholly or partly within the metropolitan area"*

Vermillion Falls, Hastings. Photo credit: Caitlin Abrams

Planning Pre-1982

- No difference between SWCD/WD metro & non-metro planning
- Optional state-wide
- Met Council requirement for local comprehensive plans

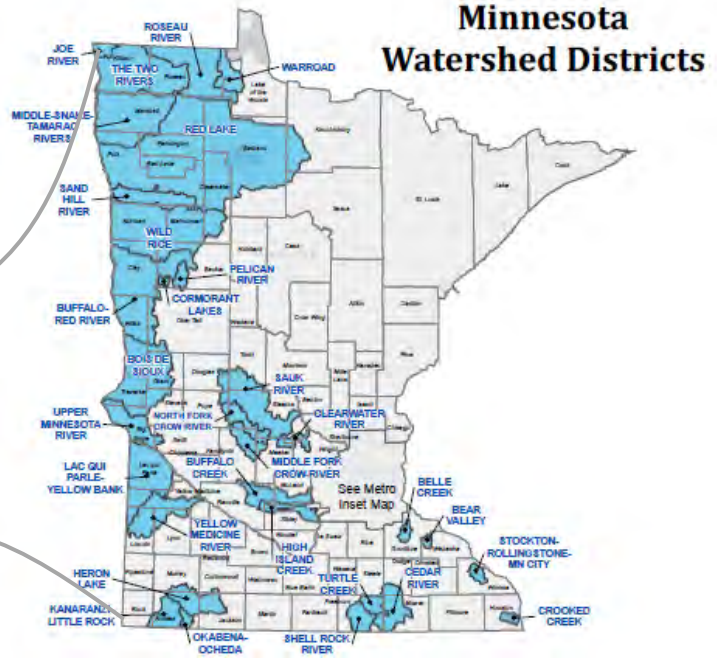
Statewide



MN Soil and Water Conservation Districts (SWCDs)

SWCD Plans *(103C)*

WD Plans *(103D)*



Metro

Comp Plans *(473)*

*Towns, cities, and counties

Planning 1982

- Planning for Metro Watershed Management Organizations (WMOs)/Watershed Districts (WDs) is now required
- Metro watershed planning is governed by 103B

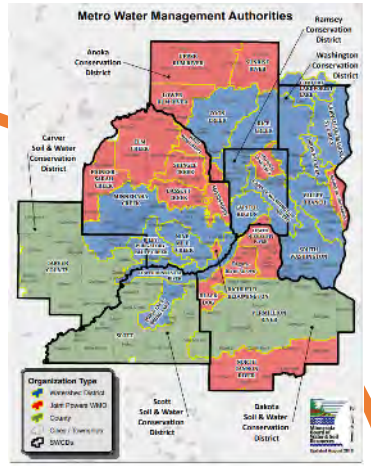
Non-metro

Metro

SWCD Plans *(103C)*

WD Plans *(103D)*

Metro WD/WMO Plans *(103B)*



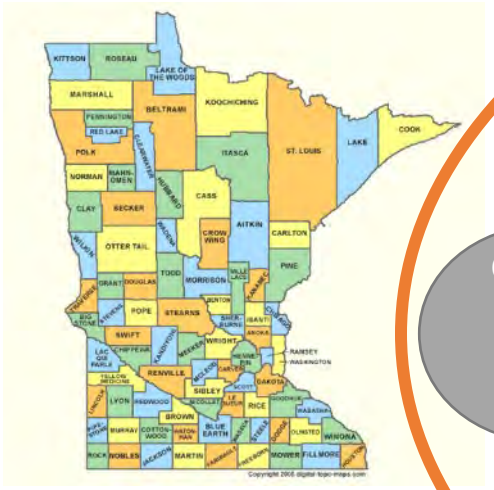
Comp Plans *(473)*

Planning 1985

- Encouraged counties to develop County Water Plans
- Required to receive Natural Resources Block Grant funding

Non-metro

Metro



SWCD Plans *(103C)*

County Water Plans *(103B)*

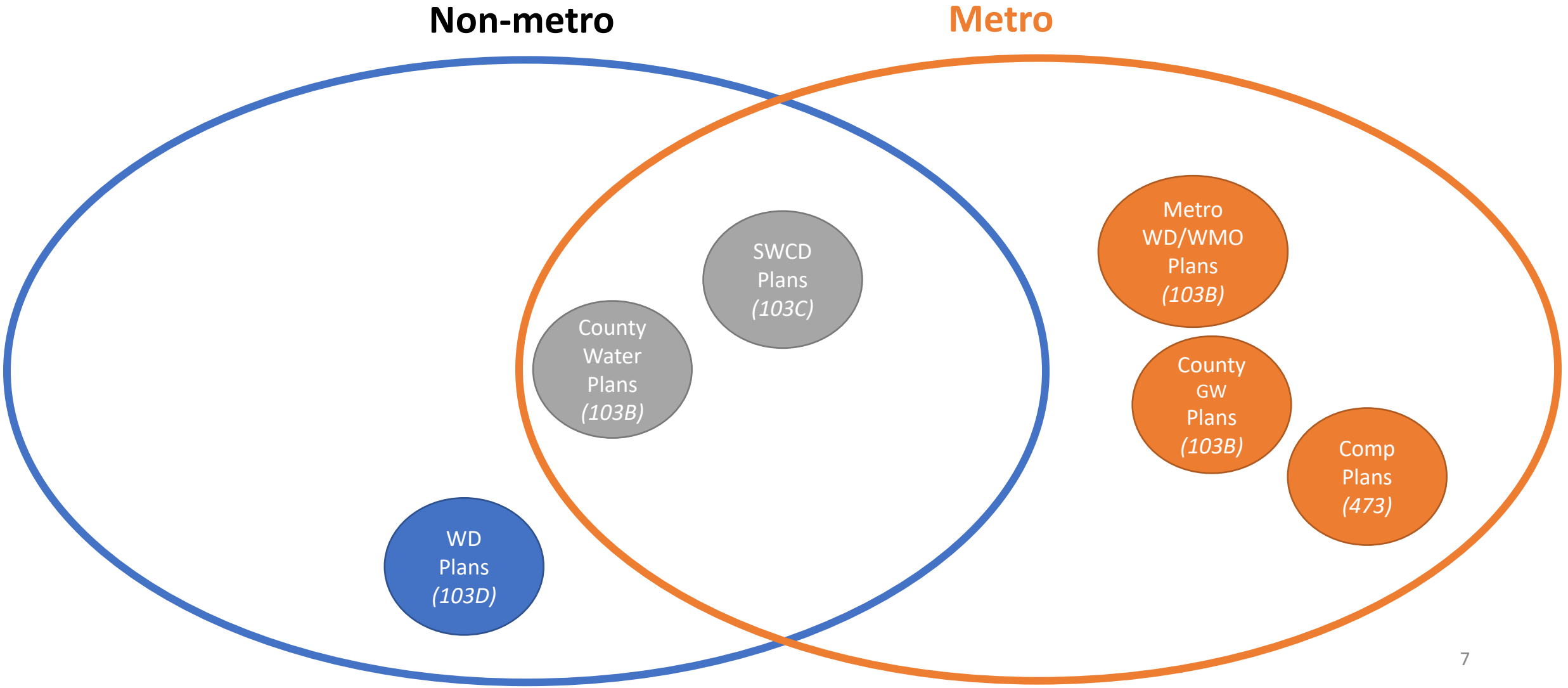
Metro WD/WMO Plans *(103B)*

Comp Plans *(473)*

WD Plans *(103D)*

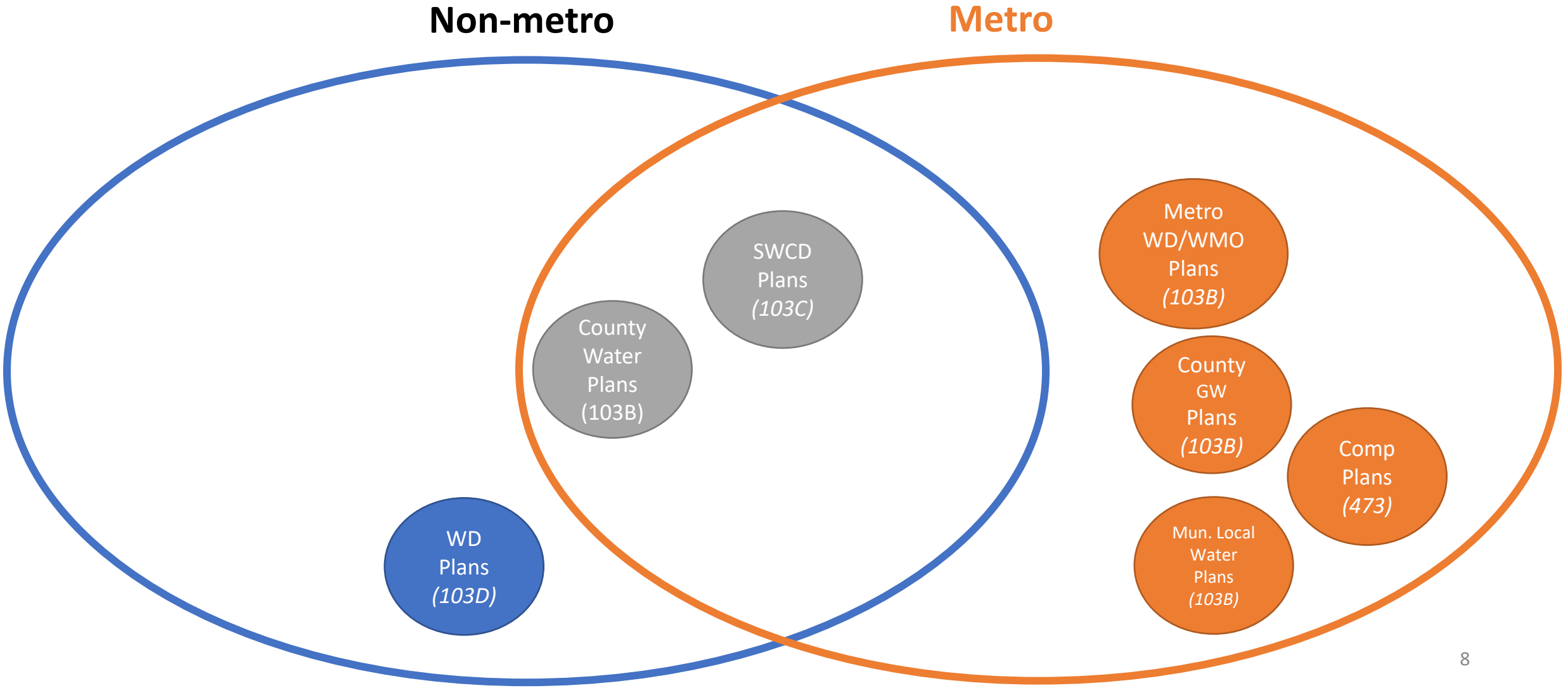
Planning 1987

- Metro counties can now adopt Groundwater (GW) Plans
- Optional
- Eligibility for Clean Water Fund grants



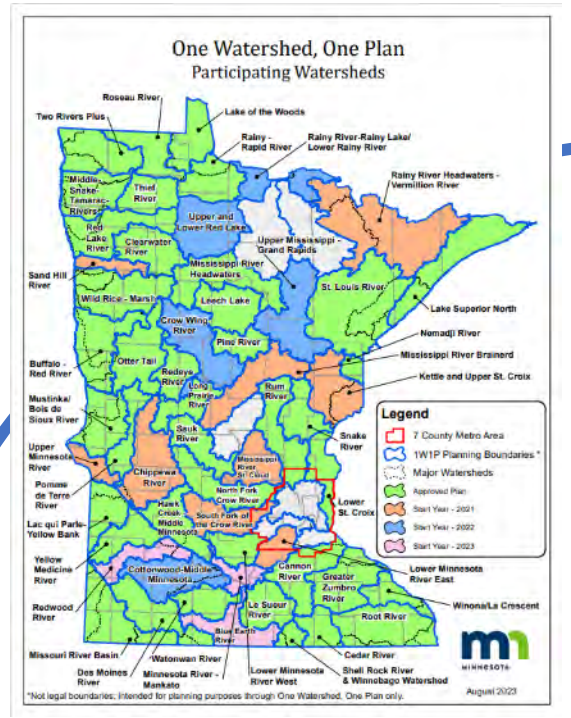
Planning 1990

- Local water management plans that "*bring local water management into conformance with the watershed plan*"
- Reviewed by the Met Council and Metro WD/WMO
- Eligibility for Clean Water Fund grants



Planning 2015

- Comprehensive Watershed Management Plans (CWMP) developed through the One Watershed, One Plan (1W1P) Program
- Optional participation for 7-county metro



Non-metro

Metro

CWMP 1W1P *(103B)*

SWCD Plans *(103C)*

County Water Plans *(103B)*

WD Plans *(103D)*

Metro WD/WMO Plans *(103B)*

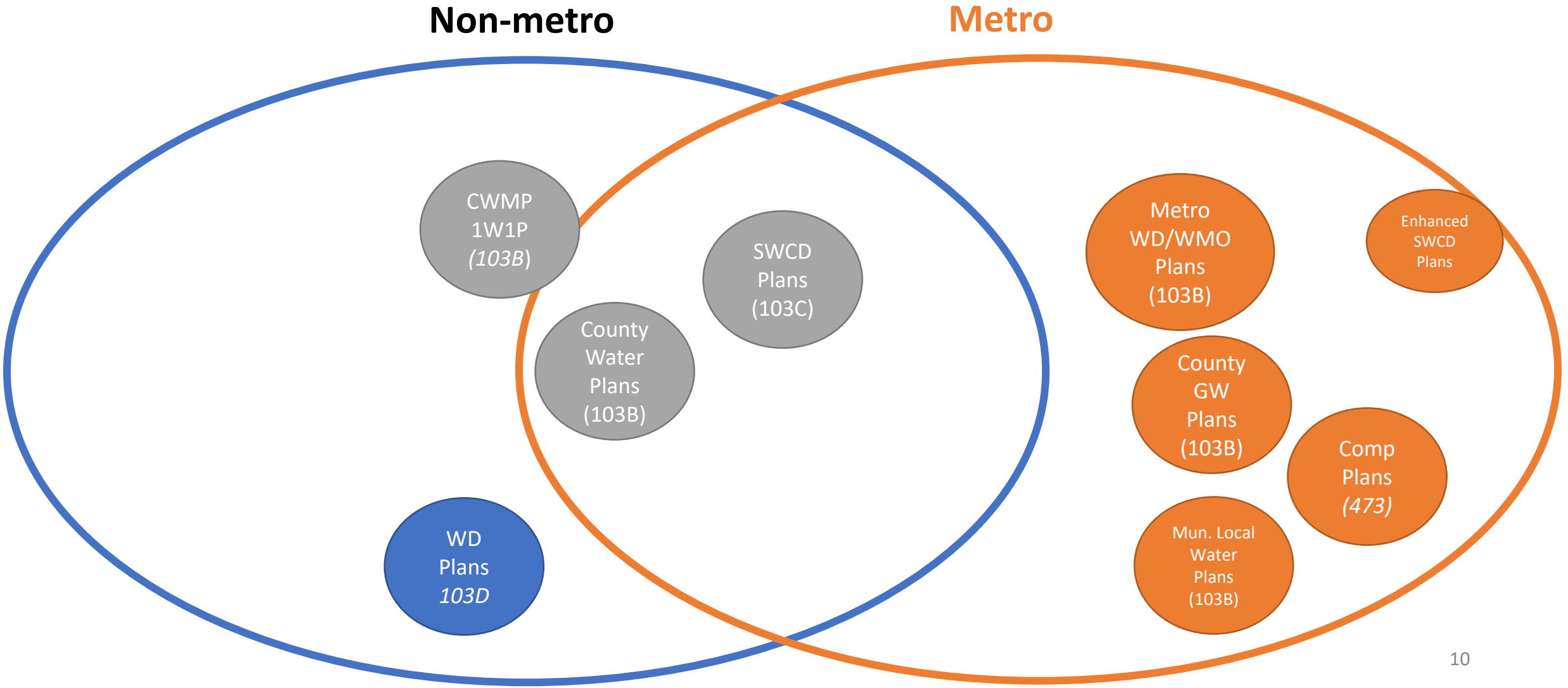
County GW Plans *(103B)*

Comp Plans *(473)*

Mun. Local Water Plans *(103B)*

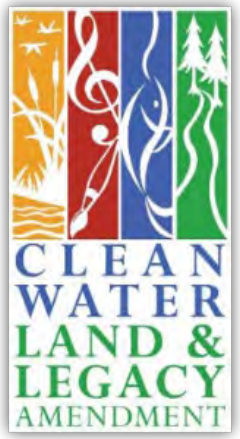
Transitioning

- Non-Metro Counties, SWCDs, and most WDs adopt CWMP and replace plans with Comprehensive Watershed Management Plans (CWMP)
- Metro Water Planning happening at multiple levels for specific reasons
- Addition of enhanced SWCD plans for Clean Water Fund (WBIF) eligibility

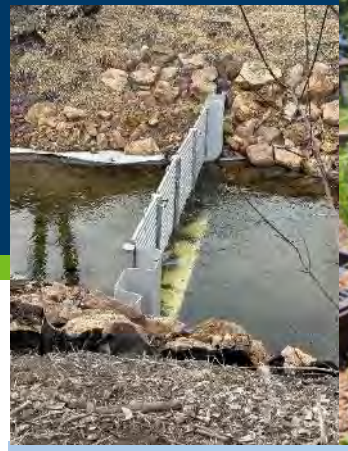


Clean Water Fund Grants

Agency	Program	Description	Grant Type	Plan Connection	Grant Recipients
BWSR	**Watershed Based Implementation Fund**	Implements activities from water plans that protect and/or restore surface water, groundwater, and drinking water	Non-Competitive	Comprehensive watershed plan (1W1P) or 7-county metro groundwater or surface water management frameworks	Local Governments, (Tribal Entities as of FY24-25)
BWSR	**Competitive Clean Water Fund**	Implementation practices that protect and/or restore surface water, groundwater, and drinking water	Competitive	State approved and locally adopted water plan, metro water plans, drinking water plans, state strategies	Local Governments



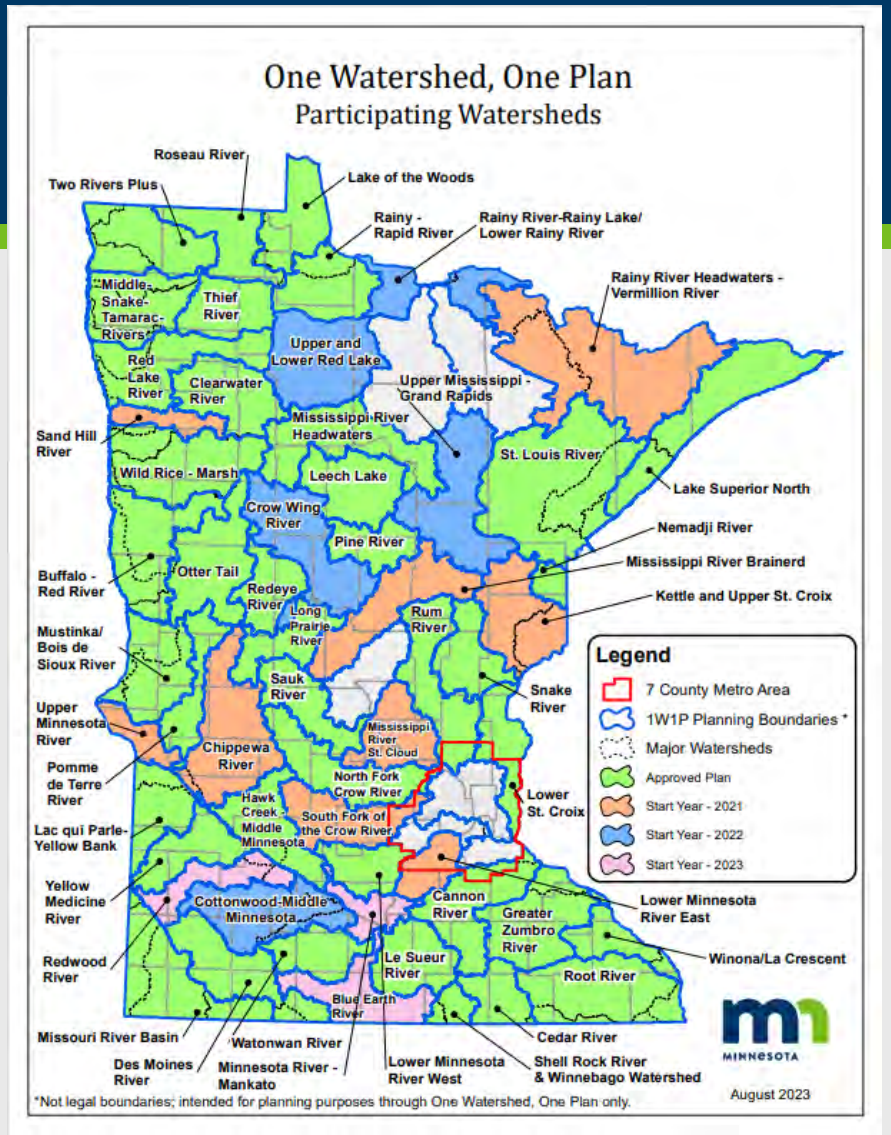
Clean Water Fund Grants - Metro



Examples of Practices:

- Agricultural/Nitrate/Feedlot BMPs
- **Chloride Reduction BMPs**
- **In-Lake Management (e.g., alum, carp management)**
- Native Plantings
- Shoreland/Ravine Stabilization
- Stream/Wetland Restorations
- **Urban Stormwater BMPs/Retrofits/Reuse**
- Well Sealing

Watershed Based Implementation Funding



Statewide WBIF Funding

($67M will pass through BWSR to LGUs in FY24-25)

Watershed Based Implementation Funding

Clean Water Fund Total $

FY 18 - 19

WBIF

$8,700,000

Clean Water Fund Total $

FY 20 - 21

WBIF

$25,970,000

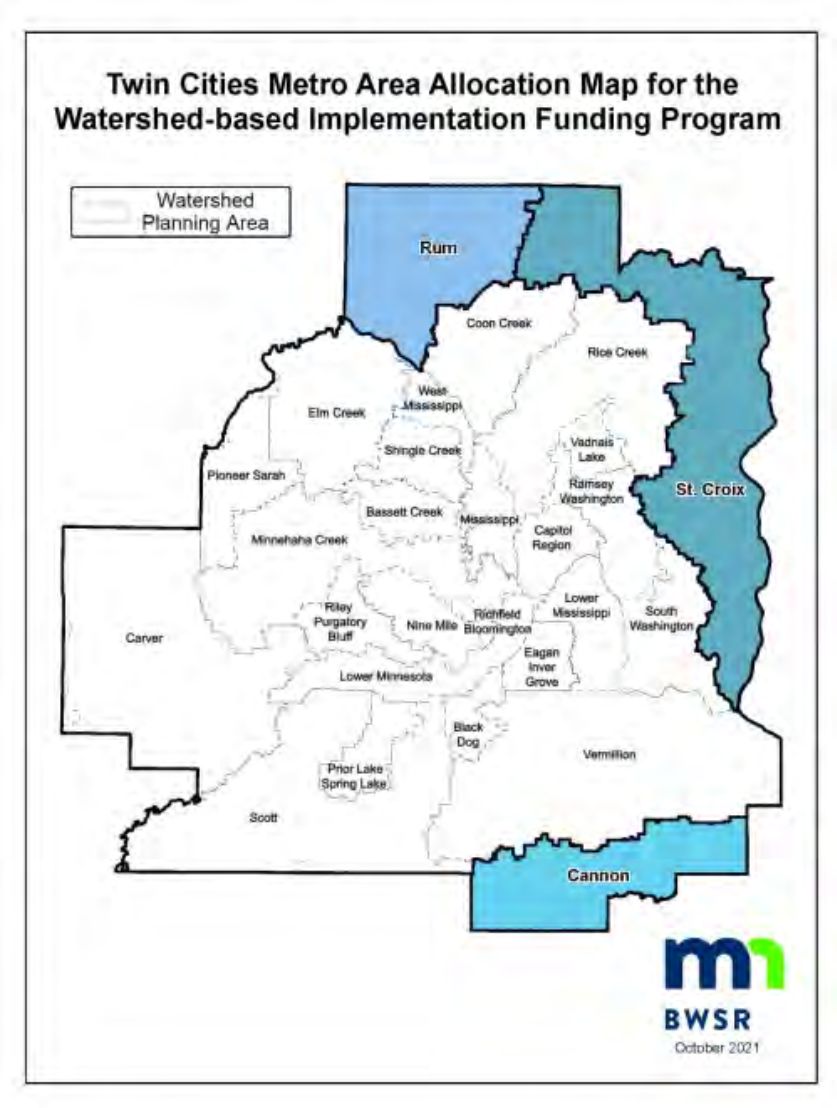
Clean Water Fund Total $

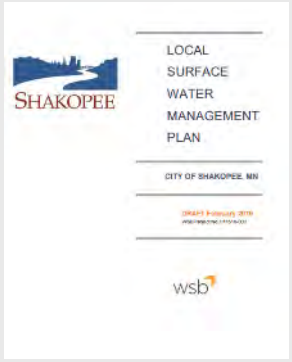
FY 22 - 23

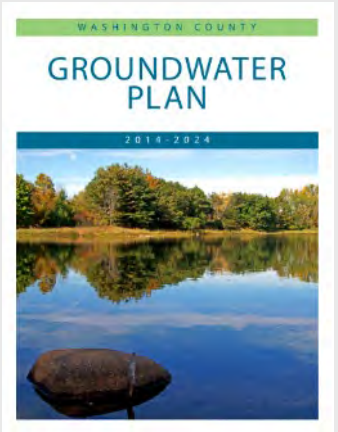
WBIF

$39,800,000

Watershed Based Implementation Funding







***Metro* WBIF Funding** ($9M will pass through BWSR to LGUs in FY24-25)

Watershed Based Implementation Funding

A Spanish-language poster for the LMRWMO's smart salting training describes the ways de-icing salt can contaminate water resources, including drinking water. **Graphic Credit:** Bolton & Menck

Who: Lower Mississippi River WMO + MPCA + Mendota Heights

Where: Dakota County

Project: Spanish-language Smart Salting Training for property managers, 2 feasibility studies for Lake Augusta and Interstate Valley Creek

Cost: $144,670 Grant + $40,000 local match

Result: Trainings and studies completed

Watershed Based Implementation Funding

ISEF - Photo Credit: Coon Creek Watershed District

Who: Coon Creek Watershed District + City of Blaine

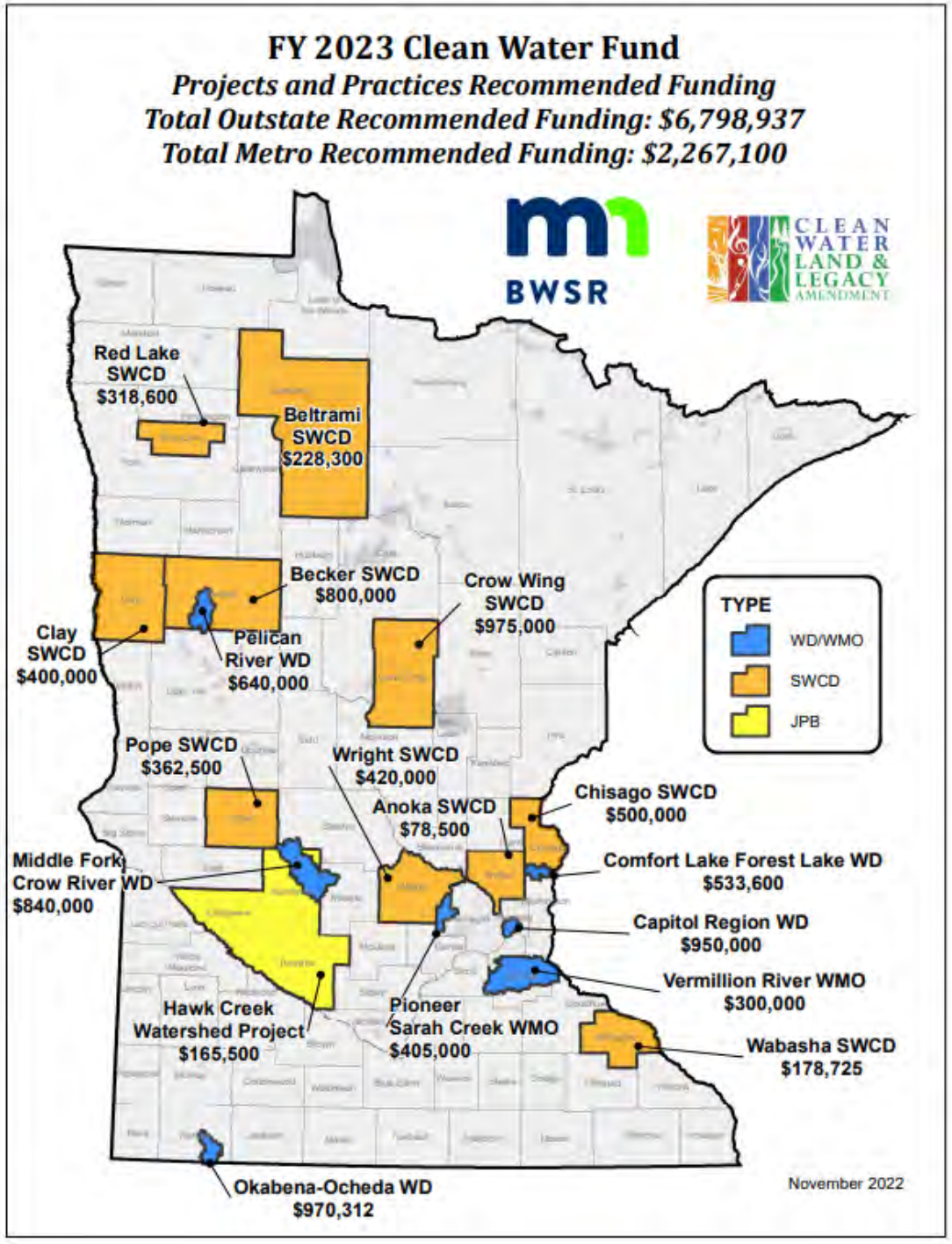
Where: Anoka County

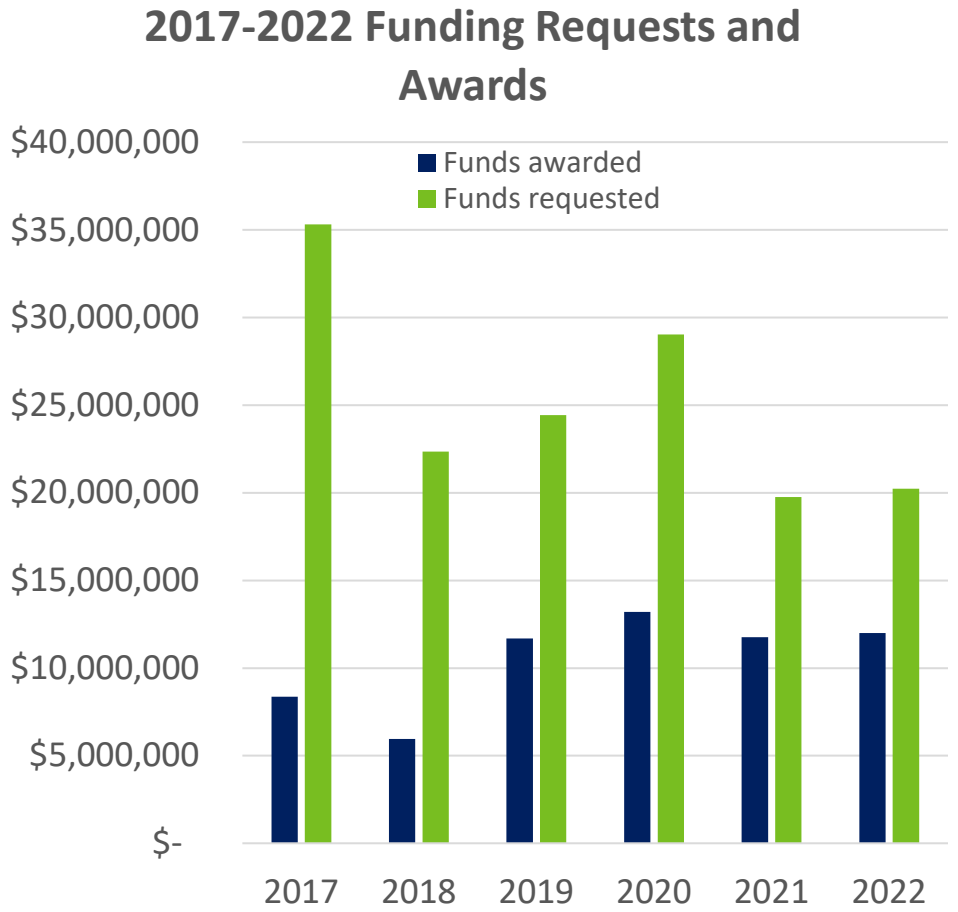
Project: Biochar + iron-enhanced sand filter to improve Pleasure Creek

Cost: $191,973 + $200,000 local match

Result: Remove 80% of *E. coli* bacteria

Competitive Clean Water Fund Grants





Competitive Clean Water Fund Grants

Three Rivers' Baker Park ravine work aids Lake Independence water quality

Video link: https://www.youtube.com/watch?v=wuyu-kkvwYQ&feature=youtu.be

Who: Pioneer-Sarah Creek WMC in partnership with Three Rivers Park District and Hennepin County

Where: Hennepin County

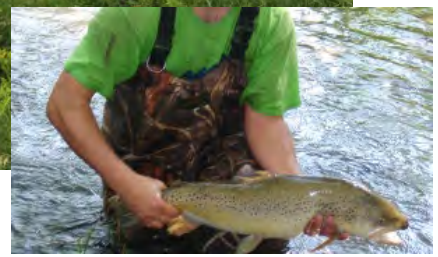
Project: Ravine stabilization to improve Lake Independence water quality

Cost: $416,000 CWF Grant + $104,000 local match

Result: 15% of the phosphorus that was needed to meet state water quality standards was reduced

Competitive Clean Water Fund Grants

Restoring a Metro Trout Stream



Photos courtesy of Vermillion JPO and Lakeville staff

Who: Vermillion River Watershed JPO + City of Lakeville

Where: Dakota County

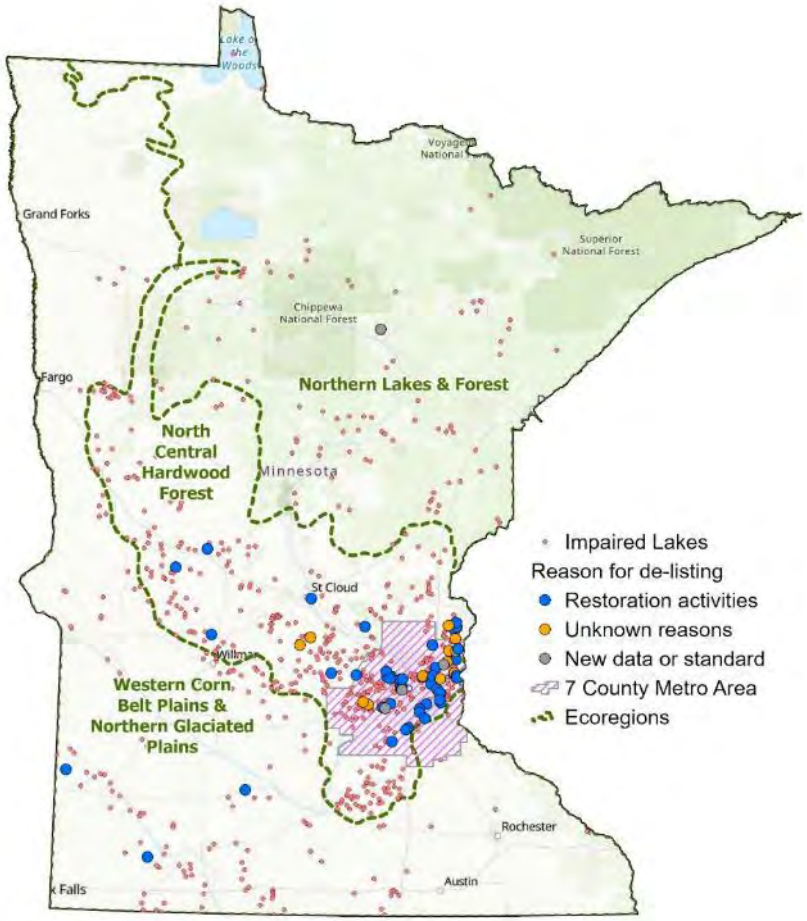
Project: Stormwater practices to improve South Creek water quality

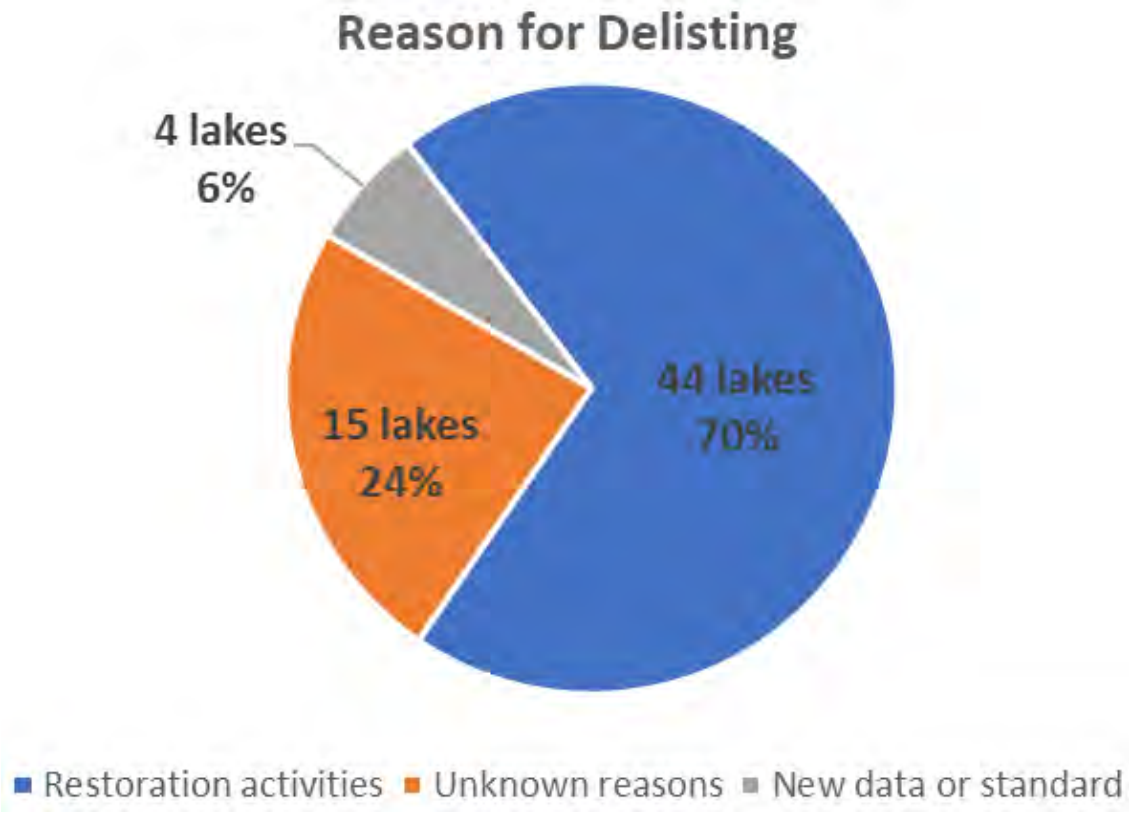
Cost: $310,800 CWF Grant + $165,570 local match

Result: Water temperatures 11 degrees lower, sediment reduction of 4 tons/yr, phosphorus reduction of 30 lbs./yr

**Outdoor Heritage Funds supported stream restoration efforts*

Funding + Efforts = Water Quality Results





Slide courtesy of MPCA (Note: Lake delisting numbers include 2024 delistings (14 lakes) that are awaiting EPA approval and are therefore preliminary)

Take-Home Points

Metro Water Planning

- Efforts started mostly in the 1980s-1990s
- Metro Water Planning happening at multiple levels for specific reasons
- Effective model so ideas used as the basis for BWSR's One Watershed, One Plan Program's statewide efforts

Clean Water Fund Grants - Metro

- Highly successful in the Metro because of well-developed water plans & LGUs
- Clean Water Funds are accelerating efforts
- Metro leading on urban BMPs and innovative practices
- Seeing real water quality results

BOARD OF WATER AND SOIL RESOURCES

Questions?

Three Rivers' Baker Park ravine work aids Lake Independence water quality

CLEAN WATER LAND & LEGACY AMENDMENT

The project taps a $416,000 Clean Water Fund grant from BWSR.

A project finishing up this spring in Three Rivers Park District's Baker Park Reserve is designed to improve the water quality of Lake Independence. One of Hennepin County's most heavily used lakes, it is impaired for excessive nutrients.

A 2014 subwatershed analysis identified channel erosion in a ravine leading to the lake as a top sediment and phosphorus contributor. It carried an estimated 277 pounds of phosphorus and 300 tons of sediment — the equivalent of 23 dump truck loads — to Lake Independence annually. Phosphorus feeds the algae that can turn lakes green.

"The lake has always had severe algal blooms," said Brian Vlach, senior water resources manager for Three Rivers Park District.

Baker

Bauerly

Vlach

Top: *By late May, the re-sloped ravine stabilization in Baker Park Reserve was greening up. Seven species of wildflowers and nine grasses were planted in the dirt covering rock riprap and topped by an erosion control blanket.* **Photo Credit:** Wenck Associates
Right: *Eric Stay of Minnesota Native Landscapes ran the excavator on Dec. 19, 2019. The project aims to reduce phosphorus-loading to nutrient-impaired Lake Independence by 134 pounds a year at a cost of $130 per pound.* **Photo Credit:** Ann Wessel, BWSR

Landscape architect Seth Bossart, left, of Wenck Associates, discussed the Baker Park Reserve ravine stabilization with project foreman Nate Bauerly of Minnesota Native Landscapes. At bottom left is one of the rock grade-control structures installed in the main channel and two tributaries.
Photo Credit: Ann Wessel, BWSR

"The lake is pea-green through portions of the summer due to algal blooms," Vlach said.

The $520,000 Pioneer-Sarah Creek Watershed Management Commission ravine stabilization, which came in $34,000 under budget, will accomplish an estimated 15% of the phosphorus reduction needed to meet Minnesota Pollution Control Agency water-quality standards.

Despite the algae, 832-acre Lake Independence remains a primary attraction in the metro park that saw well over a half-million visitors in 2018. The WMC deemed Lake Independence a high-priority sentinel lake, based partly on its high visibility and recreational use.

"The reduction of phosphorus in Lake Independence will clearly lead towards improved water quality and most notably water clarity," said Joe Baker, chairman of the Pioneer-Sarah Creek WMC.

The stabilization is a first step to reduce external phosphorus loading. To accomplish its long-term goal of increasing the lake's clarity to 8 to 12 feet, the WMC is considering a future alum treatment to address internal phosphorus loading.

Lake Independence attracted more than 27,100 swimmers to the park's two beaches, launched nearly 15,600 boaters from its public access and drew more than 3,400 anglers to its shore in 2018, the most recent year for which Metropolitan Council data are available.

"It has been a very good fishing lake," Vlach said. A community of fish houses pops up during the winter. Anglers target crappies in early spring, walleye in the summer, and muskies well into the fall.

BWSR

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners.
www.bwsr.state.mn.us

"It's been a good muskie fishery in the past. There's some big muskies in there. A lot of people have had success," Vlach said.

A technical adviser to the WMC, Three Rivers coordinated the project. Minnesota Native Landscapes of Otsego was the contractor. Wenck Associates of Maple Plain handled project design and construction administration.

Work was made possible by a $416,000 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources. A $59,500 Hennepin County Opportunity Grant from the county's Environment and Energy Department, plus $44,500 cost-share among the WMC, park district, Lake Independence Citizens Association and the cities of Independence and Medina covered the balance.

"Clean Water Funds by all

means enable a project like this," Baker said "The cities of Independence, Medina and a small part of Maple Plain as the cities of benefit just really would not have the funds for that. We've had great support from BWSR as well as Hennepin County and Three Rivers Park District to ultimately pull the funding together."

Construction finished in mid-February.

Touch-up seeding is planned in a few spots, and the park district will plant shrubs to discourage people from entering the ravine. But little evidence of construction remained this spring, as native wildflowers and grasses emerged from erosion control blankets covering the dirt-topped structures and re-sloped banks.

"The site looks very good," Seth Bossert, a landscape architect and project inspector with Wenck, said after a late-May visit. "We had good germination rates of the seed. It was probably 4 to 6 inches tall, so it's starting to look more emerald-colored."

Native plants — seven species of wildflowers and nine grasses — were planted in the dirt covering rock riprap and topped by an erosion control blanket. In mid-December, the

The project will curb how much phosphorus enters Lake Independence by about 15% of the reduction needed to meet Minnesota Pollution Control Agency water-quality standards. **Photo Credit:** Wenck Associates

Minnesota Native Landscapes crew was installing riprap and re-sloping the ravine's banks, moving downstream toward the lake. Newly constructed rock cross-vanes, which serve as grade-control structures, stood out against the snow.

The project was designed so park visitors won't see a trace of construction.

Originally slated for the previous winter, the 2,200-foot channel stabilization was delayed in order to obtain a U.S. Army Corps of Engineers permit, required because of the project's scope. Vlach said the delay resulted in more lead time and therefore lower bids.

Pending BWSR approval, the projected surplus could be used to fund smaller projects within the 7,632-acre watershed. Those might include native plantings in Baker Park rain gardens, Lake Independence shoreline restorations, a carp barrier on the Ardmore Channel or erosion control projects elsewhere in the watershed.

The grant expires in December 2020.

The Hennepin County Environment and Energy Department is developing other cost-share and locally funded projects within the watershed. Department staff provide technical assistance and support to Pioneer-Sarah Creek WMC, operate a grant program, and conduct landowner outreach.

"We want to be able to demonstrate that we can deliver projects and there's a lot of interest from landowners in this area," said Karen Galles, Land and Water Unit supervisor.

This season, staff is developing a project to stabilize and curb ice-related erosion affecting 65 feet of a 400-foot Lake Independence shoreline property. Two more projects affecting Lake Independence could be installed next year.

Conversations with landowners about potential conservation projects continue.

Nearly 500 private landowners' properties drain directly to Lake Independence or to Lake Ardmore, which are connected by a channel. About half are lakeshore or suburban; half are rural residential or agricultural.

"The two staff added thanks to capacity funds have been the first boots-on-the-ground landowner assistance staff that (Hennepin County) has had in many years," Galles said of the rural conservationists hired within the past three years.

Three Rivers' continued water-quality monitoring and a re-evaluation of the TMDL will help to determine where in the watershed to focus next.

From left: *Bluestem grass was used in the erosion control blanket. After a Dec. 19, 2019, construction meeting, a group from Wenck Associates, contractor Minnesota Native Landscapes, the Pioneer-Sarah Creek Watershed Management Commission, the park district and BWSR toured the site. Devan Maruska of Minnesota Native Landscapes staked an erosion control blanket. The ravine stabilization involved 1,800 feet in the main channel, plus 400 feet in two tributary ravines.* **Photo Credits:** Ann Wessel, BWSR

Restoring a metro trout stream

South Creek flows about 9 miles from Lakeville to Farmington in west-central Dakota County. In Lakeville, the stream flows through Airlake Industrial Park. Two Clean Water Fund projects involving the VRWJPO and the city of Lakeville improved trout habitat in the stream. Here, a Clean Water, Land and Legacy sign marks the location of the new pond outlet and emergency overflow structure. **Photo Courtesy of Lakeville city staff**

CLEAN WATER LAND & LEGACY AMENDMENT

In Dakota County, a partnership between the Vermillion River Watershed JPO and the city of Lakeville, plus 2 recent Clean Water Fund grant projects lead to lower water temperature and less sediment in South Creek

A designated trout stream that flows through a Lakeville industrial park and a rapidly developing part of town is colder and less turbid today as the result of $463,400 in projects made possible by Clean Water Funds — and a partnership between the Vermillion River Watershed Joint Powers Organization (VRWJPO) and the city of Lakeville.

South Creek flows about 9 miles from Lakeville to Farmington in Dakota County.

One of the coldest reaches within the watershed, it supports a naturally reproducing brown trout population, plus northern pike and stocked rainbow trout. Trout require colder water than other species, and gravel streambeds with fast-moving water in which to spawn.

Brown trout reproduce naturally in South Creek. **Photo Credit:** VRWJPO

Long stretches of the creek had been modified and straightened over the years, degrading habitat and natural stream processes.

As the result of Clean Water Fund-backed work, South Creek's summer water temperatures now average 11 degrees lower compared with pre-project conditions. Dissolved oxygen concentrations have improved by 2 parts per million, on average. Sediment-loading decreased by more than 4 tons a year and phosphorus-loading decreased by 30 pounds a year.

"A resource worth protecting" is how Travis Thiel, senior watershed specialist for Dakota County and the VRWJPO, described South Creek.

One of four major tributaries to the Vermillion River, located near

the headwaters, South Creek is the second-highest subwatershed priority identified in the JPO's Watershed Management Plan.

For Lakeville, the creek is a natural resources and recreational amenity. It aligns with the Lake Marion South Creek Greenway corridor in Dakota County, which will bring opportunities for recreation and community engagement to the area. The city recognized it was poised to bring together different interests to protect the creek and continue economic growth.

The Minnesota Department of Natural Resources (DNR) designated South Creek a trout stream in 1988. That designation, with additional South Creek tributaries designated in 1996, helped to jump-start restoration — and the JPO-city partnership.

Restoration efforts have come a long way since the city began the first South Creek channel restoration project in 2001. Its South Creek management plan, adopted in 2000, is designed to preserve trout stream habitat within the city and minimize negative impacts downstream.

The JPO completed a geomorphic assessment of the creek in 2010 and a subwatershed assessment of the industrial and commercial areas in 2016. Those assessments allowed the JPO to understand channel condition and stability, characterize riparian and aquatic habitats, and identify restoration opportunities to improve water quality and aquatic and riparian ecosystems.

Both entities have been working together to manage stormwater runoff, improve water quality flowing to the creek, and complete in-stream restoration work. Stormwater runoff from both agricultural and developing urbanized areas poses a threat to the trout stream. As new development occurs, it presents an opportunity for the dynamic partnership to continue leveraging opportunities for protection and restoration projects.

Vegetated riprap helps to stabilize the streambanks and control erosion. **Photo Courtesy of Lakeville city staff**

In 2017 the Minnesota Board of Water and Soil Resources (BWSR) awarded the JPO, in partnership with the city, two Clean Water Fund grants totaling $310,800 to help complete two projects to protect and improve South Creek.

The JPO received a $144,000 Clean Water Fund grant to help the city install a hydrodynamic separator, a stormwater treatment device, in an existing underground stormwater pipe that drains to South Creek. Completed in 2019, the project ultimately reduced stormwater-carried total suspended solids (TSS) by 4.2 tons per year and phosphorus by 30 pounds per year. Sediment can degrade or reduce spawning habitat by filling in riffles. Phosphorus feeds the algae that can turn waters green.

To combat increased stream temperatures resulting from nonpoint source runoff, the JPO received a $166,800 Clean Water Fund grant to separate South Creek from an existing stormwater pond. In previous studies, the JPO found that open-water stormwater ponds directly connected to, or within close proximity to the Vermillion River and its tributaries, are susceptible to increased water temperatures by sun exposure.

The South Creek Temperature Reduction Project was completed in 2019. The JPO assisted the city with construction of a dedicated stream channel around the stormwater pond. Previously, the stream flowed through the pond. Pollutant-laden stormwater runoff now is treated by the stormwater pond before it's discharged to South Creek, and warm water from the stormwater pond is prevented from directly mixing with the creek.

Mac Cafferty, Lakeville's environmental resources manager, said restoration would be much slower without the established working partnerships and grant funds.

The JPO and city contributed a combined total of about $165,570 in matching funds for both projects.

"Financial assistance from Clean Water Fund and Conservation Partners Legacy grants has allowed us to leverage additional dollars for more on-the-ground projects and an accelerated implementation schedule," VRWJPO Administrator Mark Zabel said.

The partnership and restoration work continue.

Two Outdoor Heritage Fund Conservation Partners Legacy grants from the DNR allowed the JPO and city to restore two reaches of the South Creek channel — a 2,000-linear-foot restoration in 2018 and a 1,400-linear-foot restoration in 2020.

The first restoration removed obstructions, narrowed the channel to increase stream velocity, stabilized the bank to prevent erosion, installed habitat features for fish and macroinvertebrates, and added fishing access.

The second narrowed the channel; stabilized the bank; removed stream-blocking trees; installed rocks, woody habitat and riffles (which improve aeration); and established native vegetation within the riparian area.

A narrower channel can more easily move sediment, resulting in deeper pools, better channel substrate, adequate cover and more areas for fish to spawn. The added habitat features provide cooler temperatures and improved dissolved oxygen concentrations. Improvements to the channel and its habitat make it easier to fish the stream.

Coon Creek Watershed District links habitat, stormwater work

CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Funds from BWSR backed three Coon Creek-related projects:

$376,090, 2019; CCWD and Coon Rapids; biochar- and iron-enhanced sand filter to treat a tributary's runoff. Annual reduction estimates (ARE): 80% E. coli; 69 pounds phosphorus.

$395,000, 2020; 1.1-mile Coon Creek Park stream restoration, Andover. ARE: 237 tons sediment, 201 pounds phosphorus.

$345,000, 2022; CCWD and Coon Rapids; biochar- and iron-enhanced sand filter to treat a tributary's runoff. ARE: 23 pounds phosphorus, 404 billion organisms.

COON RAPIDS — On a stream that carries stormwater runoff from a densely populated suburb, the Coon Creek Watershed District (CCWD) overcame constraints of its urban setting to improve habitat, reduce the likelihood of flash flooding, and curb pollution bound for the Mississippi River.

The two-phase, $1.3 million Sand Creek restoration project leveraged $577,930 in Clean Water Funds from the Minnesota Board of Water and Soil Resources (BWSR), and $560,540 in U.S. Environmental Protection Agency funding through Section 319 of the Clean Water Act. Work focused on a 1.2-mile-long stretch.

"When we work to address our aquatic life impairments in these urban streams, it's really twofold. The heavy anthropogenic impact on the land has led to in-stream factors: poor habitat, straightened channels, a lot flashier water, altered hydrology," said Justine Dauphinais, CCWD water quality coordinator. "Also, you have to deal with all of the regulated urban stormwater that is washing off the landscape into the creek — and the quality of that water itself."

As space, partnerships and funding allow, the CCWD pairs in-stream restoration and bank stabilization to reduce sediment-loading with best management practices to reduce peak flows and filter out dissolved phosphorus and bacteria.

Annual reduction estimates show the Sand Creek project, which finished in 2021, will curb sediment-loading by 468 tons and cut phosphorus by 420 pounds. One pound of phosphorus can feed 500 pounds of algae.

Sand Creek starts in Blaine as a series of stormwater ditches, and flows 8.3 miles to Coon Creek, a Mississippi River tributary. The downstream 2.2 miles function as a stream. The rest, bordered by hundreds of private properties, functions as a ditch.

The Sand Creek work set the stage for projects on Coon Creek.

"We started our work in Sand Creek for a couple of reasons," Dauphinais said. "It's a bit closer to meeting water quality goals. It's nice to be able to move that needle. It buys momentum. We can receive this grant money, pair it with our own and make a measurable difference. It's realistic and it's within reach (of being removed from the state's impaired waters list).

"Second is it's a major tributary to Coon Creek, which has worse impairments. Anything we do in Sand Creek helps Coon Creek."

The two years of drought conditions that followed Sand Creek project construction allowed the bank-stabilizing native vegetation to grow deep roots. Accurately

Left: *Contractors backfilled the existing Middle Sand Creek channel and restored the stream, following a natural, meandering channel design. Two BWSR Clean Water Fund grants supported the Sand Creek work: $195,160 awarded in 2018 for Lower Sand Creek corridor restoration; and $382,770 awarded in 2019 for Middle Sand Creek corridor restoration.* **Middle:** *An aerial view of the remeandered Middle Sand Creek looks upstream from the BNSF Railway stream crossing on April 1, 2021.* **Right:** *An upstream view from the pedestrian bridge at Sycamore Circle Northwest depicts native plants' growth the summer after work on a segment of Middle Sand Creek was complete.* **Photos courtesy of Coon Creek Watershed District**

VIDEO: Lower Sand Creek project



Left: *The first stage of the CCWD's Clean Water Fund-supported work on Sand Creek in Coon Rapids focused on Lower Sand Creek corridor restoration. Construction included five backwater pools, and six rock cross vanes designed to control the grade and direct stream flow. The project incorporated toe wood protection, resloping, and vegetated rock riprap streambank stabilization techniques.* **Middle:** *CCWD Water Quality Coordinator Justine Dauphinais walked along Sand Creek in fall 2019.* **Right:** *Most of Sand Creek functions as a ditch; only the downstream 2.2 miles function as a stream.* **Photo Credits:** Ann Wessel, BWSR

measuring the project's success will take about five years of phosphorus, sediment and E. coli sampling.

Anecdotally, Dauphinais said evidence of sediment-reduction already exists: After heavy rains, the water no longer resembles tea.

"Prior to this project we had a relatively straightened, shallow, over-widened channel with a sandy bottom, and not a lot of variety. So we're trying to encourage habitat variety and quality. Things like riffles, pools and runs, and then also cover and substrate variety. We want wood in the channel, and rocks along with the sand. And we want areas of faster-flowing water, areas of low-flowing waters, and then areas with overhanging vegetation and nooks and crannies for the macroinvertebrates to live in," Dauphinais said in fall 2019, when the Lower Sand Creek project was finished and the Middle Sand Creek project was being planned.

Dauphinais called the Middle Sand Creek project the "gold standard" in terms of maximizing the potential within urban constraints.

That two-thirds-mile-long segment used natural channel design methods to return the straightened stream to its winding course, adding 625 feet of length via curves that slow the velocity. The design created a 50-foot-wide floodplain, and lowered the floodplain level by as much as 2 feet.

One of the biggest challenges was explaining why it was necessary to thin the trees. The first step in the Sand Creek work — clearing, thinning and dirt-moving — generated dozens of calls to the CCWD office.

"People appreciated this oasis in the middle of Coon Rapids," Dauphinais said.

But under the heavy shade of mature trees, invasive buckthorn crowded out native understory species, leaving bare soil that eroded easily.

"As they learned more about the projects and the benefits and … the creek and the aquatic life, then things got better. We had a robust replanting plan with both seed and plugs and shrubs and trees," Dauphinais said. "When the leaves started budding and the plants started growing, then people really came around."

Dauphinais said a couple of residents who had opposed the project called the CCWD office to say they were happy with the results.

During the summer, lush vegetation now conceals bits of the narrowed, serpentine stretch. A more open canopy allowed plants to flourish, and drew eagles and owls.

"The biggest challenge (was) the public perception, and trying to explain the need and the long-term benefit of the tree-clearing and the mass excavation," Dauphinais said.

The extensive excavation was necessary to ensure the project would not increase the flood risk to neighboring homes. The design had to avoid negatively affecting existing infrastructure or sensitive areas. Working in a heavily developed landscape required extensive planning and permits — including permits from the U.S. Army Corps of Engineers, the Minnesota Department of Natural Resources (DNR), and the Minnesota Pollution Control Agency.

"In an urban environment, there's a lot of constraints, whether it's utility companies, gas lines, sewer lines, fiber optic — you have the streets and the culverts and then you have private property and bridges and the railroad," Dauphinais said.

Dauphinais credited Nick Proulx, a stream restoration specialist on the DNR's Clean Water Team, with helping engineers to devise a project that adhered to natural stream design principles.

"That was the biggest win — working well with the DNR and building that relationship. That's going to pay off in all of our future projects and (in) training our engineers that don't do that kind of work in these methods," she said.

What CCWD staff learned from the Sand Creek project translated to its recently finished Coon Creek Park restoration on the main branch of Coon Creek in Andover.

A multi-year project situated on Public Ditch 57, a straightened segment of Coon Creek, it incorporated the principles of natural channel design. It considered what the stream would have looked like before European settlement, and then made adjustments based on how much water the stream receives today — including runoff from impervious surfaces. The existing ditch was oversized and too shallow.

The completed project incorporated a two-stage channel that provides better habitat.

"We're really grateful that there's state and federal funding available for this type of work, because to do it right, it's incredibly expensive and we wouldn't be able to do it with just local funds," Dauphinais said.

‘The potential application is huge’

The Rice Creek Watershed District is testing a new way to remove carp in Minnesota. Designed to improve Long Lake’s water quality, it could work wherever carp migrate to spawn.

CLEAN WATER LAND & LEGACY AMENDMENT

Left: *Kukulski was on site for a week to test the electrical guidance system.* ***Right:*** *Przemek Bajer of the Minnesota Aquatic Invasive Species Research Center is the lead project researcher.*

NEW BRIGHTON – An experimental carp removal system being tested this month on Rice Creek could change the way Minnesota deals with the invasive fish that degrade lakes’ water quality and habitat.

If it works, the system could be used where invasive common carp migrate to spawn.

“The potential application is huge, because carp show these spawning migrations in many, many different lake systems,” said lead project researcher Przemek Bajer of the Minnesota Aquatic Invasive Species Research Center. “If you could create a device that removes them from the stream without a lot of physical labor — that would basically revolutionize carp management. You could remove 50 to 80 percent of the population with one or two people with very little effort.”

Top: *Post-doctoral researcher Peter Hundt and Emil Kukulski, director of Poland-based ProCom System’s hydro-ecological department, work April 30 to reposition a chute through which carp will migrate up Rice Creek from Long Lake to spawn in the Lino Chain of Lakes.*
Photo Credits: Ann Wessel, BWSR

The Rice Creek Watershed District is testing a low-voltage electrical guidance system that directs migrating carp into a gate that leads to a fish ladder. Paired with a Whooshh System (AKA carp cannon), not yet attached, it is designed to remove about 75 percent of migrating carp. Carp removal is one part of RCWD's $7.3 million plan to improve water quality in Long Lake.

The system combines technology used in Poland to keep fish out of hydroelectric plants with technology developed in the U.S. to pick fruit.

Carp removal is just one element of Rice Creek Watershed District's four-part, $7.3 million Long Lake Targeted Watershed Demonstration Project, a plan to improve water quality in nutrient-impaired Long Lake. A $3 million Targeted Watershed Demonstration Program grant from the Minnesota Board of Water and Soil Resources is in play.

"Algae blooms are frequent; they can be intense," said Matt Kocian, RCWD lake and stream specialist. "Common carp exacerbate that problem big time. We know in Long Lake and in some of our other lakes we're not going to meet water-quality standards without addressing carp."

Carp stir up the lake bottom in search of food, which increases turbidity and frees nutrients that feed algae growth.

Four-part Long Lake plan

Rice Creek Watershed District's Long Lake Targeted Watershed Demonstration Project addresses phosphorus- and nutrient-loading from the 100,000 acres that flow into Long Lake. The project has four elements:

- Hansen Park stormwater retrofits in New Brighton, where a $4 million iron-enhanced filter is slated to go online this summer;
- Mirror Lake stormwater retrofits in Saint Anthony Village;
- Middle Rice Creek restoration, where a remeandering added a half-mile in creek length and will help to reduce erosion and sediment-loading;
- Invasive common carp management.

To make a noticeable difference in Long Lake, the RCWD estimates the carp population must drop from 800 kilograms per hectare to 100 kg/ha. A single female can produce 1 million eggs a year.

Each spring, approximately 20,000 carp that over-winter in New Brighton's Long Lake swim up Rice Creek to spawn in the shallow Lino Chain of Lakes.

The experimental system would remove about 75 percent of adult carp leaving Long Lake; a second installation would deter about 75 percent of juvenile carp leaving the Lino Chain of Lakes.

On Day 5 of a seven-day site visit to test the electrical guidance system, Emil Kukulski stood waist-deep in Rice Creek. The hydro-ecological department director of Poland-based Procom System, Kukulski was reconfiguring the chute through which the carp will pass.

The system is designed like this: Lines of positive and negative electrodes produce a low-voltage current that carp will not pass. The electrodes are attached to buoys anchored to a track on the creek bottom. Angled across the creek, the electric guidance system funnels carp to a gate. The only upstream

From left: *Post-doctoral researcher Peter Hundt and University of Minnesota technician Kao Vang work with Kukulski in Rice Creek to reposition a chute.*

route, it leads to a fish ladder — "steps" built on a floating wood platform. When carp reach the metal chute at the top, they'll drop into the so-called carp cannon.

The Whooshh System, which was developed to pick fruit, and then modified to safely move salmon over dams, will pneumatically propel carp through a plastic tube and into a holding bin on shore.

On April 30 the carp were migrating. The electric barrier was working. But the fish refused to enter the gate.

A similar project worked on invasive sea lampreys in Michigan. The electrical guidance system keeps native fish out of hydroelectric plants' water intakes at 20 sites in Poland, Switzerland and Brazil.

This is the first time it's being tried in Minnesota.

Kukulski — along with post-doctoral student Peter Hundt and University of Minnesota technicians Kao Vang and Cameron Swanson — pounded black PVC pipes into a collar that will hold the repositioned chute in place.

Matt Kocian, Rice Creek Watershed District's lake and stream specialist, left, and Bajer discuss progress of the carp removal system being installed April 30 on Rice Creek in New Brighton. A second system would stop juvenile carp from migrating downstream from the Lino Chain of Lakes.

Other methods considered

SEINING: In the past, the Rice Creek Watershed District hired a commercial fisherman to net the carp under the ice. Ice conditions and fish movements made for inconsistent harvests, and market demand for carp has been low.

FISH BARRIERS: A permanent structure would stop carp from migrating upstream, but it also would require frequent maintenance.

HIGH-VOLTAGE BARRIER: A fixed, high-voltage barrier would prevent access to spawning habitat. The most expensive (and more dangerous) option, it also would block native fish, and would not control carp upstream.

AERATION: Aeration could keep native fish alive and therefore reduce the carp population. But the Lino Chain of Lakes vast acreage makes the option ineffective.

MAISRC adapted the electric barrier and pneumatic removal technologies with funds from RCWD, the Clean Water Fund and the Environment and Natural Resources Trust Fund.

RCWD will lease and test the ProCom equipment for two years (at a cost of $120,000) before deciding whether to purchase for an additional $30,000. RCWD will pay $80,000, part of the cost to lease the Whooshh System for two years; the University of Minnesota will pay the balance.

If the fish don't cooperate soon, Bajer said experiments would resume in the summer when carp migrate in lesser numbers. The average spring migration runs 10 to 14 days.

"There are fish trying to cross the barrier every day. They have been really trying aggressively to cross it," Bajer said two days after the reconfiguration. "However, they do not want to swim through our fish ladder. So we keep adjusting, changing one thing at a time trying to figure out what they don't like about our design."

Common carp swim under a railroad bridge when they migrate up Rice Creek from Long Lake. They'll migrate in lesser numbers during the summer, when researchers can fine-tune the removal system.

The crew tried enlarging the entrance, positioning the fish ladder deeper in the water, adding branches to naturalize the approach, increasing water flow with a second pump. Next, Bajer planned to disconnect everything but the entrance.

Once the carp do move, they'll be tracked.

Employees of Bajer's company, Carp Solutions, tagged about 1,000 carp last year. They installed five antennae — near the approach, at the gate, at the start and exit of the fish ladder, and about a mile upstream. Data will help determine the best management strategy.

"We're learning how sensitive they are to structures that we're putting in the stream," Bajer said. "They seem to be very cautious. The fish ladder is a good example. Even though they could easily cross it, they just don't want to."

> **"Long Lake can get some pretty severe algae blooms in July, August when the temperatures heat up. I don't know that I'd say long Lake is the worst in our watershed in terms of phosphorus concentrations or algae bloom severity, but it's pretty bad. The fact that there's so much recreational use, that's why we're focusing on it."**
>
> — Matt Kocian, Rice Creek Watershed District

Watershed districts throughout the state are paying attention. Two Minnehaha Creek Watershed District employees were on site recently to see the testing.

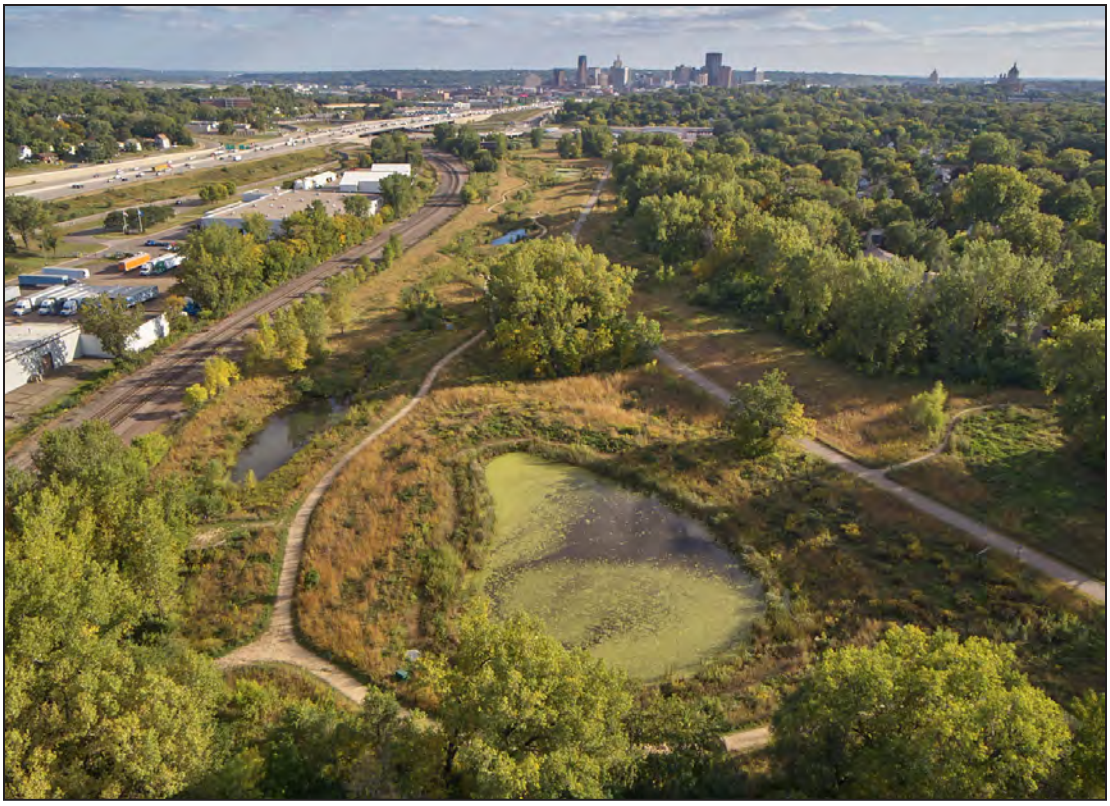
While the combination electrical guidance system and Wooshh system is the preferred outcome, Kocian said another positive result would be to use the guidance system alone to direct carp into a traditional trap. Each technology could work elsewhere with site-specific adaptations.

"If it works, it's a big deal. It could be a game-changer for how we manage carp," Kocian said. "What we're testing here absolutely could be modified and implemented in other locations."

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.

Left: *Corn was used to bait the carp, which were being successfully stopped by the electrical guidance system but refused to enter the gate leading to the fish ladder on April 30.* ***Middle:*** *Five antennae will monitor the movements of about 1,000 carp tagged last year to help determine the best management strategy.* **Right:** *Tools rested on the bank of Rice Creek. Carp migrate up Rice Creek each spring to spawn.*

Right: *St. Paul's 42-acre Trout Brook Nature Sanctuary gets about 150,000 visitors a year. A Capitol Region Watershed District Clean Water Fund project re-created more than a half-mile-long stream segment, which treats stormwater that flows to the Mississippi River.* **Photo Credit:** HR Green Inc.



Below, from left: *Native plants border a stormwater pond. The re-created stream flows through the sanctuary in St. Paul. Native plants surround a stormwater treatment pond and iron-enhanced sand filter.* **Photo Credits:** Sara Rubenstein for Capitol Region Watershed District

Re-created stream contributes to water quality, quality of life

St. Paul Parks and Recreation, Capitol Region Watershed District staff's Clean Water Fund supported work at Trout Brook Nature Sanctuary treats stormwater before it reaches the Mississippi, draws people and critters to enhanced habitat on the site of a former rail yard

ST. PAUL — A Clean Water Fund project at Trout Brook Nature Sanctuary that re-created more than a half-mile of a stream buried and channeled into a stormwater pipe 140 years ago is improving water quality, creating habitat and contributing to quality of life in the heart of the city.

The 0.58-mile segment of Trout Brook is the longest segment of natural stream in St. Paul.

"The sanctuary really is this green spine in a highly urbanized area of St. Paul," said Alice Messer, St. Paul parks' design and construction manager. "You walk into it, and you just feel the disconnect from the urban life. It's this beautiful, restored landscape that used to be a rail yard."

Bordered by a rail line to the east and an auto salvage yard to the north, 42-acre Trout Brook Nature Sanctuary parallels Interstate Highway

> **From an open stream channel, you're gaining water-quality benefits, habitat benefits and quality-of-life benefits that don't exist in a tunnel underground. … When you say an urban nature sanctuary, that's exactly what this is; it's bringing nature into the urban core of St. Paul.** — Bob Fossum, Capitol Region Watershed District

35 East, less than 2 miles from the State Capitol. Industrial pollution led the U.S. Environmental Protection Agency to designate the area as a brownfield site 20 years ago.

Today, the stream attracts dragonflies, amphibians and birds. Native plants thrive.

A $695,000 Clean Water Fund grant the Minnesota Board of Water and Soil Resources awarded to the city of St. Paul in 2015 made the $1.83 million stream re-creation possible. Capitol Region Watershed District staff spearheaded feasibility studies. St. Paul Parks and Recreation staff led design and construction.

A lift station pumps water from a stormwater sewer interceptor on one side of the railroad tracks under the active rail line to the re-created stream. It maintains water levels during dry periods and allows more water to be treated. Runoff from an adjacent residential neighborhood is captured and treated by three iron-enhanced sand filters to remove sediment and the pollution it carries before the water flows to the re-created stream and ultimately to the Mississippi River.

The many utilities at the site complicated construction, which halted for a time while a sewer line was repaired. Work finished in February 2020.

Treating the water will reduce annual phosphorus-loading by an estimated 96 pounds, nitrogen by 960 pounds and sediment by 16 tons.

"When water is flowing through a tunnel underground, whatever pollutant is in there — whether it's sediment or phosphorus or anything else — it can't go anywhere. It's flowing all the way to the river," said Bob Fossum, monitoring research and maintenance division manager at Capitol Region Watershed District.

The project, which finished in February 2020, required pumping water from a stormwater sewer interceptor on one side of the railroad tracks under the active rail line to the stream on the other side. **Photo Credit:** City of St. Paul

Fossum

Messer

"When you move the water up and put it into a stream channel, some of it will still get to the river. But there's a ton of opportunity for the sediment to settle out and become part of the stream channel, for phosphorus to be consumed and used by plants and other biota within the system."

A water-quality performance report is expected by late 2021.

Fossum said the iron-enhanced sand filters are working well. The bigger surprise was how soon wildlife responded.

"That really came back much more quickly than I was expecting. There's turkey and deer and all sorts of birds. Tadpoles and frogs are quite prevalent. A good amount of dragonflies — some of which haven't been seen in St. Paul in … recent history," Fossum said.

Trout Brook Nature Sanctuary attracts about 150,000 visitors a year. Open water is a big draw.

"It truly becomes this great park amenity where (visitors) can cross the stream, they can touch it," Messer said. "I think the resource (benefit) is having moving water within the nature sanctuary. I think it adds to the quality of life. I think it adds to wildlife. I think it adds to the native plant community."

The Clean Water Fund project is one element of park developments that have brought access to the Gateway State Trail, native plantings, ponds and art installations. More trail connections are planned this summer.

"I don't think we would have been able to do it without the Clean Water Funds," Messer said of the re-created stream. Trout Brook Nature Sanctuary is one of seven regional parks in St. Paul that receive a combined total of about $2.5 million in annual funding.

CLEAN WATER LAND & LEGACY AMENDMENT

FUNDING: In addition to the $695,000 Clean Water Fund grant from BWSR, the project received $550,000 more in Legacy Amendment funding from the Parks & Trails Fund. The Capitol Region Watershed District contributed $330,000. City of St. Paul contributions were $200,000 from the capital improvement plan and $50,000 from public works' sewer fund.

BWSR

The Minnesota Board of Water and Soil Resources' mission: Improve & protect the state's water & soil resources, working in partnership with local organizations & private landowners. www.bwsr.state.mn.us

Shingle Creek's linked restorations augment habitat, curb bank erosion

Within the confines of an urban stormwater system that drains to the Mississippi River, Shingle Creek WMC's Clean Water Fund-backed habitat and water quality work focuses on stretches within Brooklyn Park, Brooklyn Center

Stream restoration work slated to begin this spring on the second of two adjoining Shingle Creek Watershed Management Commission projects will bring the nine-city WMC one step closer to meeting water-quality standards.

CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Fund grants BWSR awarded Shingle Creek WMC in 2014 and 2021 support two segments of connected stream restorations.

Together, the Clean Water Fund-backed projects known as Connections I and Connections II will restore about two-thirds of a mile of Shingle Creek in Brooklyn Park and Brooklyn Center. The 11-mile-long creek drains stormwater from 44.5 square miles. The two Clean Water Fund grants address impairments for bacteria, dissolved oxygen and macroinvertebrates.

Spector

"Because it's now part of a storm sewer system, essentially, we can never really return it to the narrow, winding prairie stream that it was before European settlement. But we can try to add back some elements that will help improve the stream and its ability to

From top: *By late summer 2016, native plants grew along Shingle Creek WMC's Connections I stream restoration. Erosion control fabric covered native vegetation planted in spring 2016. A dense tree canopy appears along a segment of the planned Connections II project.* **Photo Credits:** Shingle Creek WMC

In Brooklyn Park, a trail connection and amphitheater-style overlook were constructed in conjunction with the Shingle Creek WMC stream restoration. **Photo Credit:** Brooklyn Park

Projects' Details

MEMBER CITIES: Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Osseo, Plymouth, Robbinsdale

MONITORING: The stream monitoring data Park Center High School students have collected since the 1990s through Hennepin County's RiverWatch program will give the Shingle Creek WMC a baseline to compare the restorations' effect on macroinvertebrates.

CHALLENGE: The pool immediately downstream from the 3-foot drop structure was much deeper than expected, so more rock was required to fill it and build the fish ladder.

support aquatic life," said project coordinator Diane Spector of the engineering consultant firm Stantec.

"The purpose of doing the project was to add back some habitat that had been lost, to help improve its ability to hold dissolved oxygen, and basically to restore some natural functions," Spector said.

Over time — aerial photos show by the 1930s segments of the stream were straightened — Spector said Shingle Creek became a flat, sandy bottomed channel hemmed by deeply shaded banks and prone to stagnation when water levels were low.

A $200,000 Clean Water Fund grant the Minnesota Board of Water and Soil Resources awarded to Shingle Creek WMC in 2014 supported the first ecological restoration known as Connections I. That $275,880 project centered on 1,400 feet of Shingle Creek in Brooklyn Park, starting at Brooklyn Boulevard near Park Center High School and ending at Brookdale Park to the east.

> **"Getting a Clean Water Fund grant allows us to do more projects, and do more on the project."**
>
> — Andy Polzin, chairman, Shingle Creek WMC

Contractors planted deep-rooted native species to stabilize the banks, and thinned the trees to allow those plants to grow. Rocks placed within the creek improved aeration and habitat. A fish ladder replaced a 3-foot drop structure. A bit of re-meandering slowed velocity and further improved habitat.

"It looks more natural," Spector said of the results.

Work finished in spring 2016. The WMC obtained $69,000 in capital improvement funds through a Hennepin County-certified levy shared by the nine member cities. The cities of Brooklyn Center and Brooklyn Park covered the balance.

The project cost less than the original $300,000 estimate because it was completed in conjunction with a Brooklyn Park trail and park improvement.

A $328,000 Clean Water Fund grant BWSR awarded in 2021 supports the second, 1,750-foot-long ecological restoration set to begin this spring. That project, which starts at Brooklyn Boulevard and extends upstream to the north and west, will thin trees, establish native plant streambank buffers, repair erosion and enhance habitat. Because it runs through private property, there is less opportunity for re-meandering.

The two restorations combined will keep an estimated 31 tons of sediment and 6 pounds of phosphorus out of the stream each year. Sediment carries pollutants and degrades streambed habitat. One pound of phosphorus can create 500 pounds of algae.

"What happens anywhere on the stream is an improvement for elsewhere on the stream," Spector said.

"As we're stabilizing the streambanks, we're reducing the amount of sediment and nutrients which are being eroded from the streambank and being washed downstream," Spector said. "One of our objectives is to improve aquatic life within the stream along its entire 11-mile length. As we're doing these restoration projects a bit at a time, we're slowly providing more habitat and more places that can better support aquatic life so that they may be able to better tolerate the areas where maybe we haven't gotten to yet."

Fish enter the creek from connected lakes. Improved

stream habitat would most likely result in more minnows and aquatic insects. In Minneapolis, a 9-foot drop structure known as Webber Park Falls prevents Mississippi River fish from entering the creek.

"We're trying to look for projects where we can clean things up before it gets farther downstream," said Brooklyn Park Water Resources Engineer Mitch Robinson, who serves on the committee that advises the WMC.

"The stream restoration projects are a good way — a pretty cost-effective way, we've found — for improving water quality (in terms of) phosphorus- and TSS- (total suspended solids) loading from these eroding streambanks," Robinson said.

While the Connections I and Connections II projects focused on improving water quality and habitat, the WMC also considered adjacent landowners' concerns about thinning the trees — which, in some cases, screened a less-than-desirable view.

> **"The stream restoration projects are a good way — a pretty cost-effective way, we've found — for improving water quality (in terms of) phosphorus- and TSS-loading from these eroding streambanks."**
>
> — Mitch Robinson,
> Brooklyn Park water resources engineer

In some spots, the WMC replaced trees with new plantings set farther back from the stream. Once the project was underway, some landowners realized the trees blocked a desirable view. Some requested tree removal.

"One of the big challenges with stream restorations is there is a period when they look really bad," said Shingle Creek WMC Chairman Andy Polzin, who represents Plymouth on the nine-member commission.

Until work finishes, banks stabilize and plants grow, Polzin said it can sometimes be difficult to help people understand how appealing restorations will look.

Just upstream in Brooklyn Park's Village Creek Redevelopment, Spector described Shingle Creek as the "star of the area." The creek became the focus of that redevelopment, which began about 20 years ago as a result of the city's master planning work with Hennepin Community Works. Spector said the city of Brooklyn Park's work on Village Creek was the impetus for the current Clean Water Fund-backed restorations.

The Connections sites' linked walking trails and a new viewing area make it easier for people to see the progress, learn about the WMC's work and get close to the water.

"The more we do and the better we do at education and outreach, the more people understand the creek and the mission of the city and the watershed and improving water quality. It gives them a chance to connect to surface water, which a lot of people really don't have an opportunity to do," Polzin said.

Next, Spector said the WMC is pursuing funding for a Connections III restoration that would end downstream at Xerces Avenue.

BWSR

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Website: www.bwsr.state.mn.us

Watershed approach boosts metro-area water quality

CLEAN WATER LAND & LEGACY AMENDMENT

Local governments in Minnesota are beginning to see conservation outcomes supported by the first round of watershed-based implementation funding.

The Minnesota Board of Water and Soil Resources (BWSR) has made approximately $30 million available for local water quality priorities since 2018. Since then, local government partnerships established through BWSR's One Watershed, One Plan (1W1P) program or the Metro Surface Water Framework have combined implementation dollars with other funding sources to embark on high-priority conservation projects.

The funding is part of a broader state strategy to transition away from the competitive grant funding model toward an approach that dedicates funding to priority resource concerns within individual watersheds. The 1W1P program aims to align local water planning on watershed boundaries to create prioritized, targeted and measurable implementation plans. This collaborative approach enables comprehensive water management work on issues such as flooding, habitat, water quality and recreation.

Under the Metro Surface Water Management Act, local governments in the seven-county Twin Cities Metro area have been doing comprehensive watershed management planning since 1982. The watersheds in these counties can choose to go through the 1W1P process but are not required to do so to be eligible for watershed-based implementation funding.

A biochar/iron-enhanced sand filter and pump system at the city of Blaine's Pleasure Creek Pond went online July 24. The filter is designed to remove hard-to-target pollutants like dissolved phosphorus and E. coli bacteria. The recently completed project aims to reduce E. coli levels by 80%; early analysis shows an 84% reduction.
Photo Credit: Coon Creek Watershed District

Planning partnerships in the Twin Cities metro area were eligible to receive $5.59 million in fiscal year 18-19 and an additional $6 million dedicated to watershed-based implementation funding in 2019.

"The purpose of watershed-based implementation funding is to supplement existing funding to ensure the most critical clean water activities are being implemented," said BWSR Clean Water and Grants Coordinator Marcey Westrick. "The intent is that water resource managers within the metro and statewide will be able to predict funding availability more accurately, and as a result be able to implement water quality projects efficiently and systematically."

Here's a look at three metro-area projects supported by FY18-19 watershed-based implementation funding.

Pleasure Creek biochar/ iron-enhanced filter

A biochar/iron-enhanced sand filter and pump system designed to remove dissolved phosphorus and E. coli bacteria at the city of Blaine's Pleasure Creek Pond went online July 24.

The new filter is designed to remove hard-to-target pollutants. Biochar is a charcoal-like substance created by burning wood chips or other organic material at a high temperature in the absence of oxygen. Coon Creek Watershed District Water Quality Coordinator Justine Dauphinais said the district decided to incorporate biochar into the filter because lab tests show it's highly effective at removing

An expansive project to integrate water quality and habitat improvements into an overhaul of Edina's Arden Park includes a remeandered portion of Minnehaha Creek (above) and a new regional stormwater management system that involves an underground pre-treatment structure and six biofiltration swales planted with native plants (below).
Photo Credits: Minnehaha Creek Watershed District

E. coli bacteria. The project's goal is to reduce E. coli levels by 80%. Initial analysis shows an 84% reduction in bacterial removal since the system became operational.

According to Dauphinais, the filter treats roughly 195 gallons of water per minute and 1.97 million gallons per week. The system results in cleaner water entering Pleasure Creek, which is impaired for having excess nutrients and bacteria. Pleasure Creek needs a reduction of 29 pounds of phosphorus per year to meet state standards; the new system is anticipated to remove 25 pounds annually.

"This one project goes a really long way in getting us closer to meeting state standards," Dauphinais said.

The project received $191,973 in watershed-based implementation funding. The city of Blaine contributed $200,000 toward project costs, with Coon Creek Watershed District covering the balance.

Dauphinais said that while the competitive grant process is still an important component in water quality improvement projects, watershed-based funding offers more predictable funding for high-priority projects.

"Having the dedicated watershed-based funding pot of money allowed our cities to be more active participants," Dauphinais said. "It was a way to make a larger project affordable for all parties."

Arden Park improvements

Watershed-based implementation funding contributed to stormwater improvements that are one component of an expansive project to integrate water quality and habitat improvements into an overhaul of a popular neighborhood park in Edina. The project at Arden Park — a partnership between the Minnehaha Creek Watershed District (MCWD) and the city of Edina with support from multiple grants — involves managing regional stormwater, re-meandering the previously ditched and straightened creek, creating new trail and boardwalk connections, and installing new park features such as a shelter and playground.

BWSR contributed $124,151 to help build a new regional stormwater management system in Arden Park. Drainage within the park was improved by moving localized stormwater to a two-stage system that treats a 90-acre residential area. The stormwater system includes an underground pre-treatment structure

and six biofiltration swales planted with native species to provide pollinator habitat in addition to filtration. The new on-site drainage system moves stormwater away from open park spaces, meeting community priorities for year-round usability.

MCWD Policy Planning Manager Becky Christopher said the transition to a watershed-based funding approach has come with some challenges, but she's optimistic about the direction of the new approach going forward.

"We have more influence in decision making at a local level to say what we should be targeting and how we want to prioritize the projects," Christopher said. "It's been interesting to work through this process with other local government units and hear their perspectives."

An August 2019 rain garden maintenance workshop in Fridley was one of more than 50 events hosted last year by the Anoka County Water Resource Outreach Collaborative. The collaborative offers trainings and creates outreach materials to raise awareness about protecting local water resources.
Photo Credit: Anoka Conservation District

Anoka County outreach

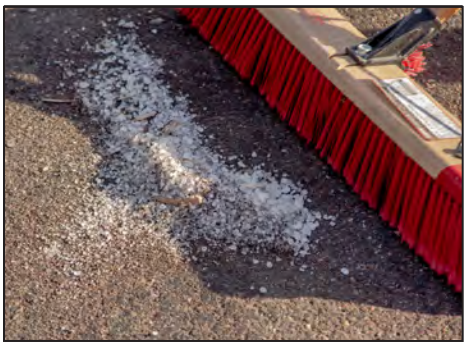
Anoka Conservation District in 2018 launched the Anoka County Water Resource Outreach Collaborative (ACWROC) to offer training and create outreach materials and programs that focus on protecting local water resources. Partners include Anoka County, six watershed management organizations, and more than 20 cities and townships.

ACWROC received $125,000 in watershed-based implementation funding, supplemented by a $12,500 local match provided by Anoka Conservation District.

"The purpose of this outreach program is to inform communities about the issues that are affecting local water bodies, including groundwater, and engage people in activities and behavior changes that really help protect and improve those water resources," said Emily Johnson, outreach and engagement coordinator for Anoka Conservation District.

In 2019, ACWROC held over 50 events engaging thousands of residents and providing training to more than 420 residents. Events and trainings offered by the collaborative touched on subjects such as planting and maintaining rain gardens, buckthorn removal and well and septic system maintenance. In the past year, WROC has also produced three animated videos about water stewardship topics, including groundwater ("Our Groundwater Connection," "Our Groundwater Connection: Contamination") and lakeshore restoration ("Our Lakeshore Connection").

Smart salting training, in Spanish



From left: *A 12-ounce smart salting-themed cup indicates an appropriate amount of salt to use on 10 sidewalk squares. Snowplows apply de-icing salt on University Avenue in St. Paul. A broom can be used to evenly distribute de-icing salt on walkways.* **Photo Credits:** Clean Water MN

Lower Mississippi River WMO's efforts to reach Latino communities, reduce chloride pollution enlist MPCA, BWSR and Dakota County SWCD staff plus Bolton & Menck engineers and All in One Translation

CLEAN WATER LAND & LEGACY AMENDMENT

The Clean Water Fund supports Watershed-Based Implementation Funding for watersheds participating in One Watershed, One Plan or the Metropolitan Surface Water Management Act.

The Lower Mississippi River Watershed Management Organization (LMRWMO) plans to host a Spanish-language Smart Salting for Property Management Certification and training course to better serve Latino communities and reduce chloride pollution in lakes, rivers and streams within the watershed.

A virtual training is planned for 8 a.m. - 2 p.m. Sept. 19.

Dakota County Soil & Water Conservation District (SWCD) Senior Resource Conservationist Joe Barten said the training's target audience is people who own or manage private and public buildings within the watershed and throughout the greater Minneapolis-St. Paul metro area. This includes building maintenance and janitorial staff, private business owners, and anyone who regularly shovels snow and applies de-icing salt at public and commercial properties. Attendees will complete the Minnesota Pollution Control Agency's (MPCA) Smart Salting and Property Management Certification during the six-hour training.

MPCA data indicate chloride from de-icing salt frequently enters lakes and streams, plus groundwater sources that supply drinking water. One teaspoon of salt can permanently pollute 5 gallons of water. Chloride is extremely difficult to remove from water, so prevention is a key strategy in reducing chloride pollution.

The LMRWMO is organizing the training along with the MPCA, which is providing course content. Engineering firm Bolton & Menk will run the training with All in One Translation offering live Spanish translation. Course materials and the certification test will be offered in Spanish.

"We hope to gain a better understanding of how we can best serve all members of our watershed communities and bring them information where they are, in a meaningful way that positively impacts our water resources," Barten said.

The Metropolitan Surface Water Management Act, passed by the Minnesota Legislature in 1982, requires WMOs to create and

> **We hope to gain a better understanding of how we can best serve all members of our watershed communities and bring them information where they are, in a meaningful way that positively impacts our water resources.**
>
> —Joe Barten, Dakota County SWCD senior resource conservationist

implement 10-year watershed management plans. The LMRWMO identified multilingual education and outreach as a priority in its 10-year watershed management plan.

A $144,670 Watershed-Based Implementation Funding (WBIF) grant from the Minnesota Board of Water and Soil Resources (BWSR) supports the training, which leverages about $40,000 of the total grant funds, plus matching funds from the LMRWMO. The LMRWMO and MPCA plan to share information created during this process to help other metro-area WMOs to develop their own Spanish-language education and outreach materials, such as social media templates or future trainings.

"This information doesn't belong to the WMO, we want it to be shared back to communities and other watershed management organizations throughout the metro," Barten said.

A Spanish-language poster for the LMRWMO's smart salting training describes the ways de-icing salt can contaminate water resources, including drinking water. **Graphic Credit:** Bolton & Menck

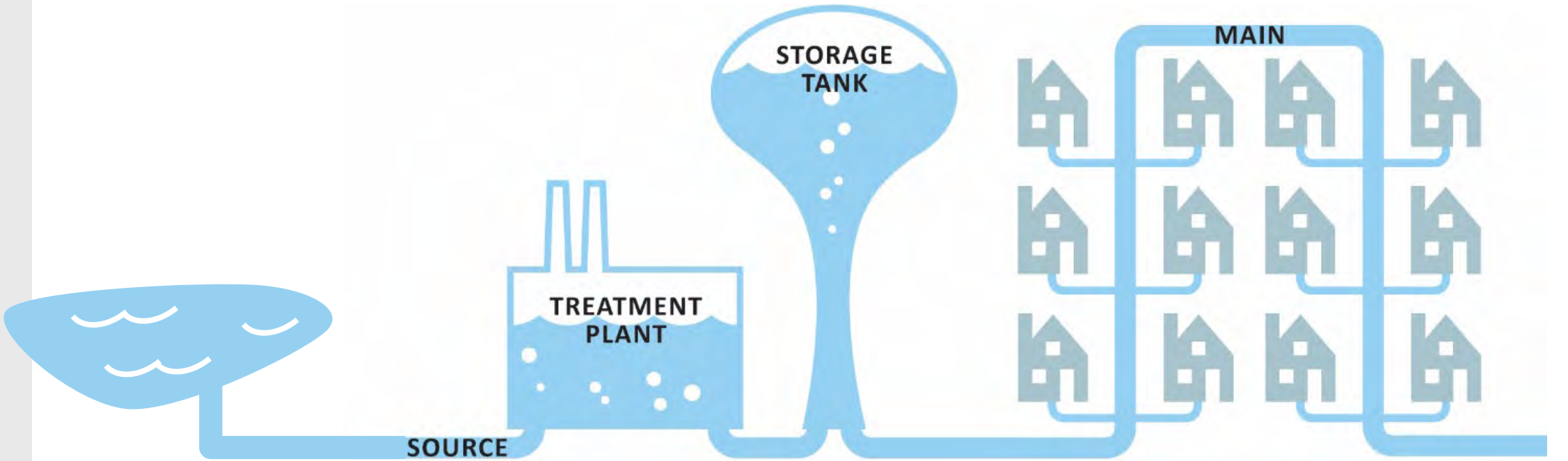
The LMRWMO plans to use the remaining WBIF grant funds to complete two feasibility studies. A study of Lake Augusta in Mendota Heights will evaluate resource concerns to help identify projects to improve water quality in the lake and watershed. A second study will evaluate erosion issues in the three major stream reaches of Interstate Valley Creek, which runs through Mendota Heights, with the goal of identifying areas in the watershed to implement water quality improvement and volume reduction stormwater management practices. Matching funds provided by the city of Mendota Heights will contribute to both studies.

Multi Community Source Water Protection Pilot

Lanya Ross | Metropolitan Council

Steve Robertson | Minnesota Department of Health

Source to Tap Framework for Protecting Drinking Water



How does MDH facilitate Source Water Protection?

- Objective, science-based planning process
  - Modeling to delineate Drinking Water Supply Management Areas (DWSMAs – Dwiz-muh)) around drinking water sources
- Planning to identify threats and outline activities that prevent contamination in the DWSMA

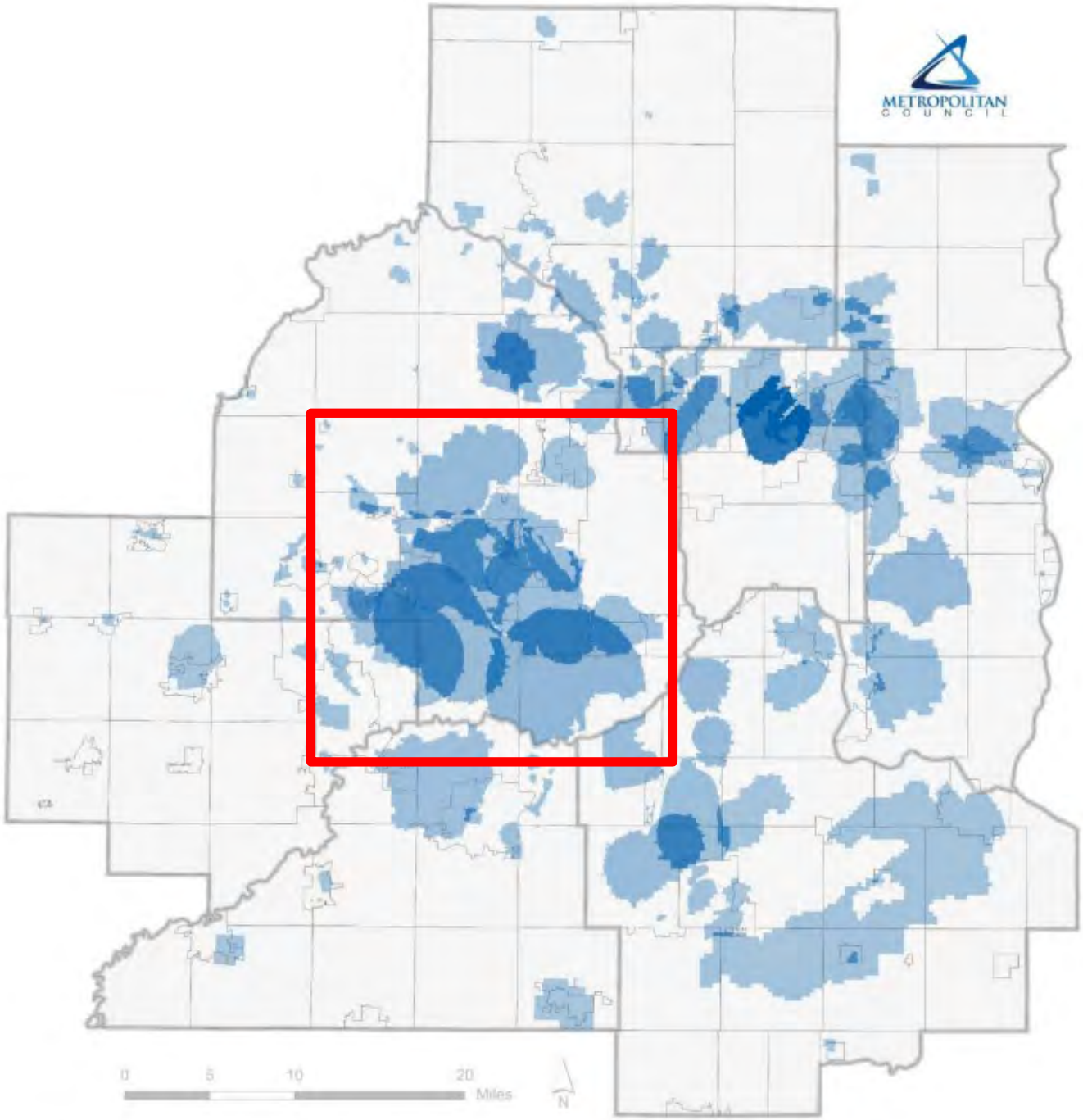
CLEAN WATER LAND & LEGACY AMENDMENT

Metro Area – considerations driving protection approaches

- Large population/many systems
- Different sources
- Vulnerable DWSMAs

- Extra jurisdictional issues
- Inconsistent planning
- Lack of coordination

CLEAN WATER LAND & LEGACY AMENDMENT



Population served

0

400,000+

Some areas contribute to populations as small as around 200 people (East Bethel).

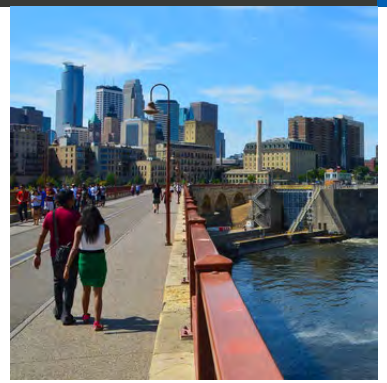
Some areas contribute groundwater to water supply systems serving more than 400,000 people (St. Paul and its overlapping areas).

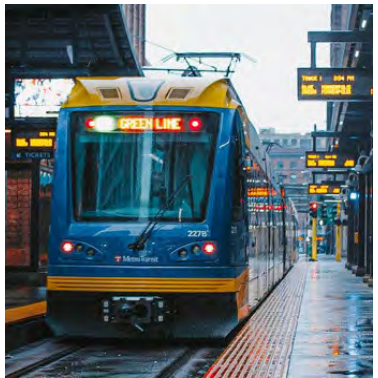
Metro DWSMA Overlap

No one community can do it alone

Every single person and community makes up the fabric and essence of this region.

- 7 counties
- 182 cities and townships
- More than 3 million residents
- Native people from 11 federally recognized Minnesota tribes and many other tribal communities
- Growing diversity representing wide-ranging racial and ethnic people, with about 300 languages spoken at home





Metropolitan Council

Metro Area Water Supply Plan (MWSP)

- **Met Council supports local water suppliers in their efforts to ensure sustainable water for today and for future generations**
- Regional issues and policy solutions
- Subregional chapters
  - Issues
  - Opportunities
  - Strategies
- Companion to Water Supply Planning Atlas

Vision and approach

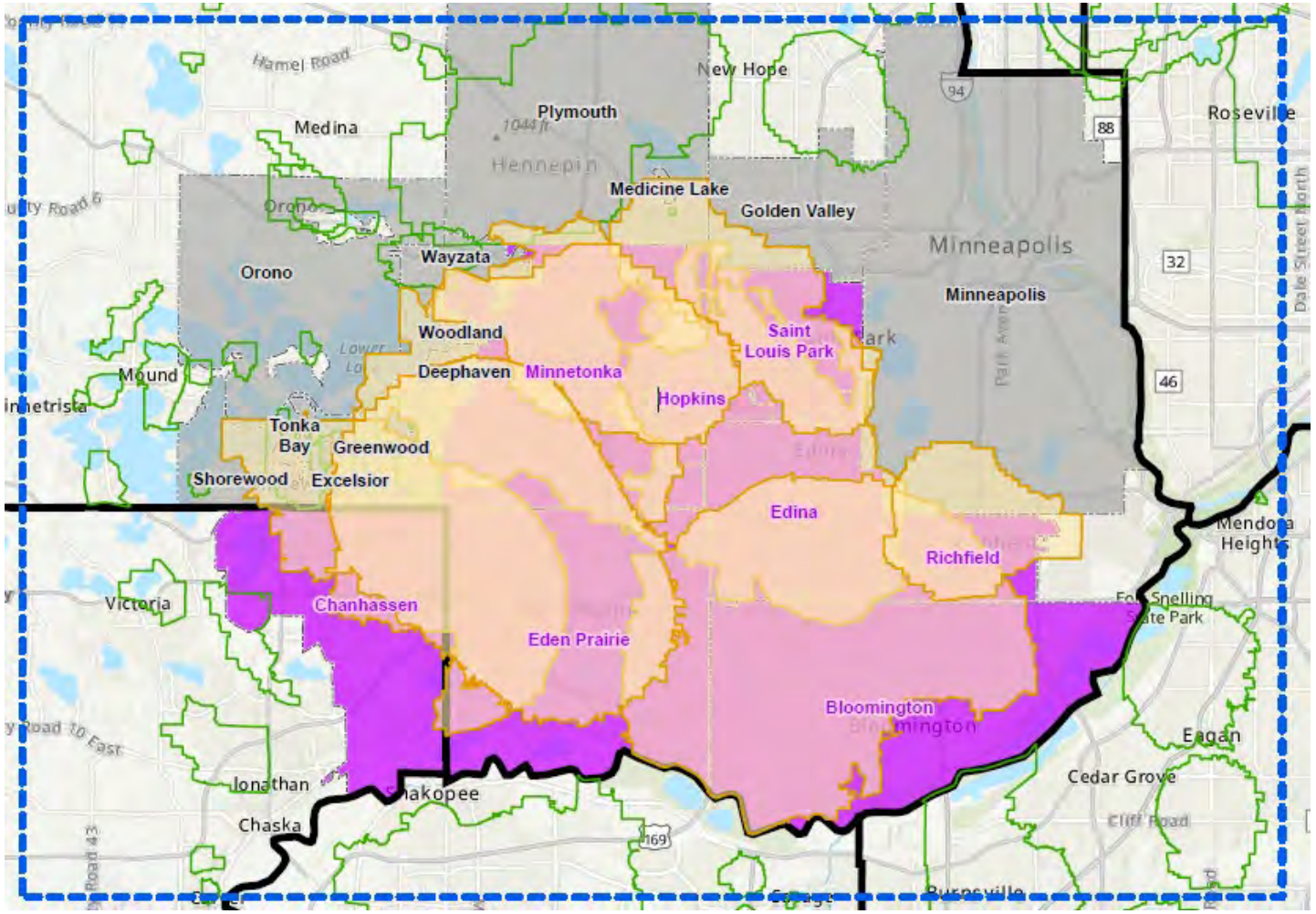
A coordinated and collaborative approach that protects and safeguards regional drinking water sources, by reducing barriers and improving local drinking water protection implementation in overlapping DWSMAs or where DWSMAs extend into a neighboring city.

Metropolitan Council

Multi-community Wellhead Protection Plan

- Reduce barriers to collaboration by cities with overlapping DWSMAs
- Enhance implementation efforts for regional benefit
- Benefits to communities include:
  - Use up updated regional groundwater model at no cost to systems
  - Coordinated and prioritized implementation activities
  - Reduced time required for individual city WHP planning and implementation

Phase 1 in progress: Subregional DWSMA delineation and assessment



Thank You!

Lanya Ross, Steve Robertson

Lanya.ross@metc.state.mn.us, steve.robertson@state.mn.us

Contaminants of Emerging Concern Work at MDH

Sarah Fossen Johnson | Manager, Environmental Health Division

Stefan Saravia | Lab Manager, Public Health Laboratory

Mary Navara | Manager, Environmental Health Division

CLEAN WATER LAND & LEGACY AMENDMENT


Contaminants of
Emerging
Concern

In the beginning…

Where we are today…

- Increased technical capacity to identify CECs and develop health-based water guidance
- Increased capacity to analyze for CECs in water, and to detect lower concentrations
- Addition of laboratory accreditation for contract laboratories

What’s Next For CEC work in MN?

Challenges of Testing for Emerging Contaminants

- Lack of standardized methods
- Expensive instrumentation
- Need for highly skilled technical staff
- Generally present at very low concentrations
- Often not a need to test for high numbers of samples

History of CECs at the Public Health Lab

- First public health laboratory in the country to test for PFAS in drinking water (since 2002)
- Lab began receiving CWF funding in 2012 for:
  - One Research Scientist
  - Money for supplies
  - Portion of an instrument
  - Ongoing instrument service contracts

Future of CECs at the Public Health Lab

- Establishment of an Emerging Contaminants Unit
- Acquisition of dedicated instruments for the program
- Staff dedicated to method development
- Increased capacity for testing of PFAS in water
- **More water samples from around MN will be tested for emerging contaminants and for a wider variety of analytes**

CECs and the Lab Accreditation Program

- Established in 1989 to accredit laboratories reporting data to federal, state and local environmental programs and private citizens
- Instill public and regulatory confidence in environmental data
- Provides homeowners with a list of environmental laboratories that perform analyses and report reliable results
- Hold the accredited labs accountable to standards that support the generation of reliable data
- Accredit private and public labs to increase analytical capacity

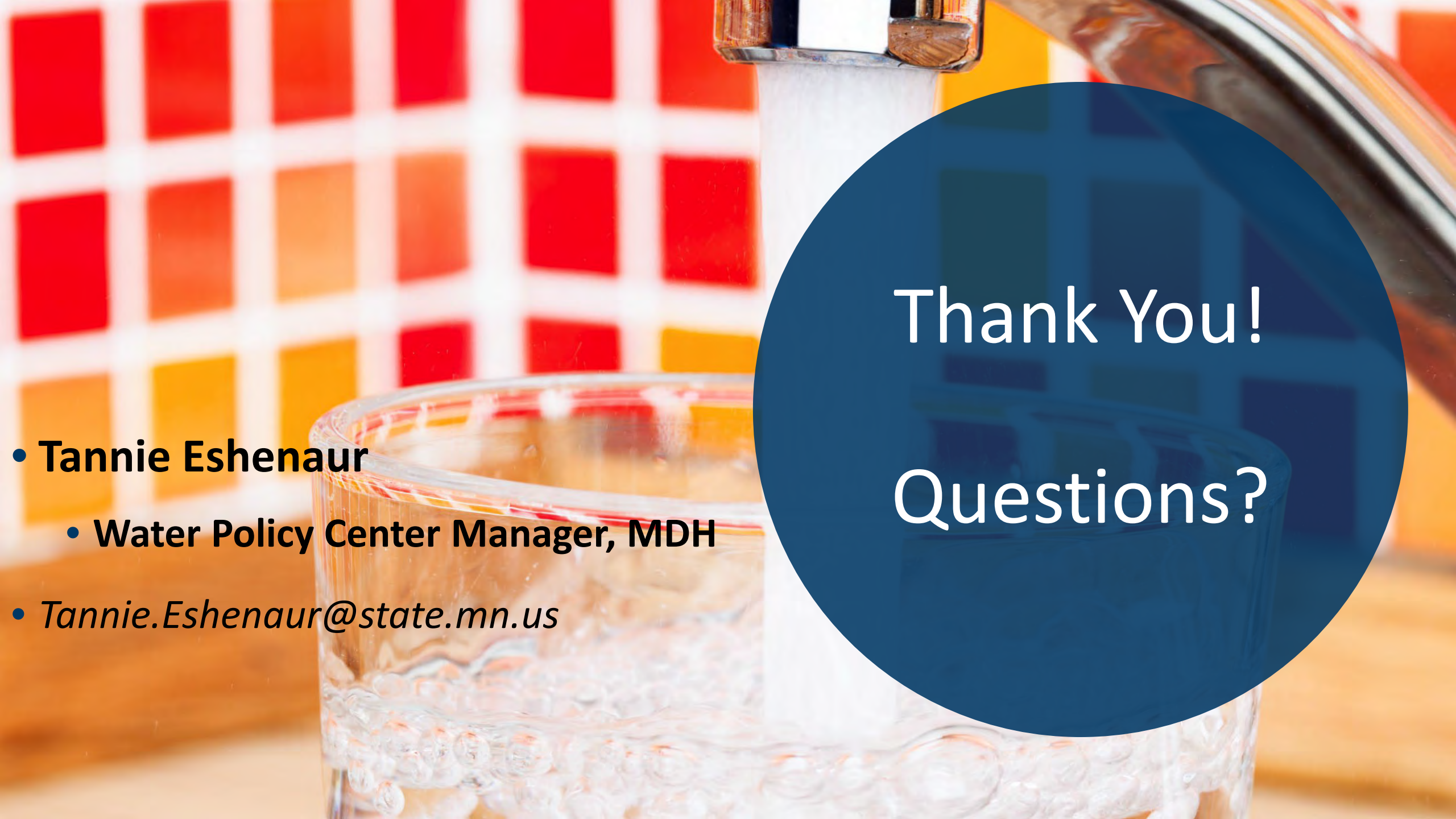
CECs and the Lab Accreditation Program

- MNELAP began receiving CWF funding in 2023:
  - database enhancements
  - 3 additional staff for PFAS/CECs
- Responsive to additional CECs using the PFAS framework

CECs and Human Health Risk Assessment

Hi Health Risk Assessment unit? This is the rest of the CEC Universe calling… We're waiting for you.

- Entering a new PFAS risk assessment paradigm
- Energizing work on other CECs
- Small grants



Thank You!

Questions?

- **Tannie Eshenaur**
  - **Water Policy Center Manager, MDH**
- *Tannie.Eshenaur@state.mn.us*

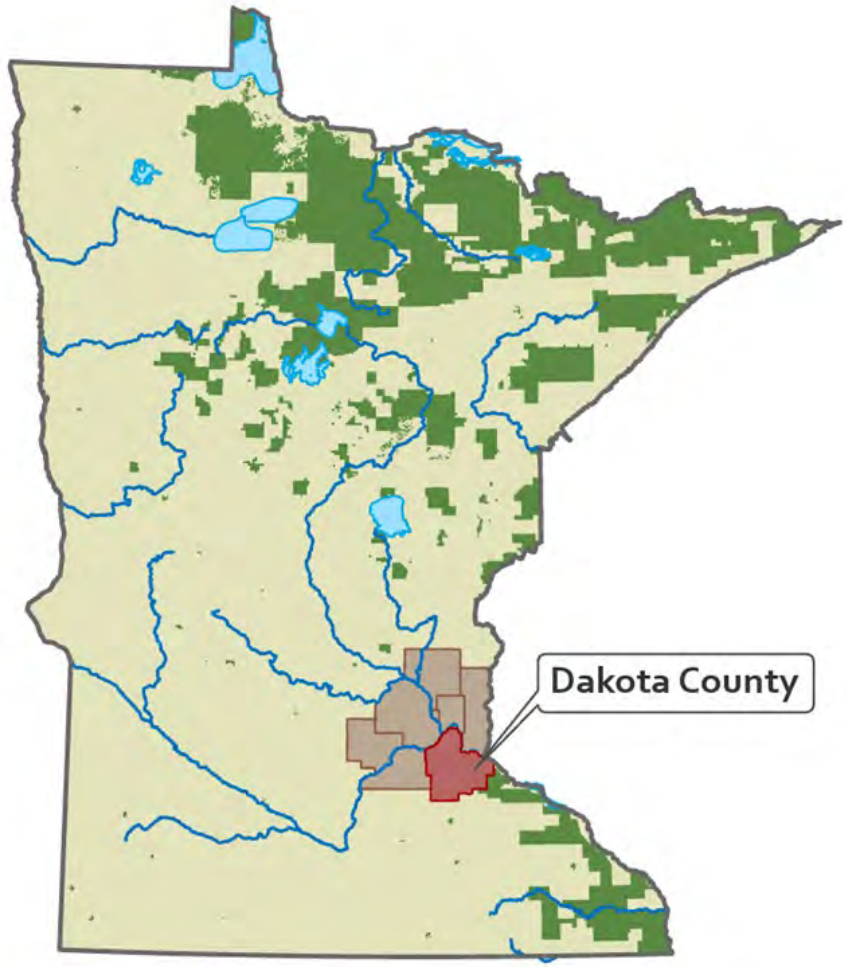
PRIVATE WELL WATER QUALITY IN DAKOTA COUNTY

Vanessa Demuth P.G. Dakota County Environmental Specialist

Dakota COUNTY

MDH DELEGATED WELL PROGRAM

- 1989 Dakota County Delegated Well Program
- Geologically Sensitive - Karst
- Require private well testing at property transfer for Nitrate, Coliform Bacteria, Arsenic & Manganese
- 8000 private drinking water wells in use
- Permitted 5,535 New Well Constructions
- Permitted 7,647 Well Sealings



ACCOMPLISHMENTS

- Published four drinking water quality studies
- Over 157,600 individual private water test parameters
- Leveraged partnerships and grants – including many Clean Water Legacy Funds

STUDIES

1ST Study - Hastings Nitrate Study

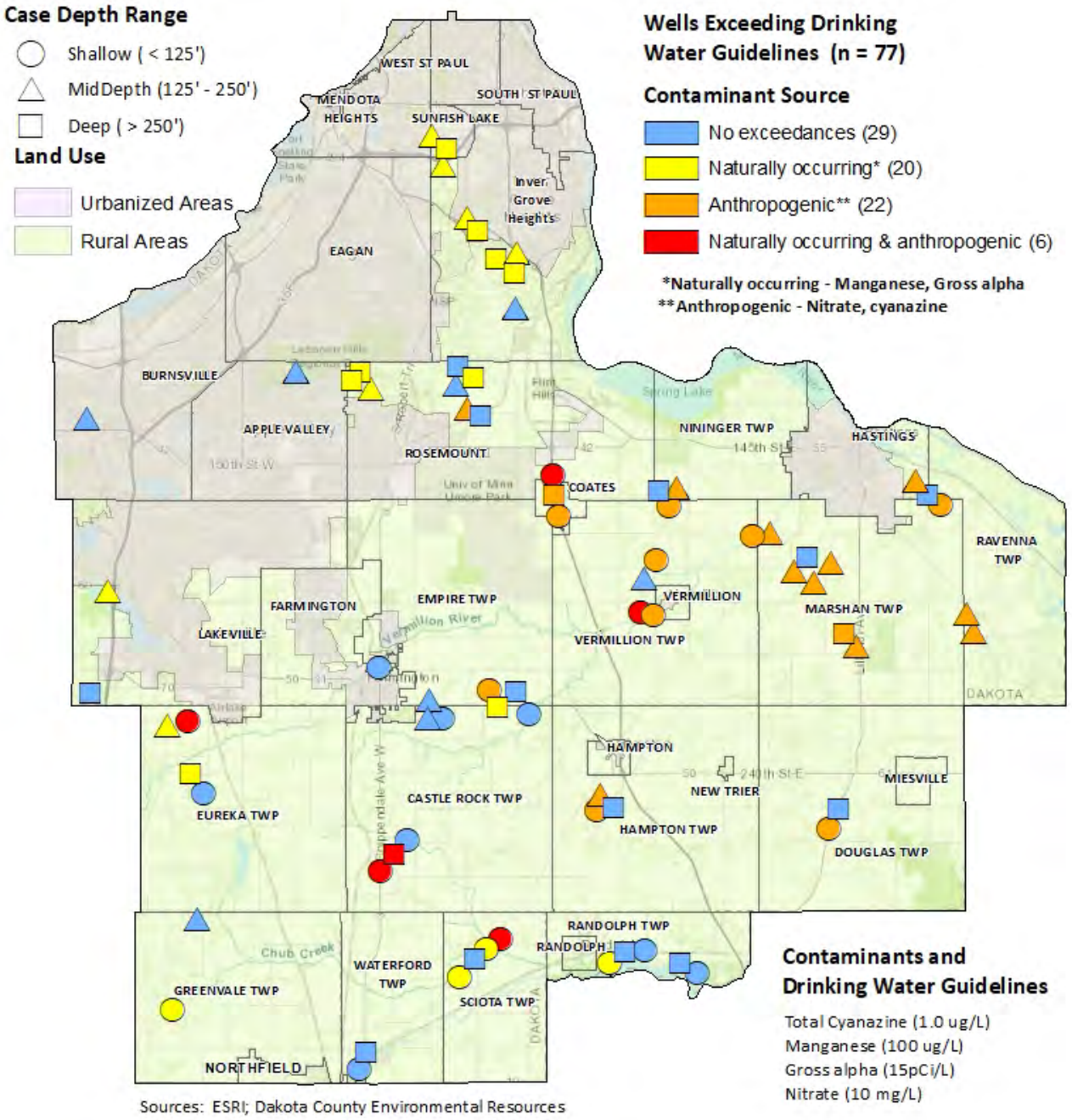
- 26% of private wells exceeded the nitrate guideline of 10 mg/L
- 53% of wells had pesticides detected; none over 2003 guidelines

2ND Study - Wells And Increased Infant Sensitivity (WIISE Study in Inver Grove Heights)

- 71% exceeded the manganese guideline of 100 µg/L for infants one year or younger
- 56% of those exceeded 300 µg/L a recommended guideline for everyone over one

3RD STUDY - AMBIENT GROUNDWATER QUALITY STUDY

- 20-year study
- Established baseline private well water quality and look for changes over time
- Largest known datasets for triazine and chloroacetamide herbicides and their breakdown products in private wells with multiple years of data from the same 77 wells
- More upward trends in private wells for chloride than for nitrate
- Published report to website in September 2020 after peer review



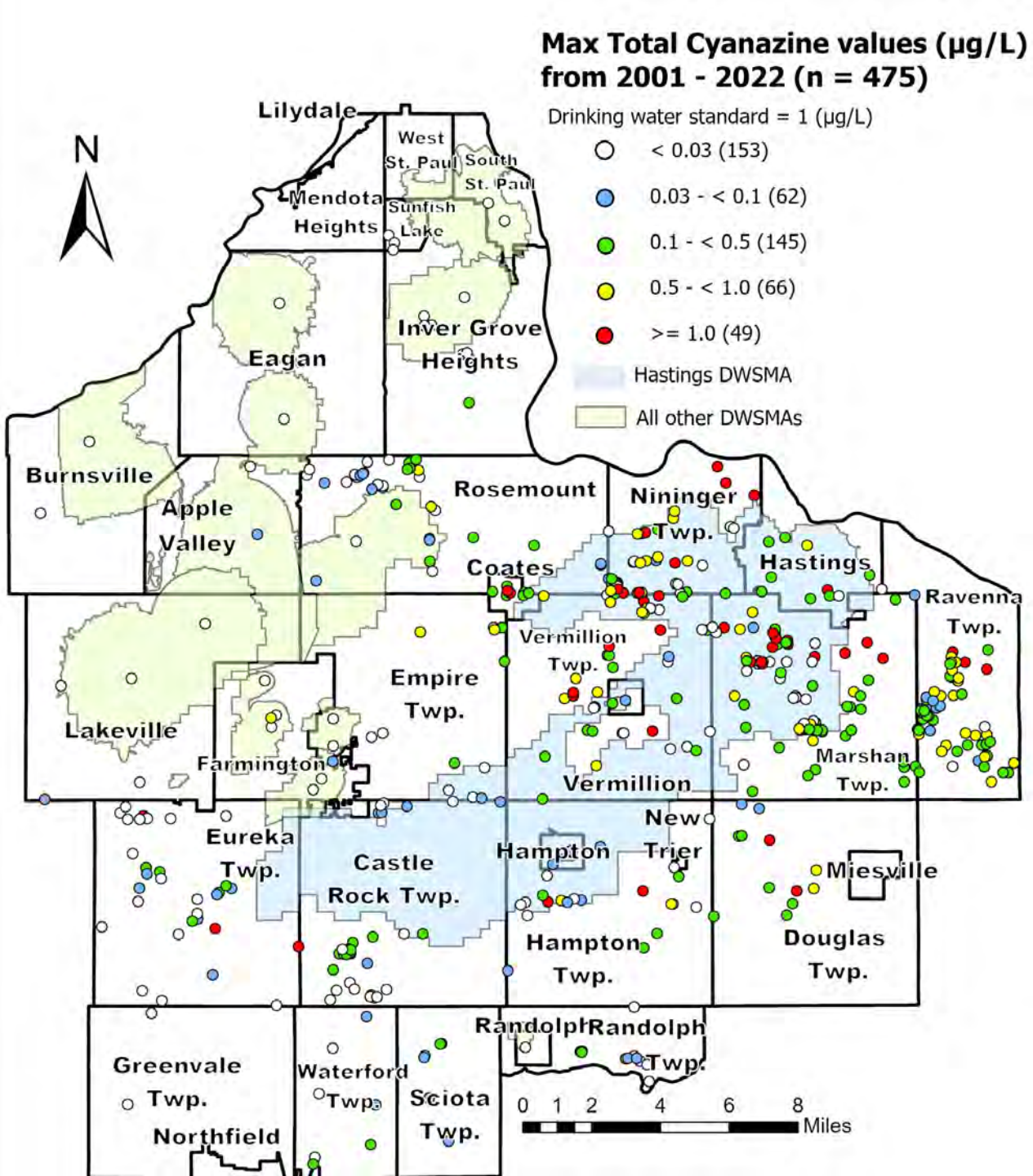
Sources: ESRI; Dakota County Environmental Resources

AMBIENT STUDY 62% OF WELL EXCEED

Chemical	Percent of Wells Exceeding Drinking Water Guideline At Least Once between 1999-2019
Manganese	34 percent of wells sampled exceed the guideline of 0.100 mg/L (milligrams per liter or parts per million)
Nitrate	31 percent exceed the guideline of 10 mg/L
Cyanazine breakdown products	22 percent exceed the guideline of 1 µg/L (micrograms per liter or parts per billion)
Gross Alpha	3 percent exceed the guideline of 15 pCi/L (picocuries per liter)

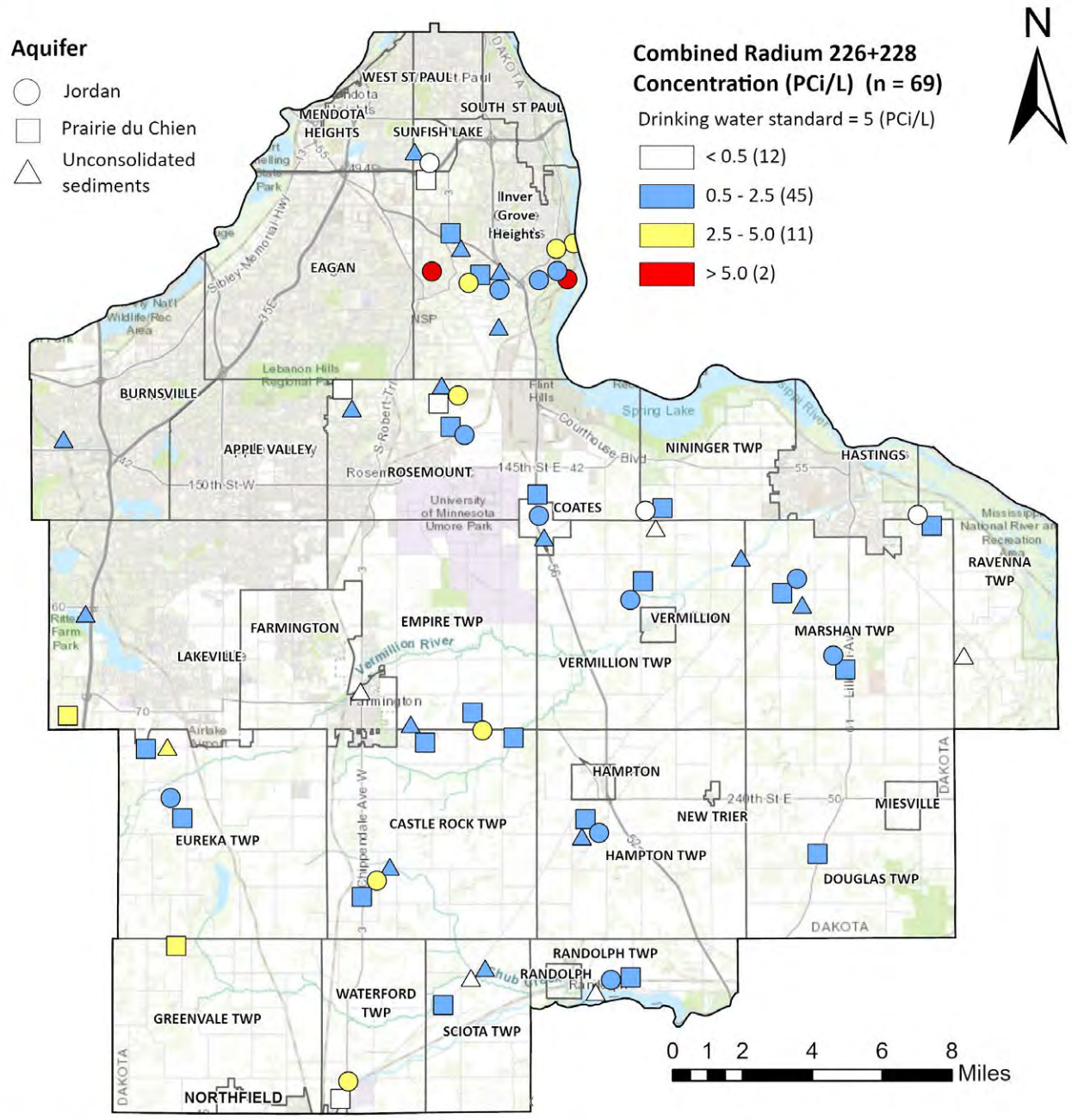
CYANAZINE
(Discontinued Herbicide)
DAKOTA CO. & MDA RESULTS

- 10 percent exceeded the drinking water guideline of 1.0 µg/L
- 23 of the 49 wells that exceed are within the Hastings Drinking Water Supply Management Area (DWSMA)
- Cyanazine workgroup – Dakota Co., MDA & MDH to address the problem of cyanazine breakdown products in drinking water.



RADIUM RESULTS DAKOTA CO. & MDH

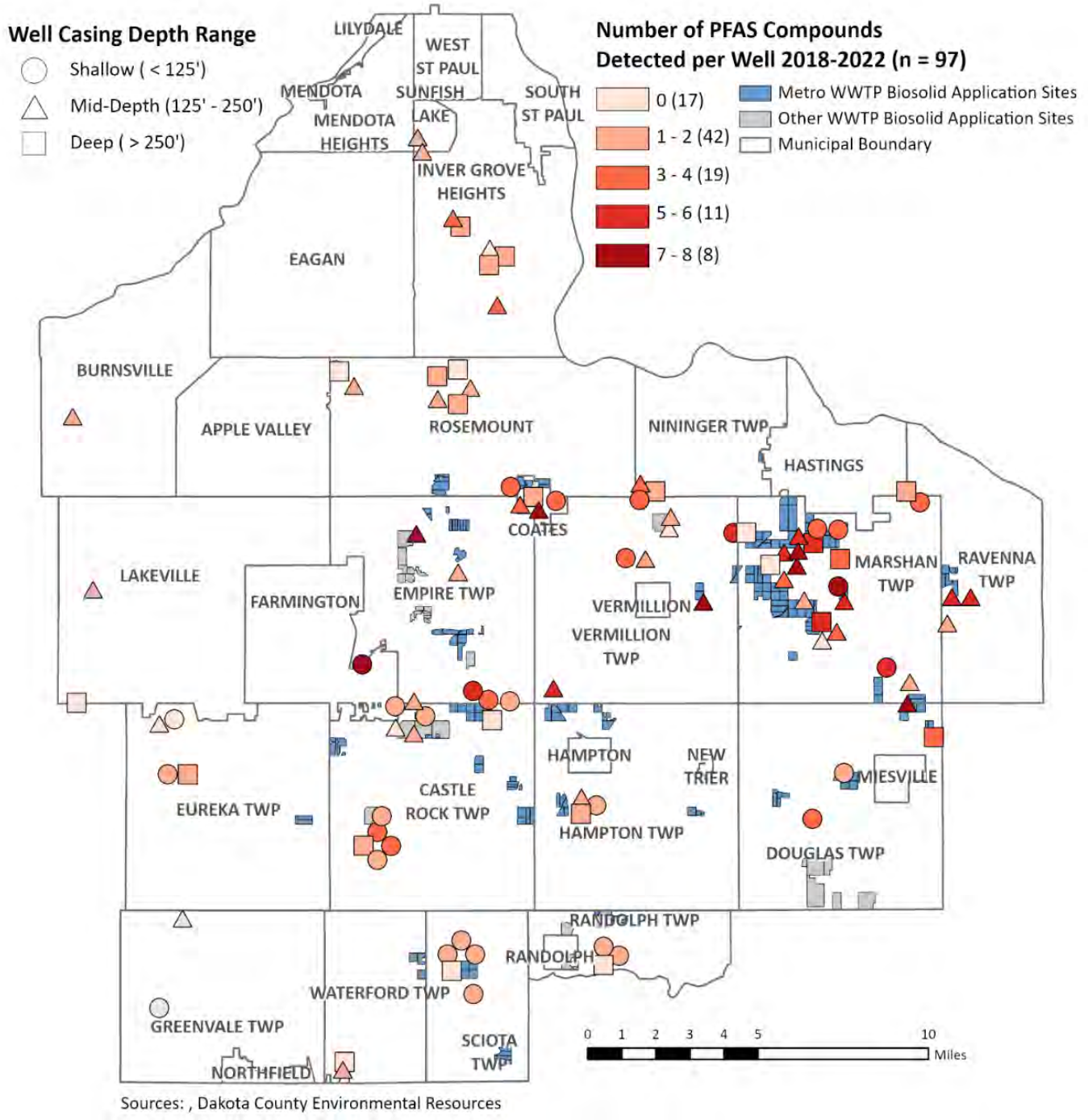
- Radium, geologically sourced
- Present above guideline in 2 of 69 private wells
- Elevated in municipal well water
- No amount is safe, causes cancer



Sources: ESRI; Dakota County Environmental Resources

4TH STUDY - PFAS

- 10 different PFAS were detected
- PFAS detected in 81 percent of the wells



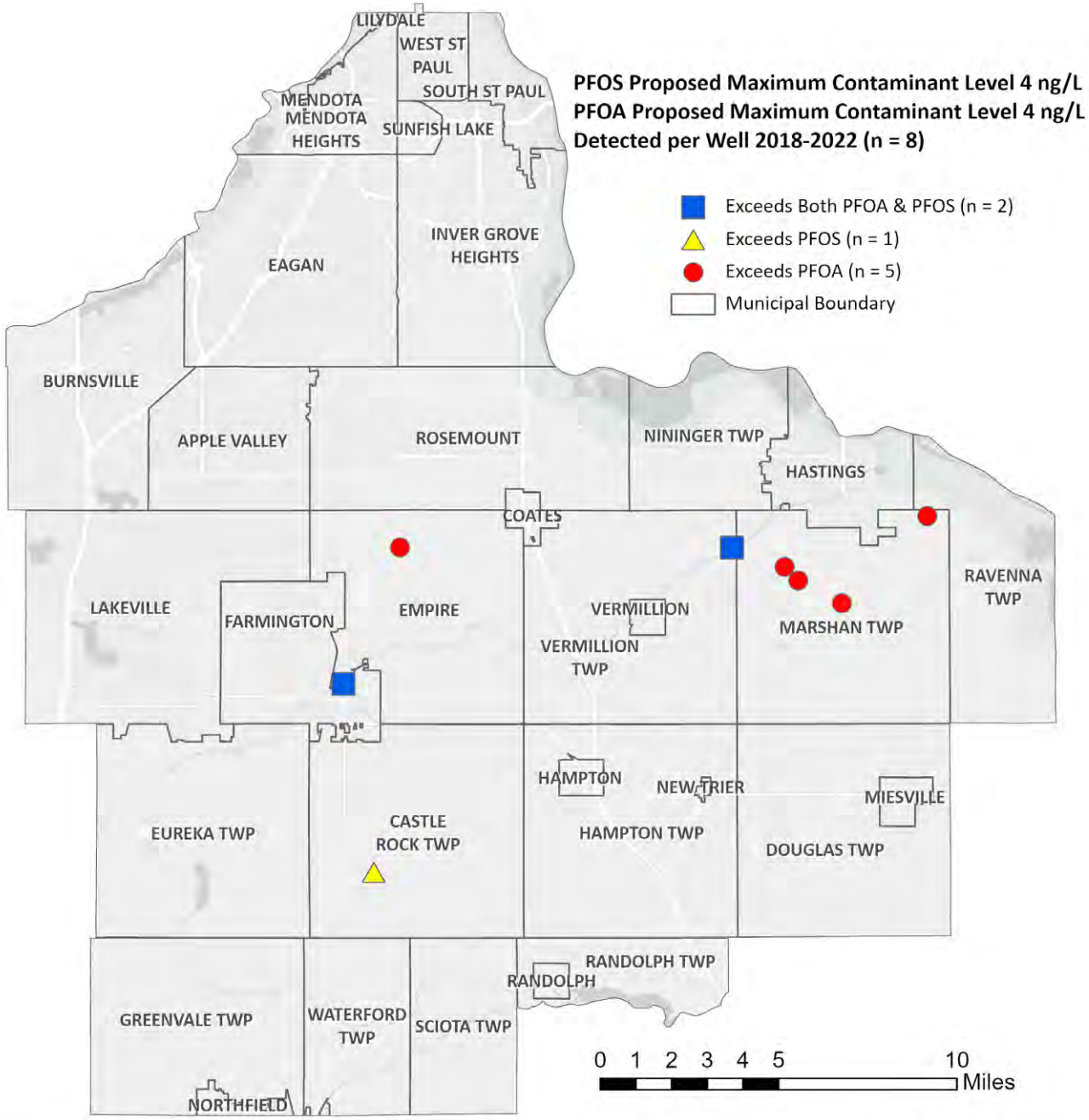
PFAS EXCEEDING EPA PROPOSED LEVELS

8 wells exceed the EPA proposed MCLs of 4 ng/L

- 7 for PFOA (associated with Teflon)
- 3 for PFOS (associated with Scotchgard)
- 2 for both PFOA and PFOS
- 3 of the 8 exceed the HRI

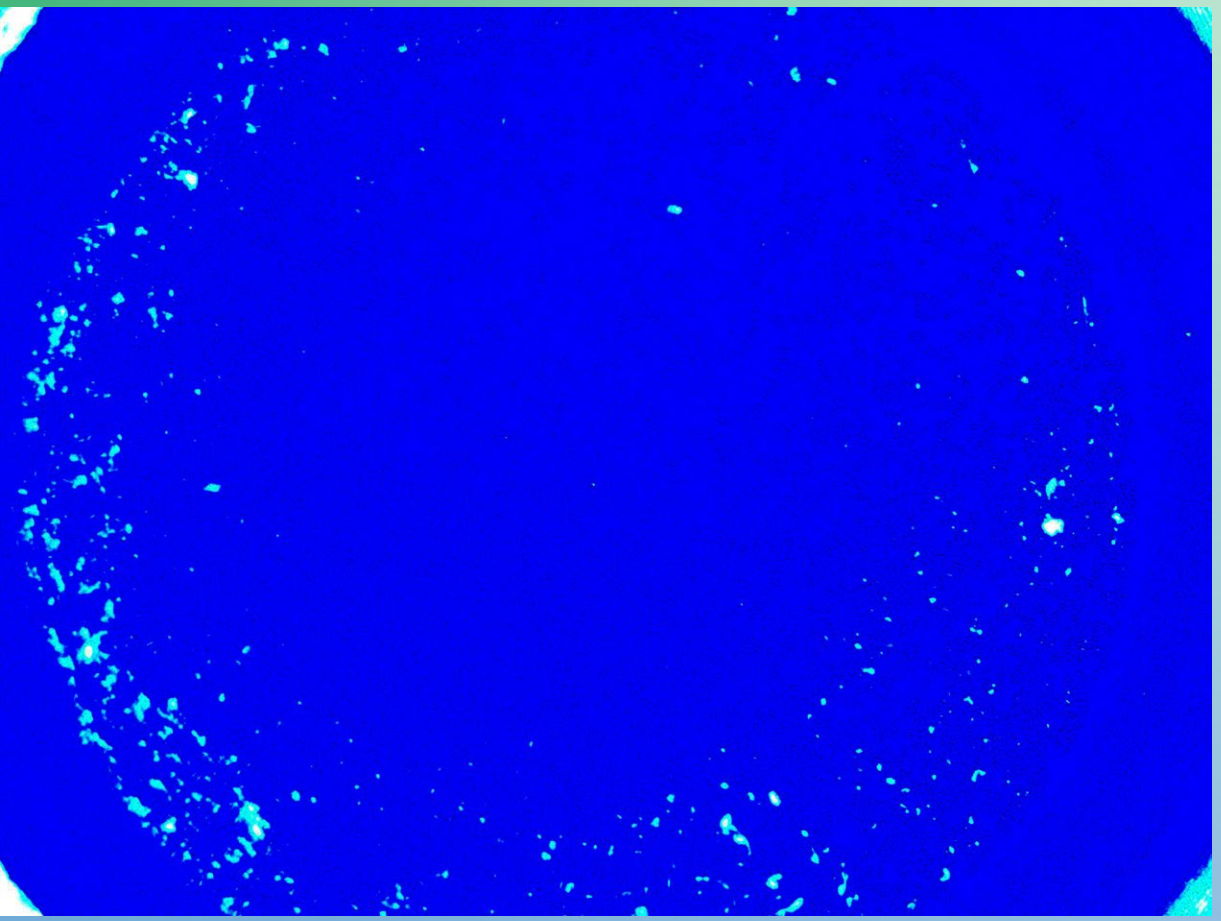
Concentrations of PFBA, PFPeA, and PFHxS in wells were significantly correlated to the distance to a known biosolid application site

5 of the wells are in the Hastings DWSMA



Source: County of Dakota, Metropolitan Council, MetroGIS, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Dakota County Environmental Resources

2020 MICROPLASTICS



- 5 wells near biosolid application sites were tested for microplastics
- All 5 had microplastics detected ranging from 3.6 - 84 particles per 20 ml water sample which is approximately 4 teaspoons
- Picture of water sample the highest number of particles, 84
- The lab provided photos of every sample
- No established health standards

ONGOING STUDY -COMMUNITY FOCUSED SAMPLING

Purpose: Offer all 8000 private well owners free testing at least once every 5 years

Funding: Dakota County

- Well owner collects samples from outside untreated spigot & inside from primary drinking water tap to confirm if treatment devices are working
- Outside samples: analyzed for arsenic, chloride, manganese, and nitrate
- Inside samples: analyzed for lead; and
  - Nitrate if > 3 mg/L,
  - Arsenic if > detected in outside sample
  - Manganese if equal to or greater than 90 ug/L in the outside sample

Response rate: 25% (1,622 of 6,553)

2022 Pilot Grant Program
Drinking Water Treatment System

- 12 Reverse Osmosis (RO) systems and 5 water softeners installed
- Direct mailing to over 200 households with a nitrate, arsenic or manganese exceedance
- Low-income criteria
- $2,000 maximum grant
  - Water softener is required prior to RO unit installation
  - Material costs increased significantly over last couple of years
    - Average RO cost = $1750
    - Softeners cost =$1500-$1800
    - Potentially 62% of all our wells need treatment, that is about 5000 wells.

WELL SEAL GRANTS

- Offered well seal grants to well owners for the past 30 years
- Funded by BWSR, Dakota County and federal block grants
  - Watershed based implementation funding
    - Targeting wells located in DWSMAs
    - Mississippi East WMO well seal grant funds expended in 2021
    - Currently utilizing funds designated for wells in the Black Dog WMO
    - Applied for well seal grant funds for the Hastings DWSMA

CITY OF COATES

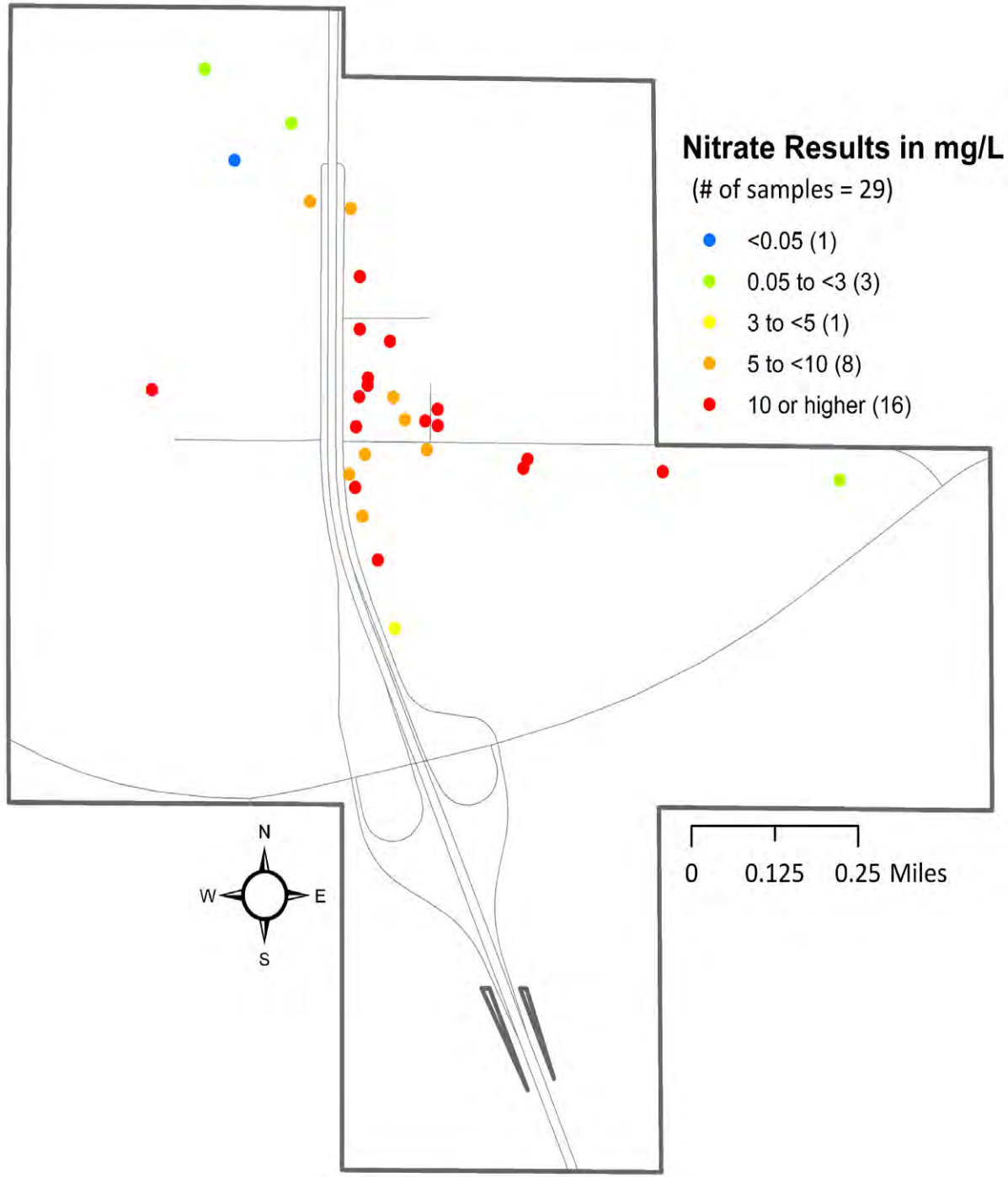
Poor water quality

- 55% of drinking water exceed Nitrate
- Elevated cyanazine
- PFAS
- Chloride

Feasibility Study to connect Coates to City of Rosemount's municipal water supply

12th on MDH's 2023 Project Priority List

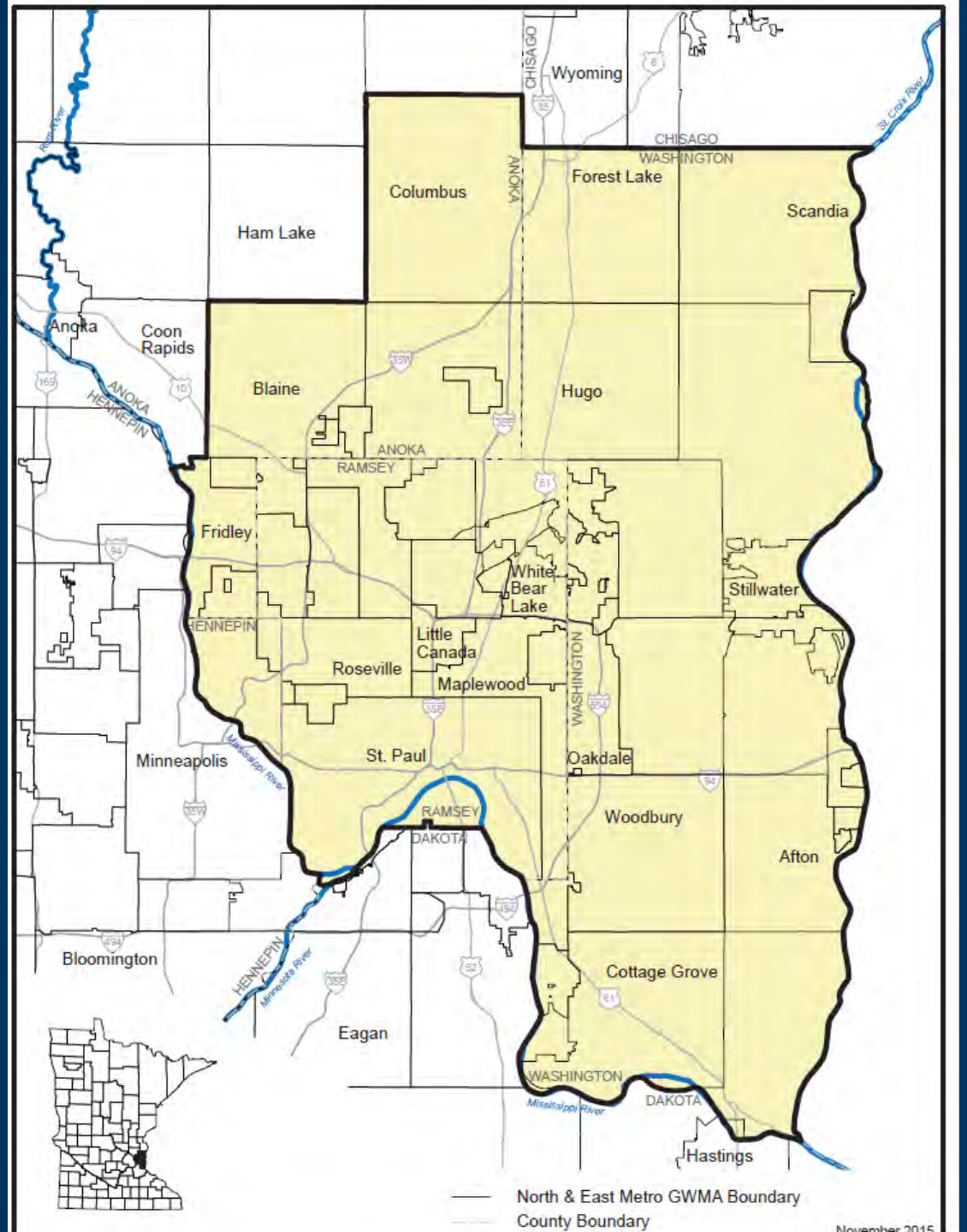
Rural Feasibility Study in progress



SUMMARY

- Dakota county has over 157,600 individual water test results soon to be in EQuIS database
- Partnerships with MDH, MDA, USGS, Vermillion River Watershed JPO, and cities
- All our studies are available on our website including a document summarizing the studies at www.co.dakota.mn.us *search term* water studies

Contact information: Vanessa Demuth
Dakota County Environmental Resources Department
vanessa.demuth@co.dakota.mn.us
952-891-7010 office phone



North and East Metro Groundwater Management Area

Summary of Issues

- Substantial contamination from PFAS
  - Public water supply and private wells
  - Settlement funds to ensure safe and sustainable drinking water and enhance natural resources
- Growing population
- Long-term Sustainability Concerns
  - Aquifer levels
  - Water levels for Lakes, Streams and Wetlands

White Bear Lake Water Levels & Drinking Water Supply Planning

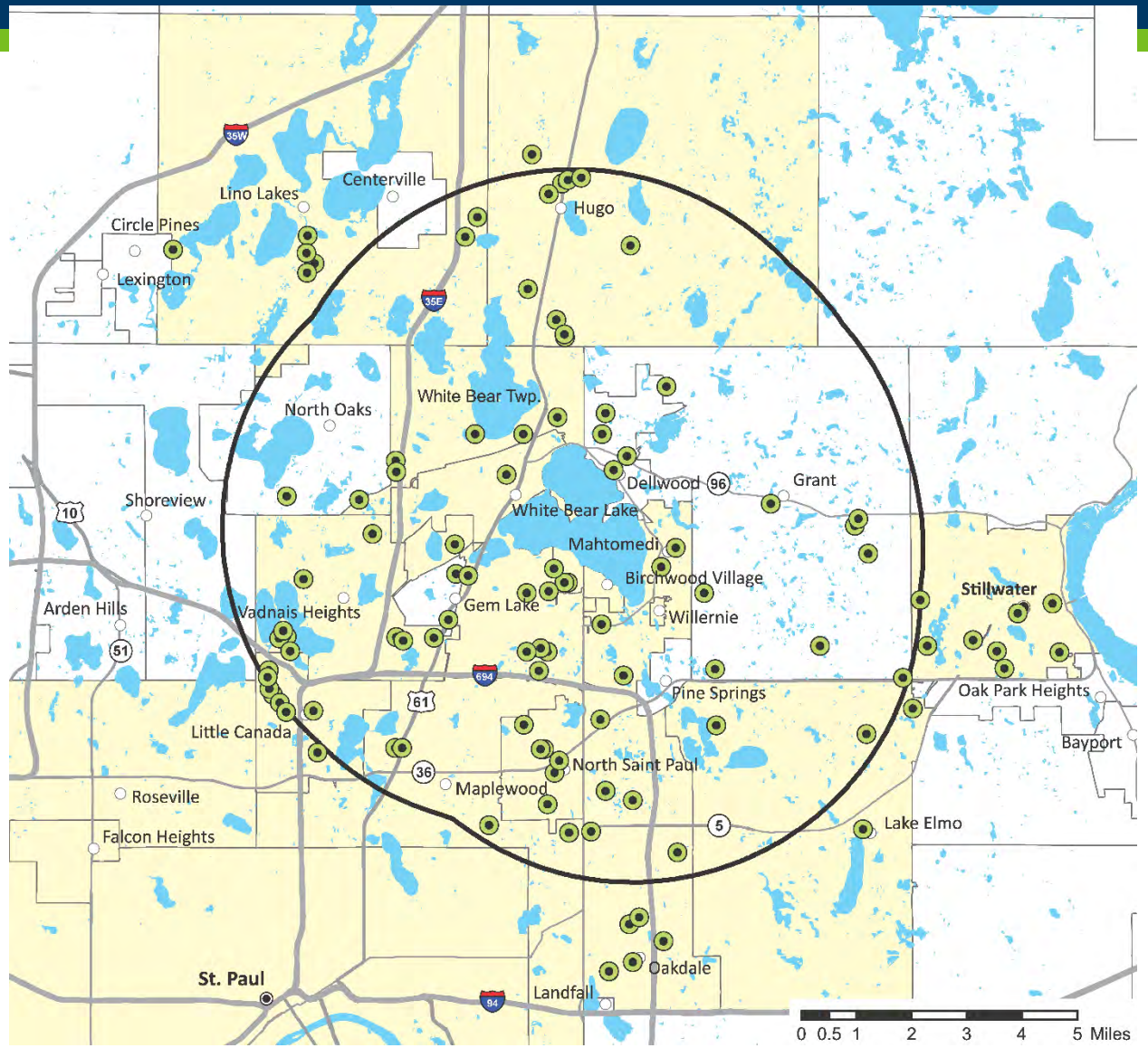
- Jason Moeckel – Section Manager, DNR Ecological and Water Resources

DEPARTMENT OF NATURAL RESOURCES

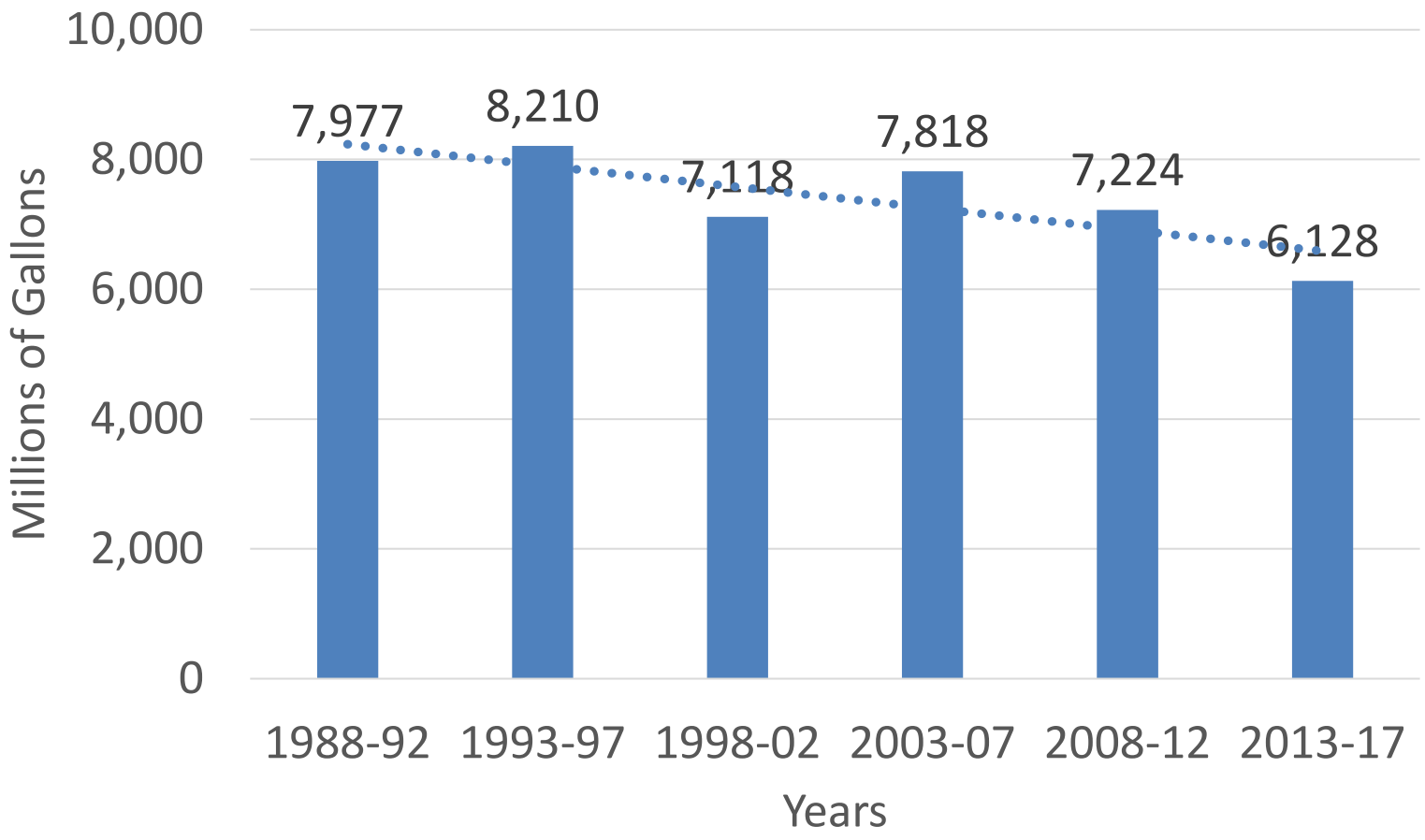
Key Elements of Court Order

- DNR is prohibited from issuing new permits or increases within 5 miles unless certain conditions are met
- Residential irrigation ban at 923.5 lake elevation as trigger to the protective elevation
- Residential goal of 75 gpd per capita water use and total 90 gpd
- Requires public water suppliers to develop a contingency plan to shift their source of water from groundwater to surface water
- No groundwater permits can be issued unless the DNR has sufficient hydrologic data to understand the impact on White Bear Lake and the Prairie du Chien-Jordan aquifer
- DNR to set a collective annual withdrawal limit for White Bear Lake and adjust permits accordingly
    - Applies to all water use, including private wells

Permits and Wells w/in 5 Mile Area

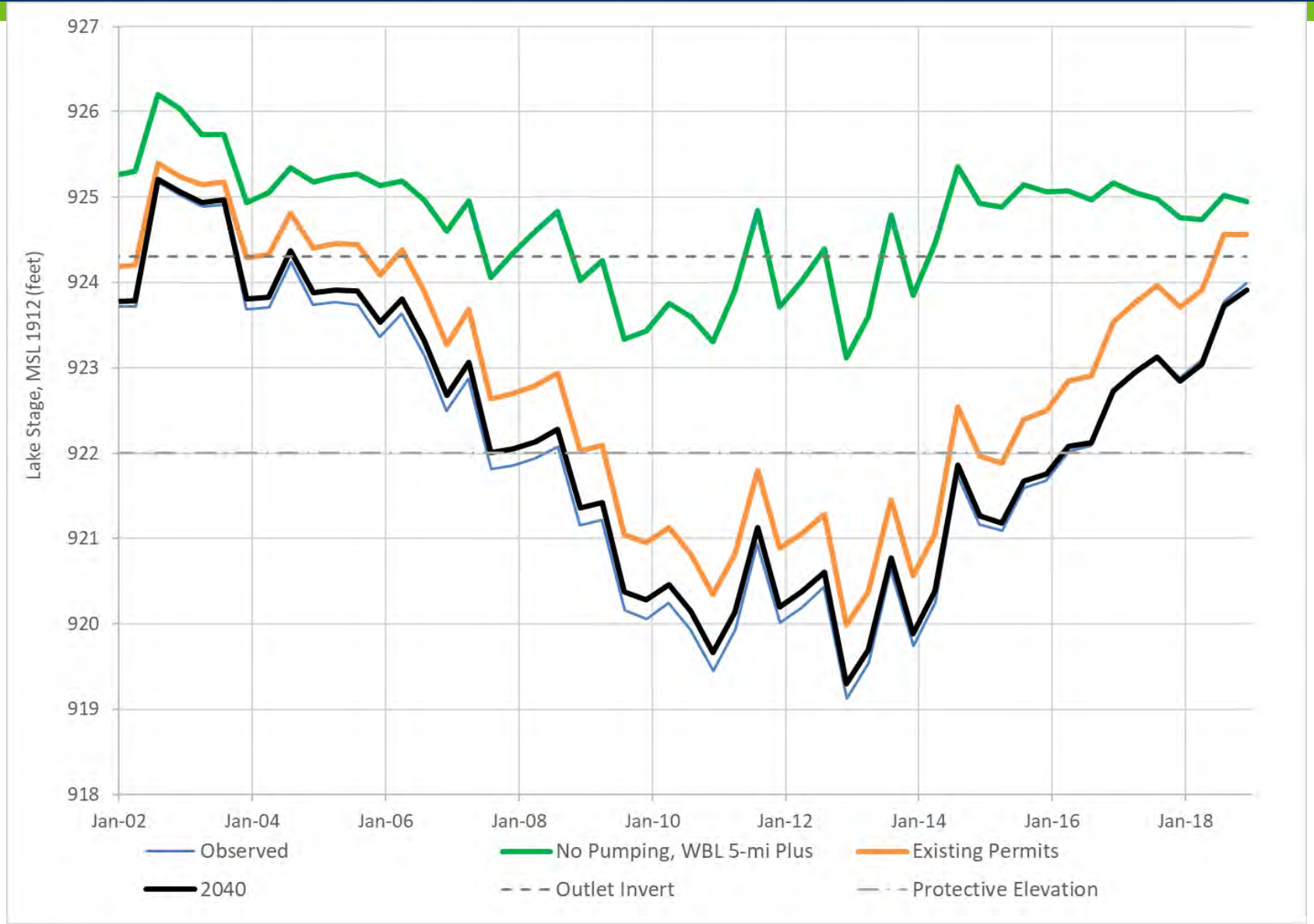


5 Yr Annual Avg Groundwater Use Within 5 Miles of WBL



Note: St. Paul Regional Water Services no longer relying on groundwater

White Bear Lake – Projected Lake Levels Under Average 2040 Water Use in North and East Metro Area



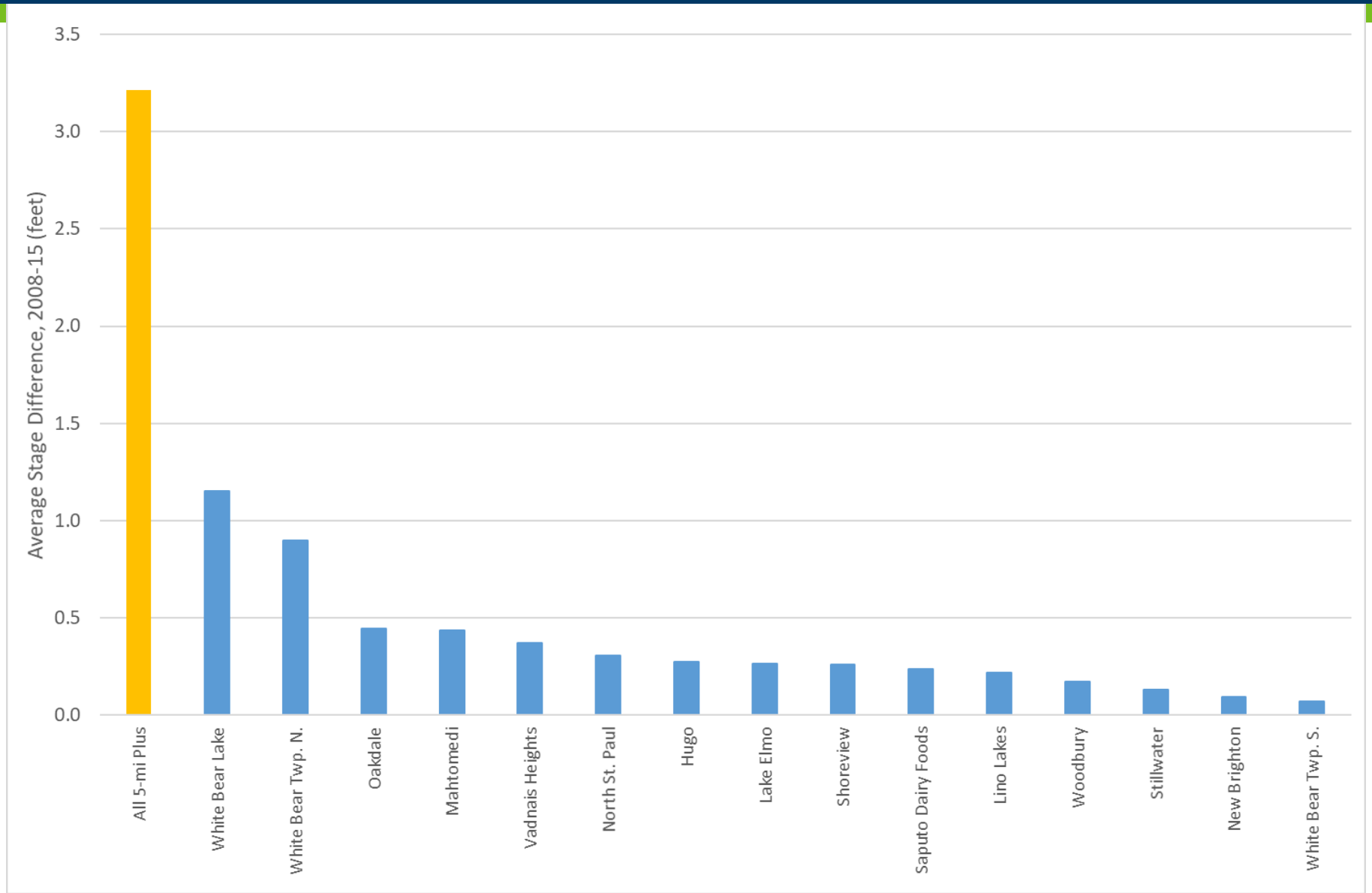
Collective Annual Withdrawal Limits

- MN Statute - limits 0.5 ac-ft/ac
- Protective Elevation - 0.4 ac-ft/acre 314 MGY
- Existing use – 0.745 ac-ft/acre comparable withdrawal – 585 MGY

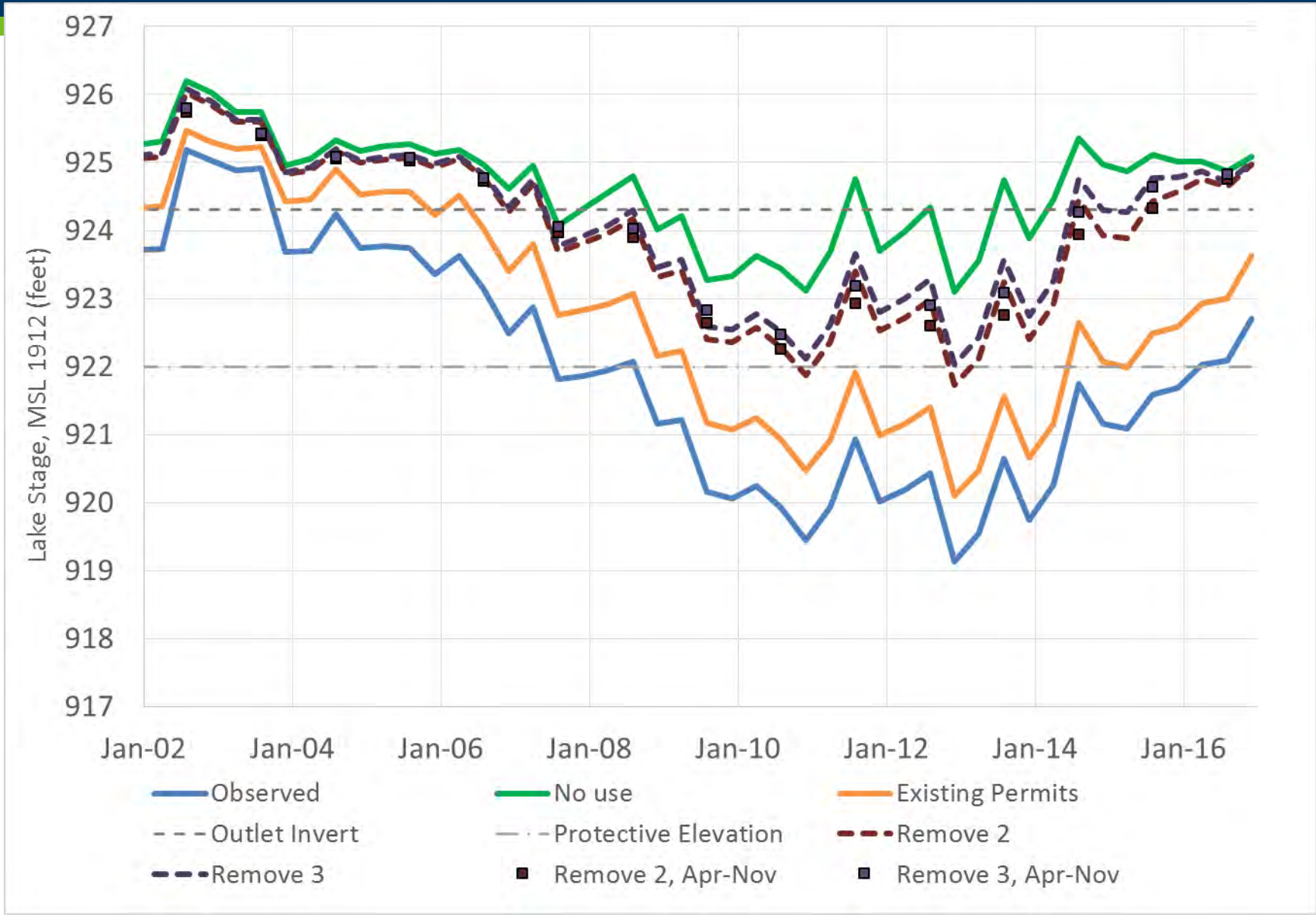
Analysis to Ensure Domestic Supply

- Our modeling analysis indicates limiting total water use to the equivalent of about 55 gallons/day/capita (gpcd) would maintain lake levels near or above 922 feet under normal range of conditions.
- This is essentially limiting water for 1st priority uses, which does not include the use of water for schools; hospitals; medical offices; government buildings; commercial uses such as restaurants, gas stations, grocery stores, or any other store, hotels, or industrial uses.
- This analysis assumes 2020 population as the basis and pumping volumes from existing municipal water supply wells. (pop.) x (55) x (365) = allowable volume
- Any increases in domestic use or allowing lower priority water use would not maintain lake levels above 922 ft.

Relative Influence of Individual Permits on Lake Levels Under 2040 Water Use Projections - Top 15 Influencers



White Bear Lake – Results of Using an Alternate Source of Water for Several Public Water Suppliers



2014 Feasibility Study on Northeast Metro water supply

Northeast Groundwater Management Area Meeting

METROPOLITAN COUNCIL

June 2022

Ali Elhassan
metrocouncil.org

2014 Findings

- Current SPRWS ***excess*** capacity: 30 MGD
- To bring water to the study area, a new water main from McCarrons Water Treatment Plant would be necessary.
- The six communities nearest to Saint Paul's system could be served without expanding major water treatment facility or raw water delivery system to the plant.
- Service beyond these six communities, would require additional large-scale infrastructure improvements.
  - Would significantly increase the capital costs

METROPOLITAN COUNCIL

Summary of Costs (2014) – Water Supply Approaches

	Description	Capital Cost	Capital Cost (Per Person Served)
Alternative 1A	SPRWS - N St Paul	$5,191,000	$396
Alternative 1B	SPRWS - 6 Communities	$155,363,000	$1509
~~**Alternative 1C**~~	~~SPRWS - 13 Communities~~	~~$623,178,000~~	~~$2969~~
-	-		-
Alternative 2B	New Water Treatment Plant - 6 Communities	$229,739,000	$2231
~~**Alternative 2C**~~	~~New Water Treatment Plant - 13 Communities~~	~~$609,701,000~~	~~$2905~~

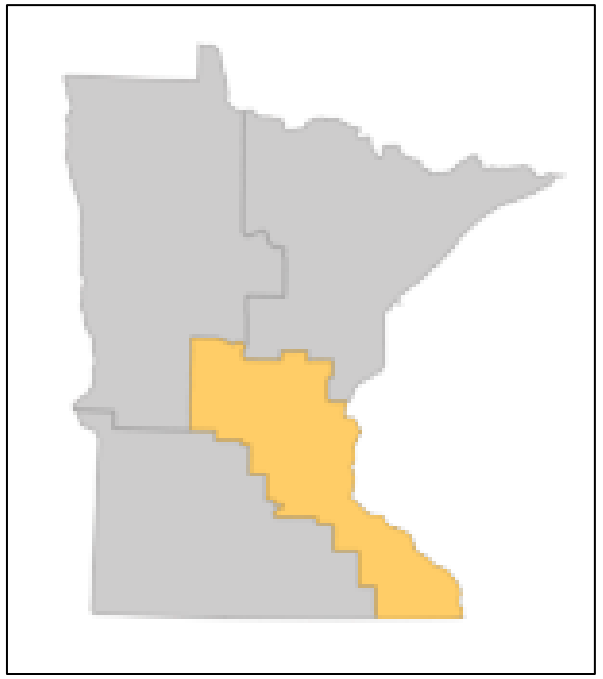
Augmentation and Recharge - Capital Costs - $ Millions

COST ITEM	SUCKER LAKE ALTERNATIVE	EAST VADNAIS LAKE ALTERNATIVE
Grading and Restoration	$14.7	$15.7
Filtration Facility	$6.9	$6.5
Pump and Pipe Work	$8.0	$7.8
Tunneling	$9.6	$1.1
Permits/Easements	$2.0	$2.7
Total Construction Cost	$41.2	$33.8
Contingency @ 20%	$8.2	$6.7
Total Construction Cost with Contingency	$49.4	$40.5
Engineering, Legal and Administrative @ 25%	$12.4	$10.1
Total Cost in 2015 Dollars	$61.8	$50.6
Total Cost at Mid-Point of Construction (2018-19)	$67	$55

Annual (Operations & Maintenance) Costs - $ Millions Per Year

ITEM	$ MILLIONS PER YEAR
Filtration System	$0.11
Pumping	$0.17
Pipeline	$0.07
Water Purchase	$0.22
TOTAL	$0.57

DEPARTMENT OF NATURAL RESOURCES



DNR Regional Clean Water Work

Nick Proulx, Clean Water Legacy Specialist

DNR Regional Clean Water Work

Outline

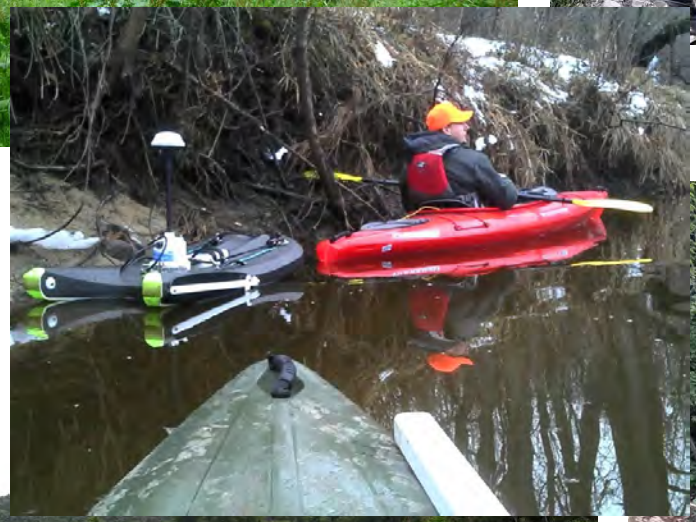
- Assessments
  - Geomorphology
  - Hydrology
- Implementation
- Coordination
- Summary

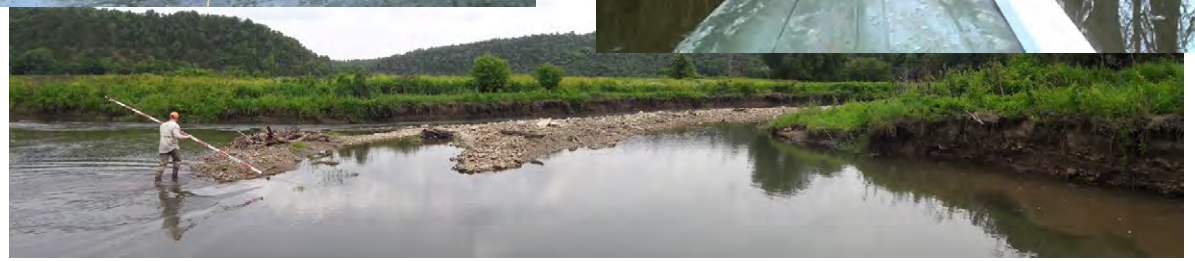
Regional CWL Team

- 3 Watershed Specialists
- 2 Hydrologists









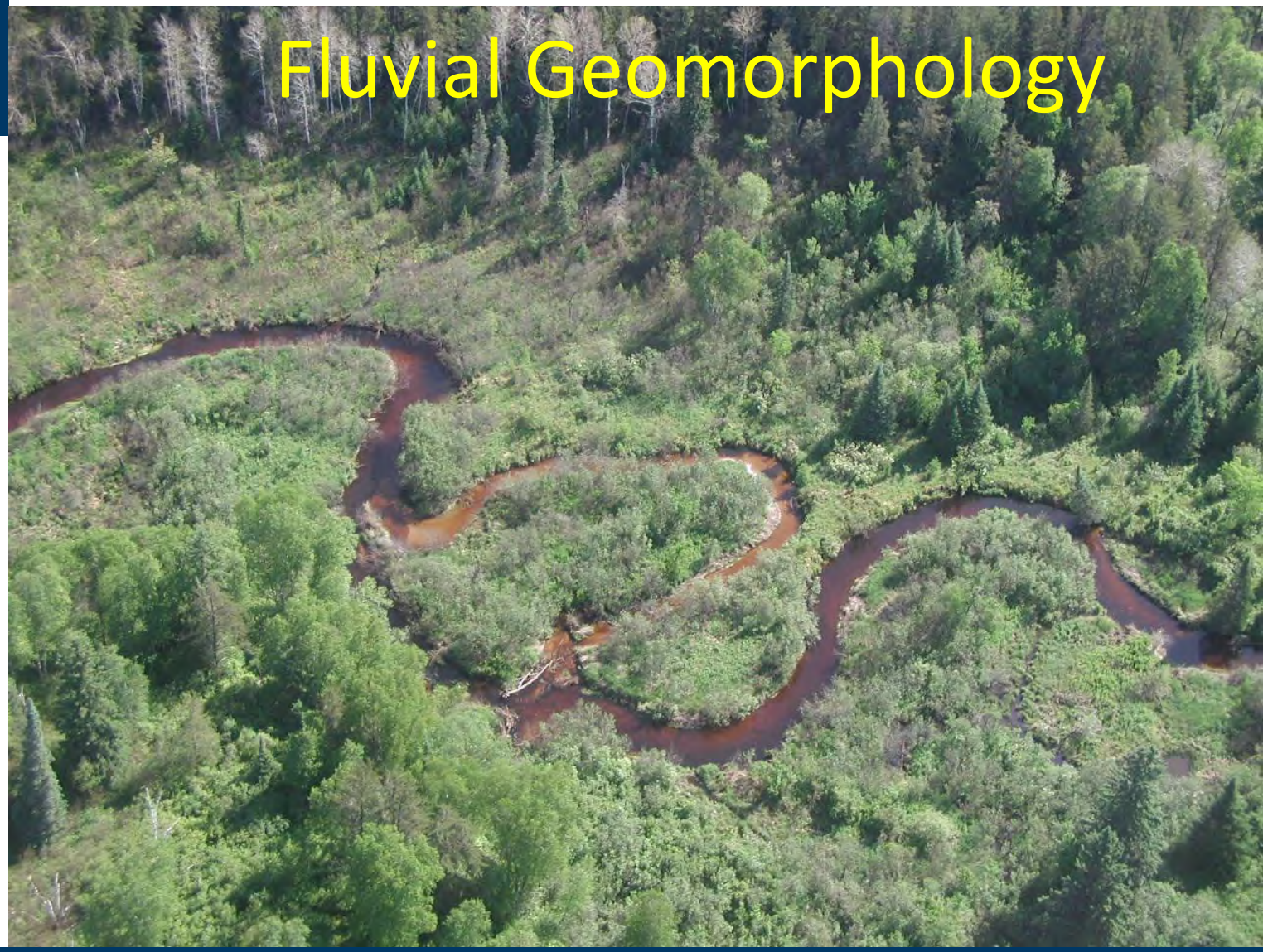

Assessments

Rivers are complex

Geomorphic Stream Assessments

Purposes

- Channel stability
  - Sediment transport and fate
- Inform impairments: excess sediment and aquatic life
- Stream restorations and projects



'... the branch of science that studies the landforms associated with river channels and the processes that form them..' (Kellerhals and Church 1989)

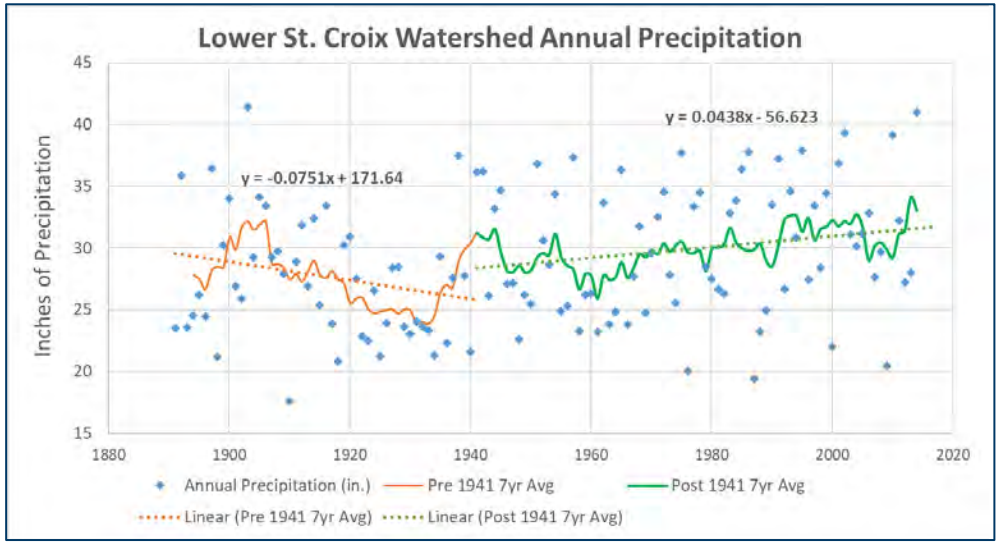
Scale and Scope

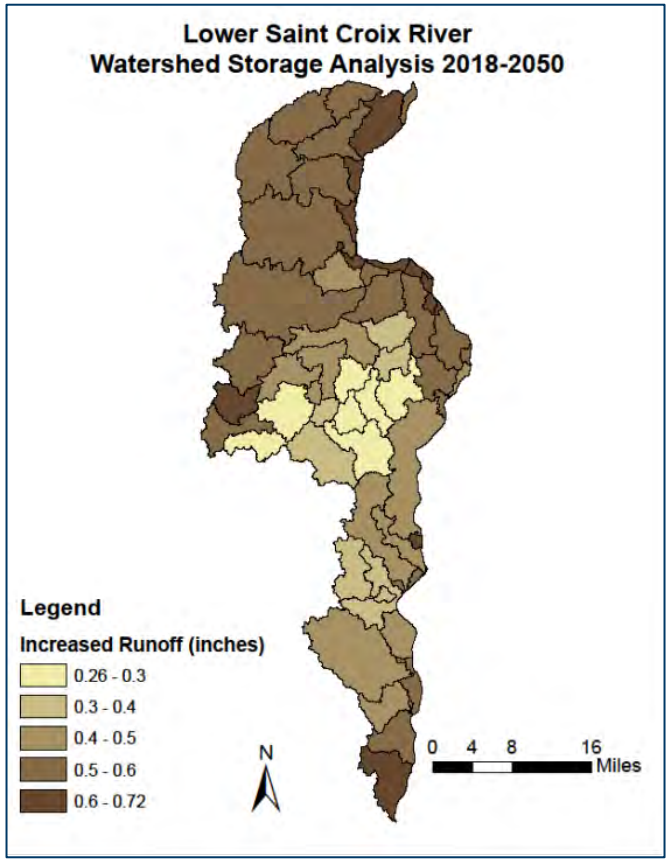
- Site level assessments
- Catchment level assessments
- Sediment source studies
- Augment modeling efforts

Geomorphic Stream Assessments

Hydrology

- Evaluation of Hydrologic Change (EHC) analysis
- Assist with water storage goals





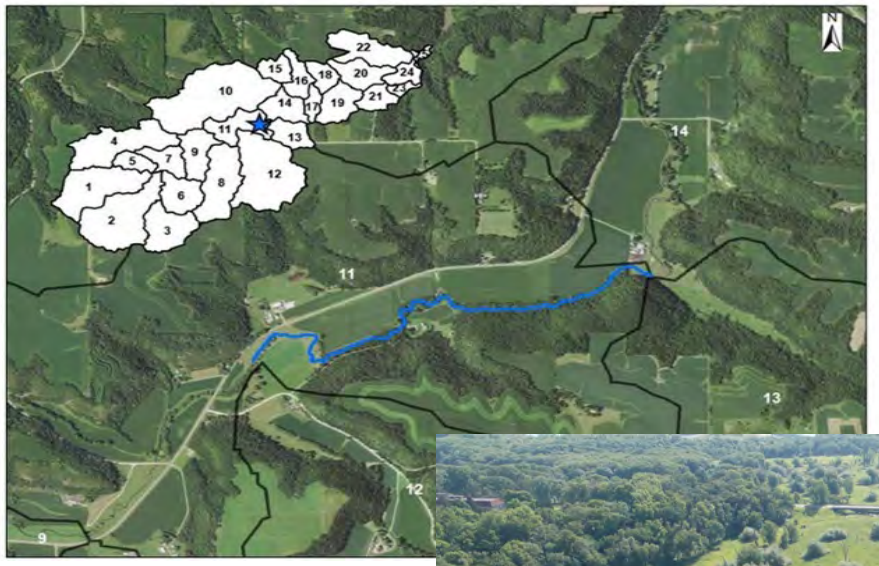
Hydrology Assessments

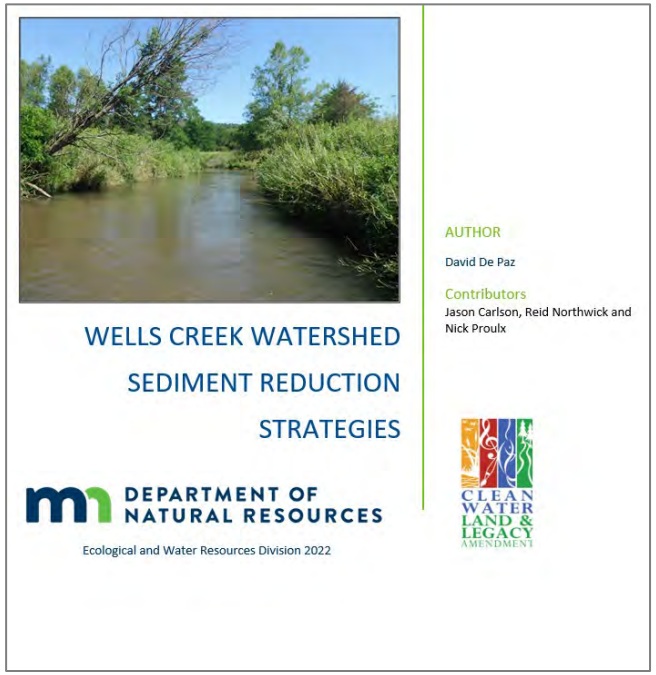
Implementation

- Prioritization and targeting
- Scope and scale of project
- Design concepts
- Integration concepts into plan set
- Construction
- Effectiveness monitoring

Targeting

- Focus on the in-channel excess sediment
- Inform overland excess sediment



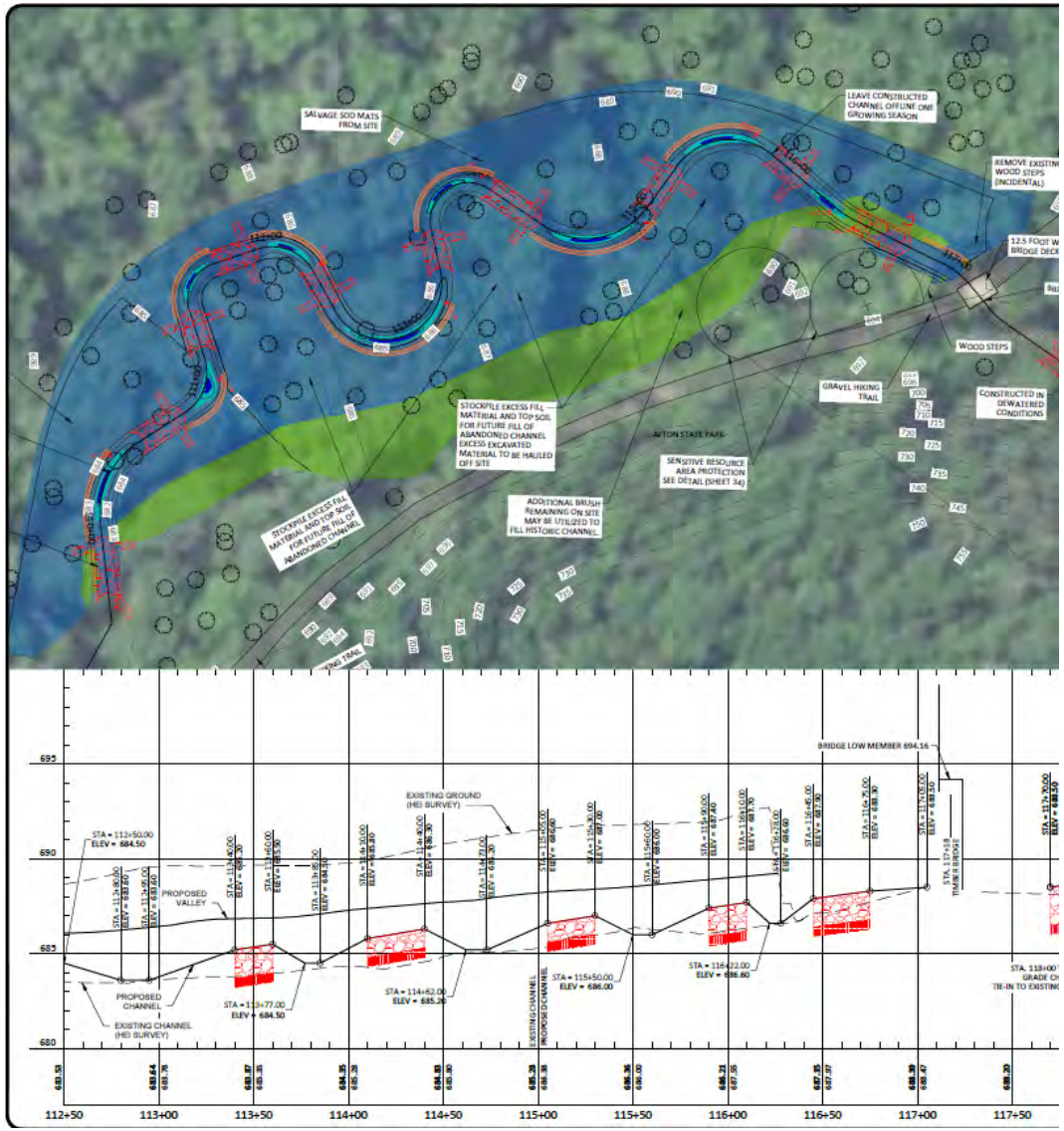


Implementation

Concepts

- Develop partnerships
- Foundation to pursue grant dollars

Implementation

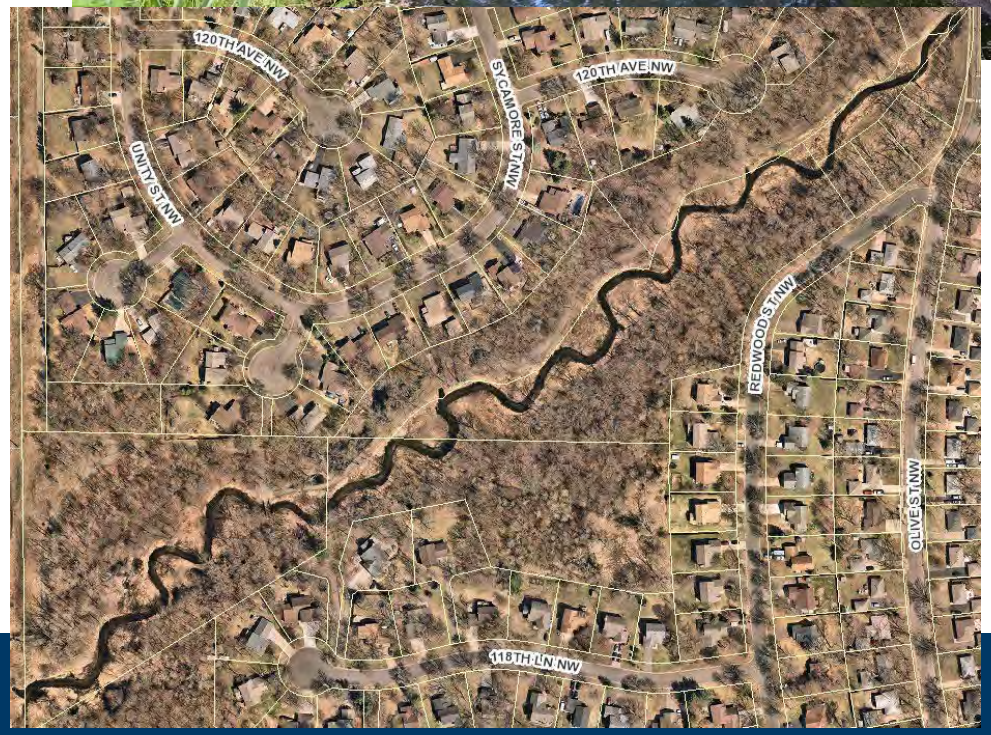


- Collaboration with design team
- Permits

Implementation

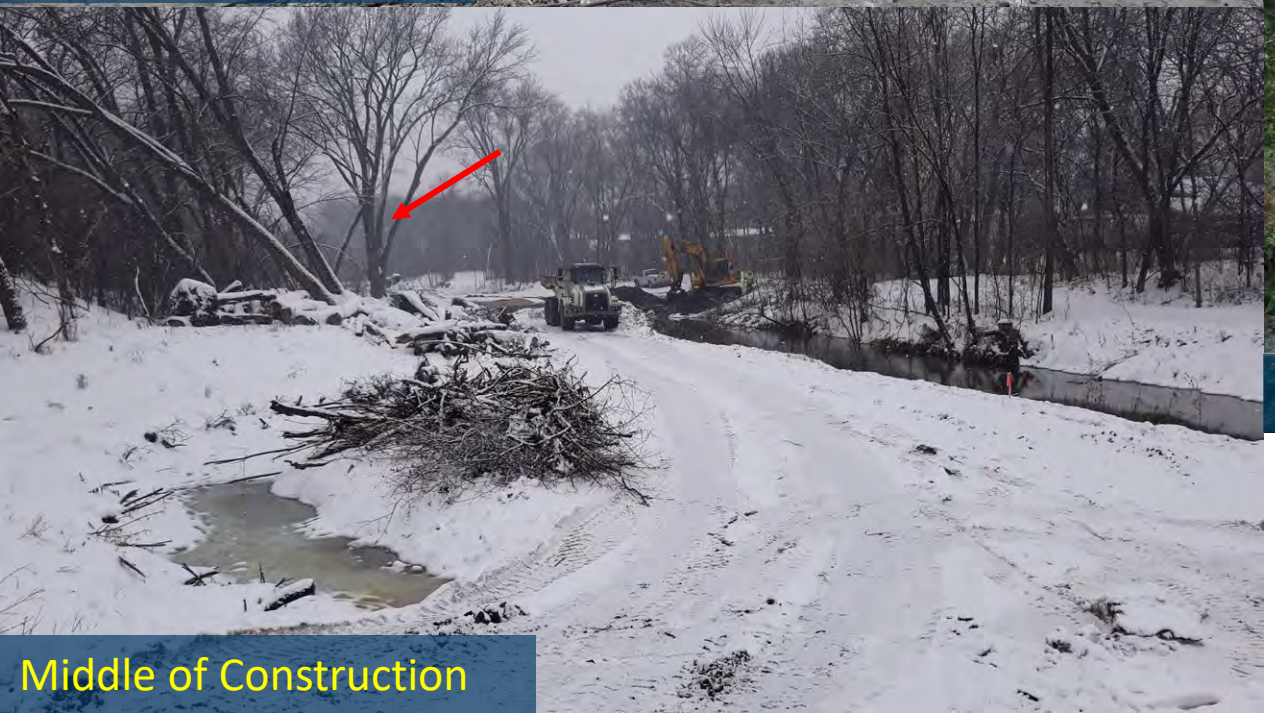
Construction over-site

Implementation



Sand Creek – Coon Rapids, Anoka County

Start of Construction



Middle of Construction

Post Construction

Sand Creek at flood stage

Metro River Restorations and Bank Stabilizations

Completed

Restorations

- Regal Creek – St. Michael
- Sand Creek – Coon Rapids
- Trout Brook Phase 1 – Upper Afton State Park
- Trout brook Phase 2 – Afton Alps
- Trout Brook Phase 3 – Lower Afton State Park/Afton Alps

Bank stabilizations

- Crow River – St. Michael
- South Fork Crow – Camden Twp
- Mississippi River – Otsego
- Crow River – Dayton

Concept Phase

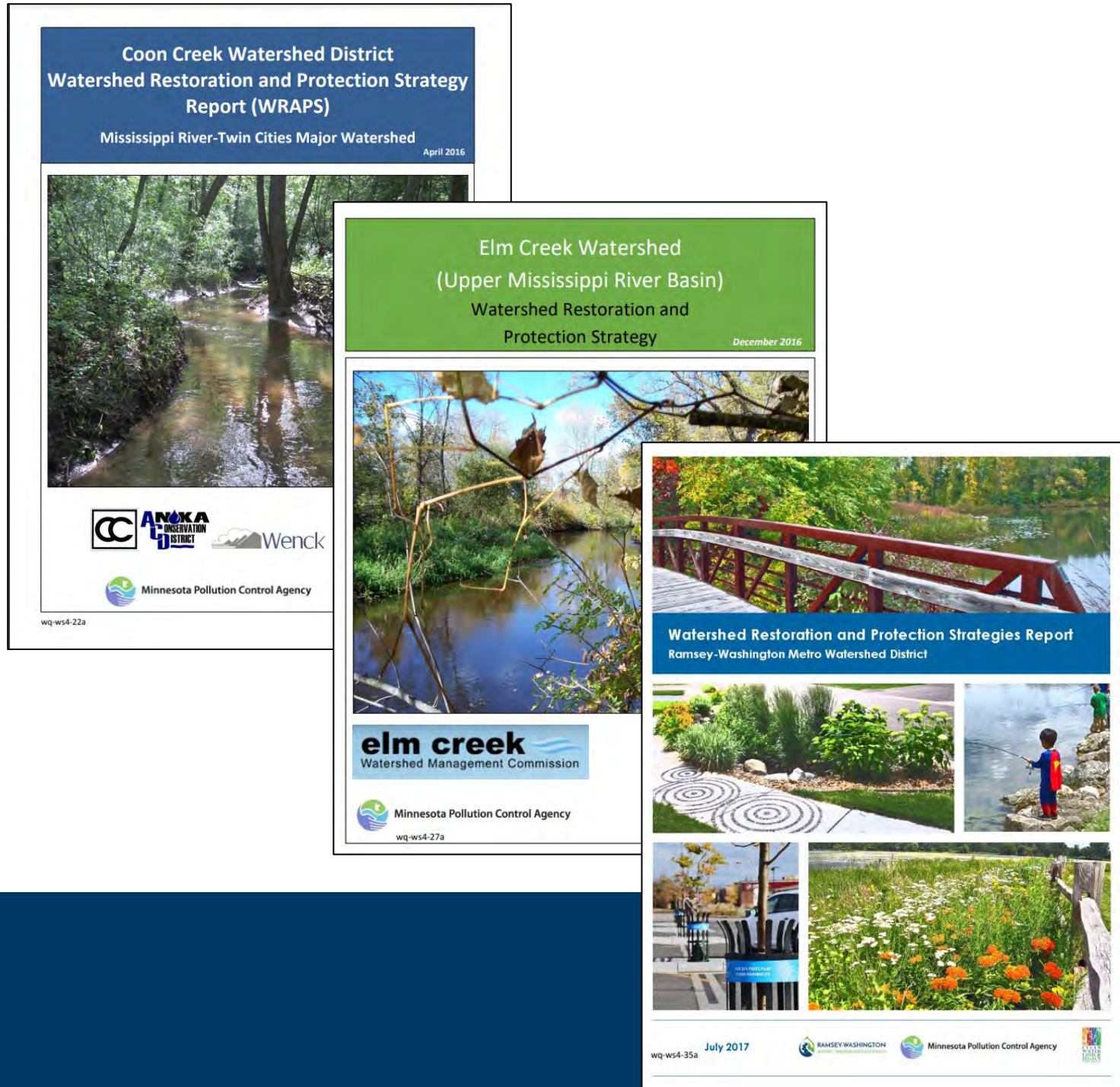
- Shingle Creek, Brooklyn Park – 2024-25?
- Anoka Dam multiple uses - ?

Coordination

- Coordination with Clean Water Programs across Agencies
  - WRAPS and 1W1P
- Goal: Advance Stream Science
  - Benefits

Clean Water Programs

- WRAPS
  - Inform aquatic life and sediment impairments
- 1W1P
  - Integrate DNR's priorities across Divisions
- Metro
  - High functioning Watershed Districts and Organizations
  - History of DNR engagement



Coordination

Why Stream Restoration?

- Address water quality impairments (physical and chemical)

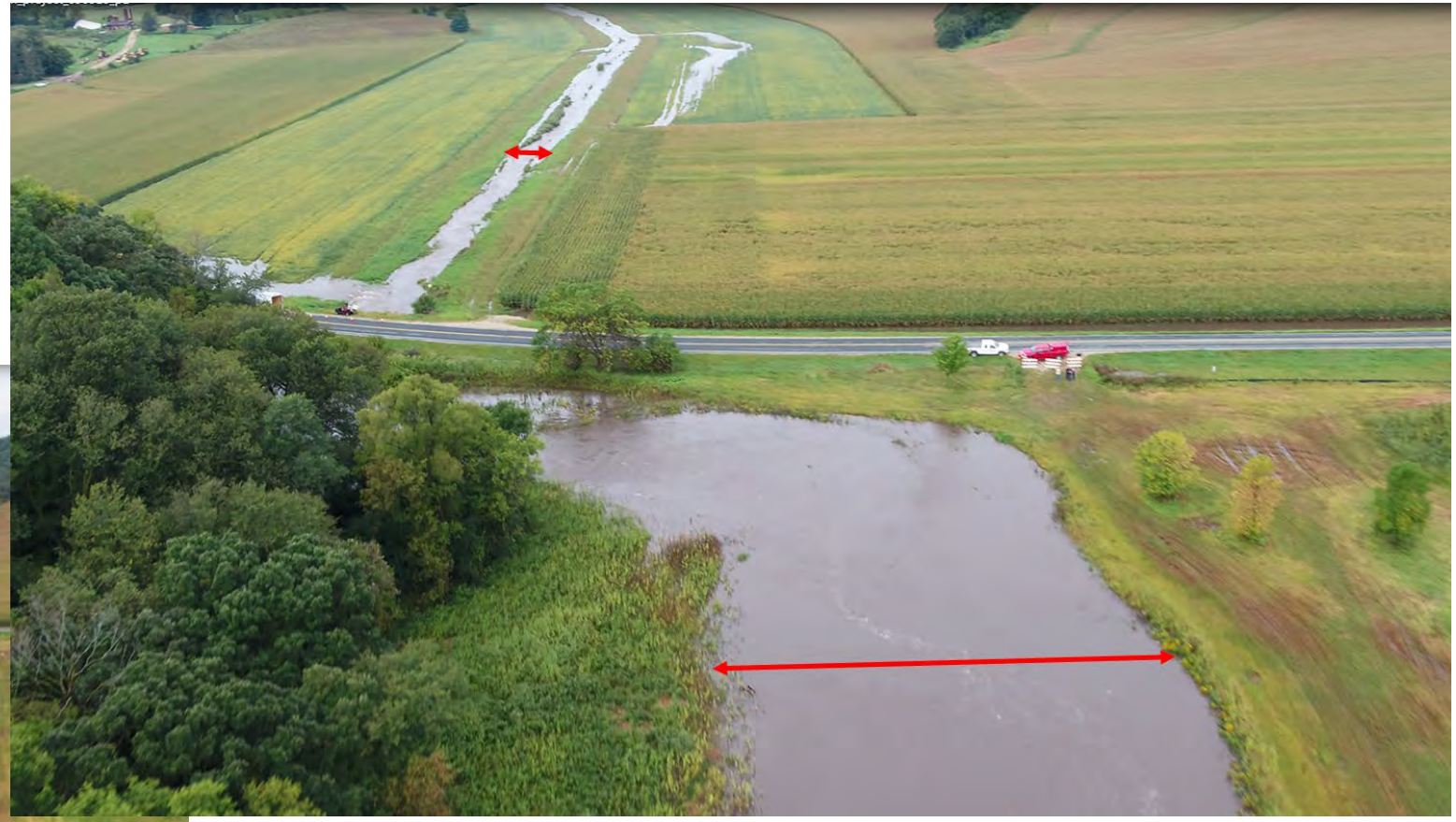
U.S. Clean Water Act

"The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

Goal – Advancing Stream Science

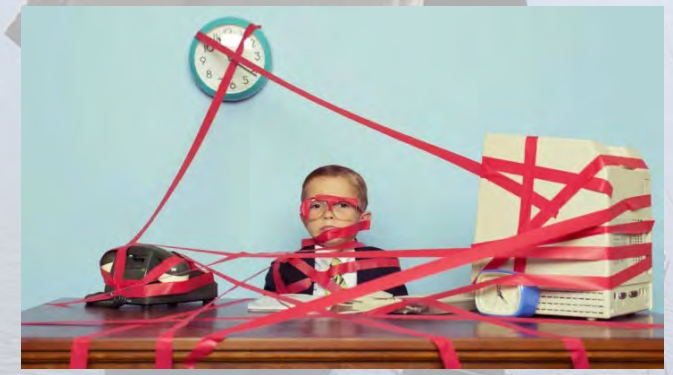
Floodplain connectivity

- Reduction of downstream flooding
  - Nutrient uptake
  - Sediment storage



Goal – Advance Stream Science

- Agency Coordination
- Technical assistance
- Data accessibility
- Training opportunities
- Regulatory



Goal - Strategies

Summary

- Regional DNR Clean Water Legacy contributions
  - Assessment
  - Implementation
  - Coordination
- Metro Clean Water work is unique
- Evolution of work

DEPARTMENT OF NATURAL RESOURCES

Nick Proulx

Implementation outside of Metro in 2023

- Mill Creek realignment with MNDOT, Chatfield
- Mississippi Riverbank stabilization in Houlton Preserve, Elk River

South Fork Crow – Carver County

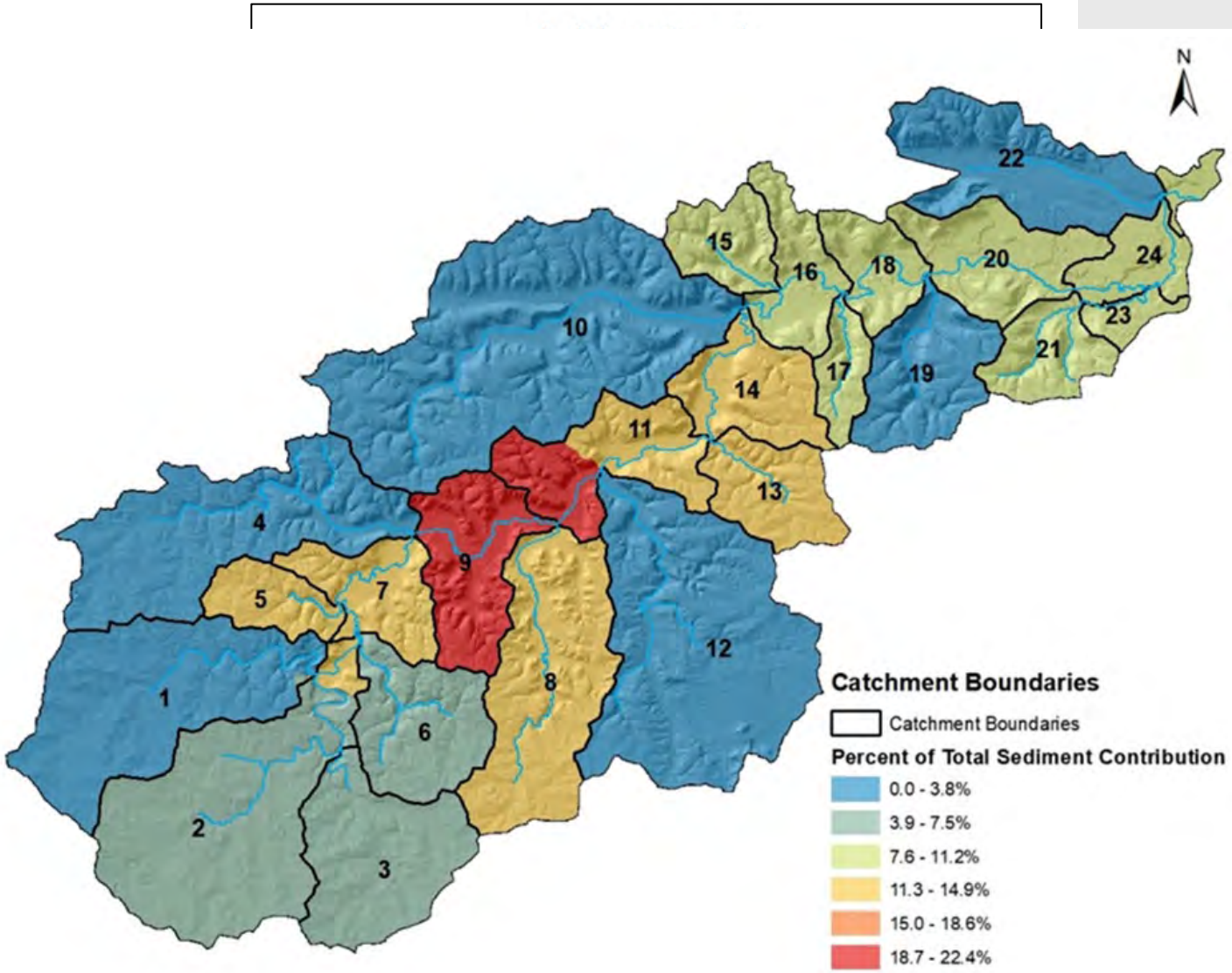
2023

Trout Brook - Afton

Geomorphic Stream Assessments

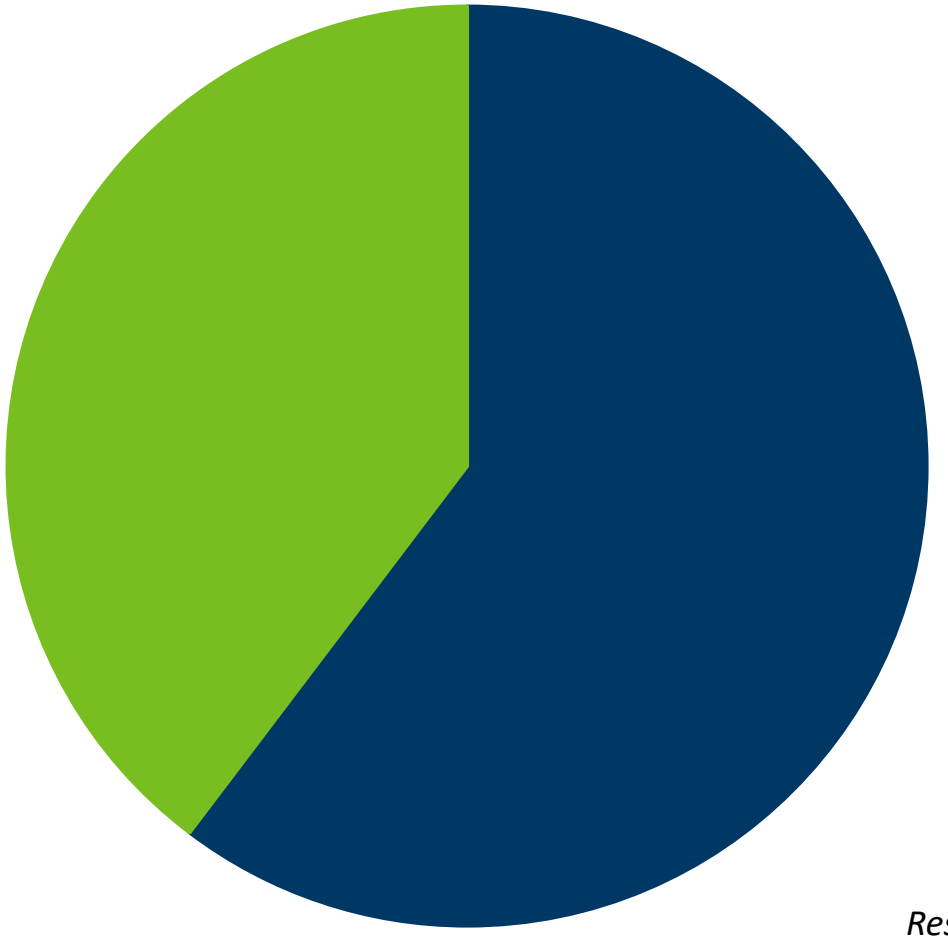
- Strategic scale and scope
- Tailored by need and local input

Sediment Supply Process	Total Annual sediment (tons/yr)	Percent of Total Sediment Supply
Streambanks	9,404	89%
Surface Erosion (HSPF)	1,200	11%
Total Sediment	10,604	100%

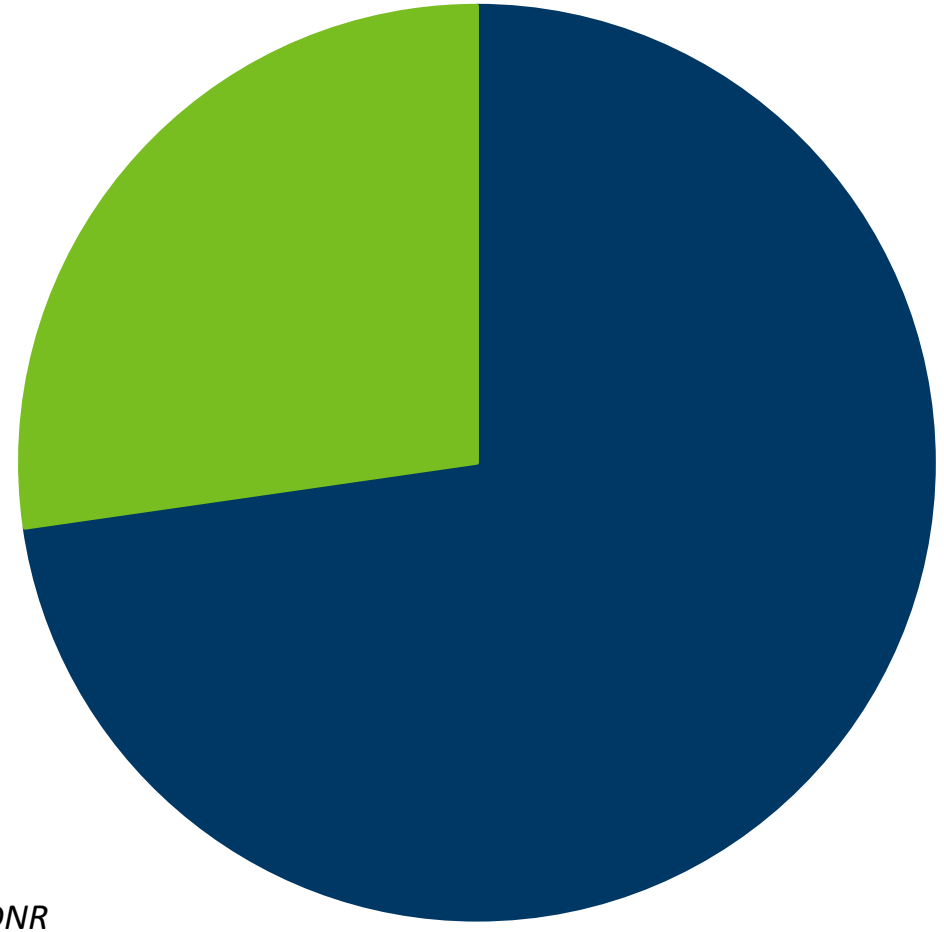


Did Projects have Problems With Implementation?

Streams (63)



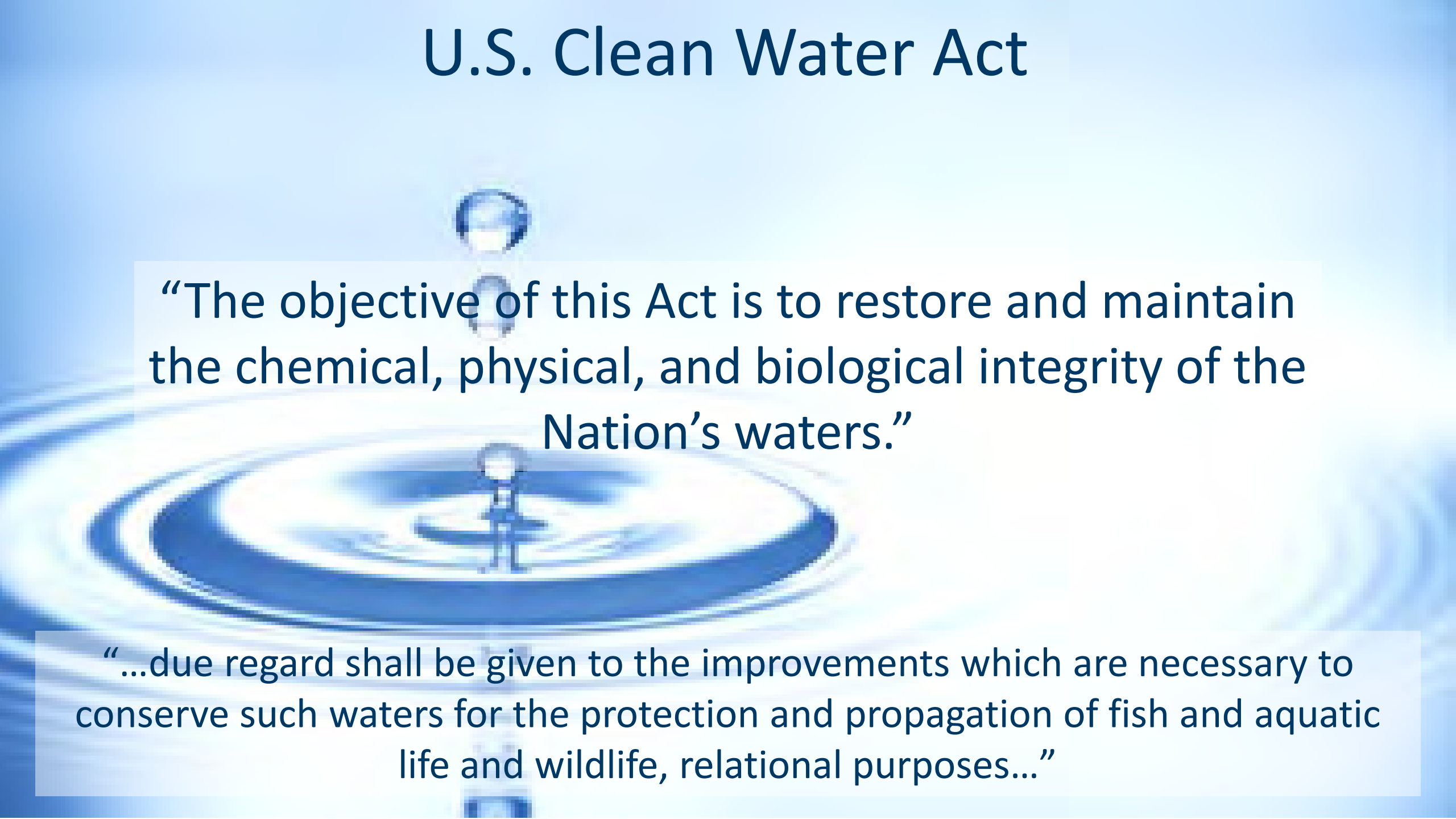
Non-Streams (88)



No

Yes

U.S. Clean Water Act



"The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

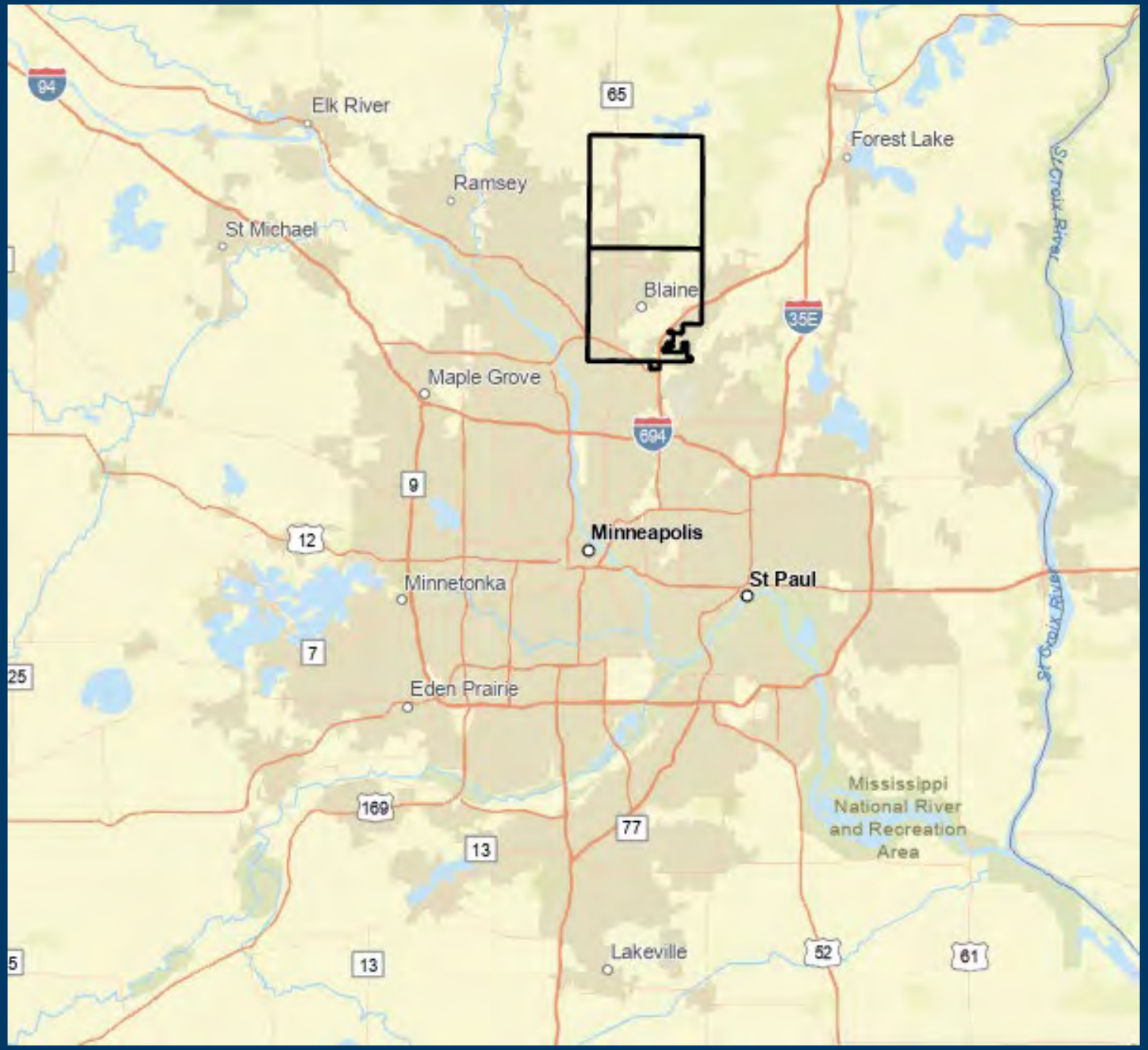
"…due regard shall be given to the improvements which are necessary to conserve such waters for the protection and propagation of fish and aquatic life and wildlife, relational purposes…"

DEPARTMENT OF NATURAL RESOURCES

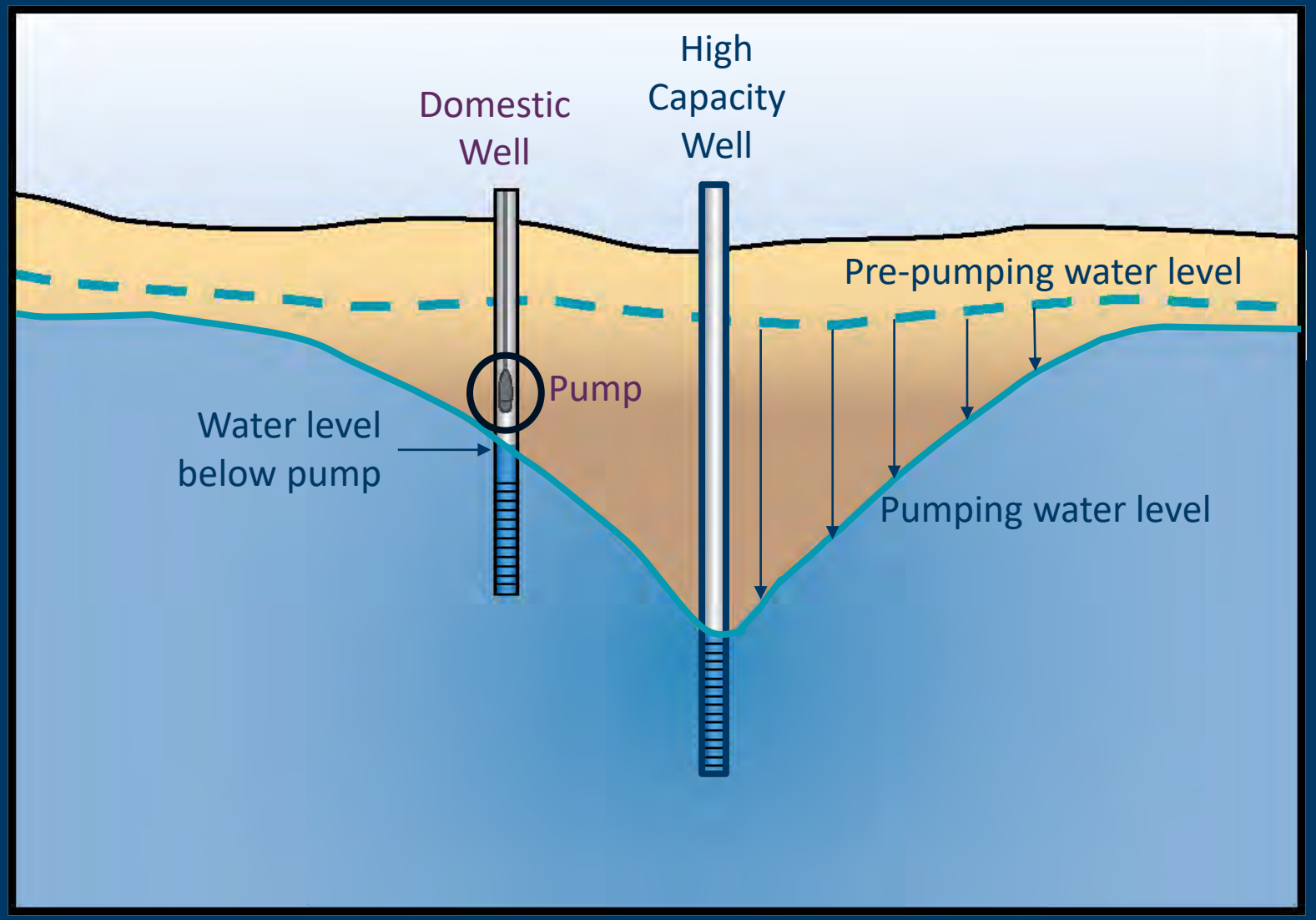
Blaine-Ham Lake well interferences

Ellen Considine, PG | Groundwater Supervisor

August 2022


94
Elk River
65
Forest Lake
Ramsey
St Michael
Blaine
35E
St Croix River
Maple Grove
694
9
12
Minneapolis
Minnetonka
St Paul
7
25
Eden Prairie
Mississippi
National River
and Recreation
Area
169
77
13
13
Lakeville
52
61
5

Well interference



Minnesota Water Allocation Priorities

1. 

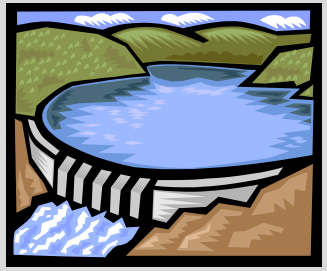
Domestic water supply

2. 

Consumptive less than 10,000 gallons/day

3. 

Agricultural irrigation & processing

4. 

Power production

5. 

Consumptive uses in excess of 10,000 gallons/day

6. 

Non-essential uses

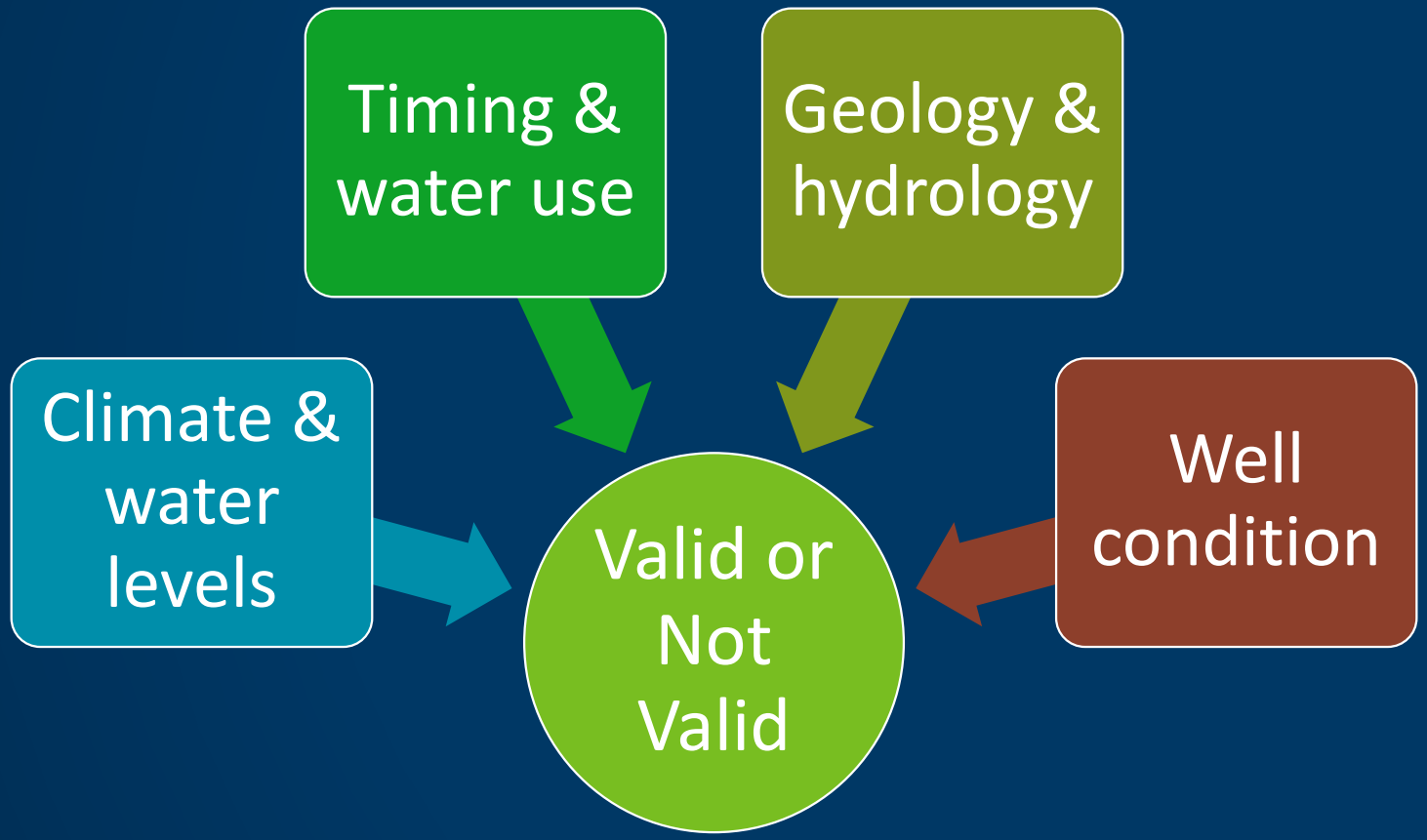
Blaine & Ham Lake complaints

Over 150 calls

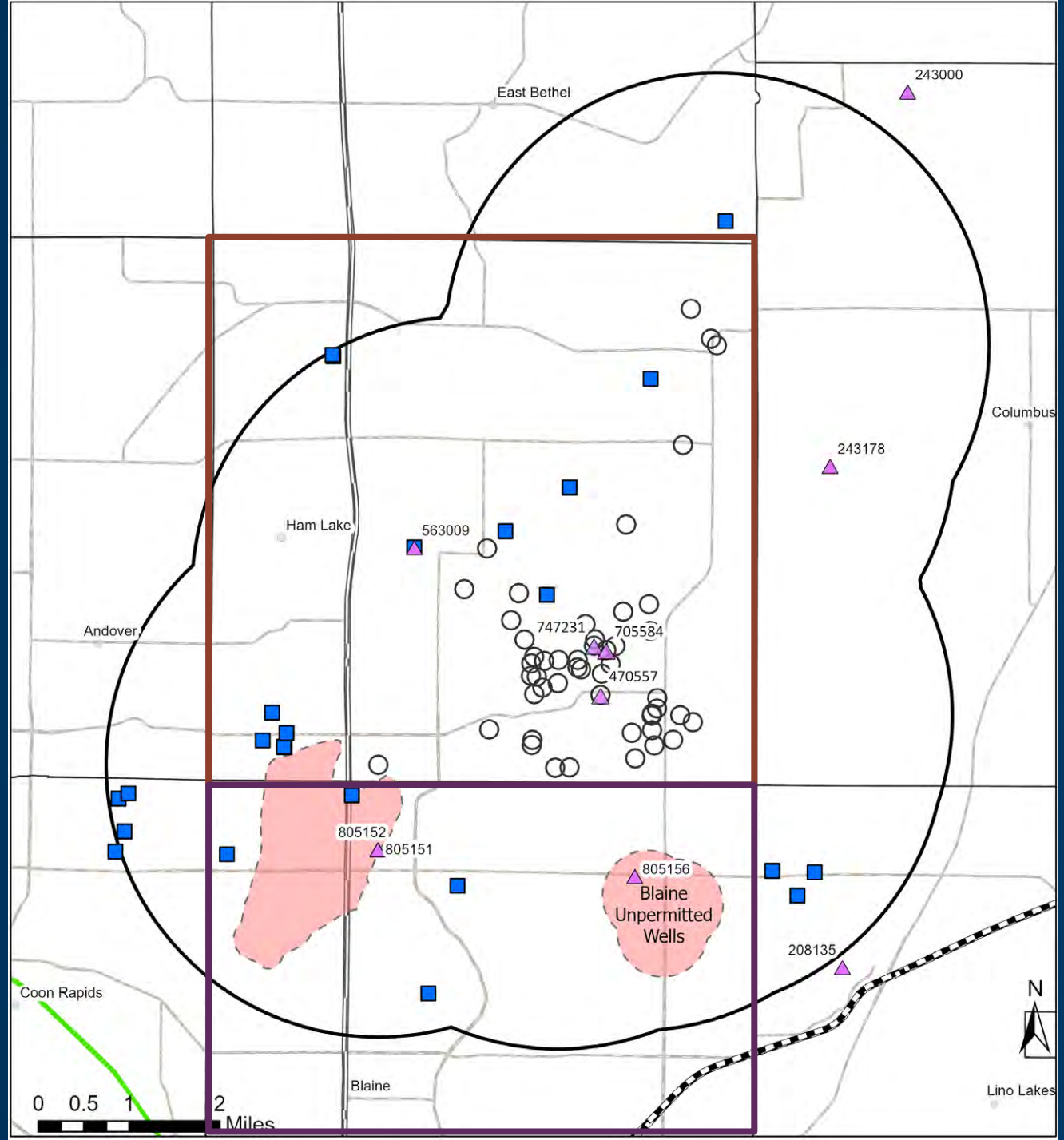
66 complaint forms *

50 investigated so far

Well interference investigation

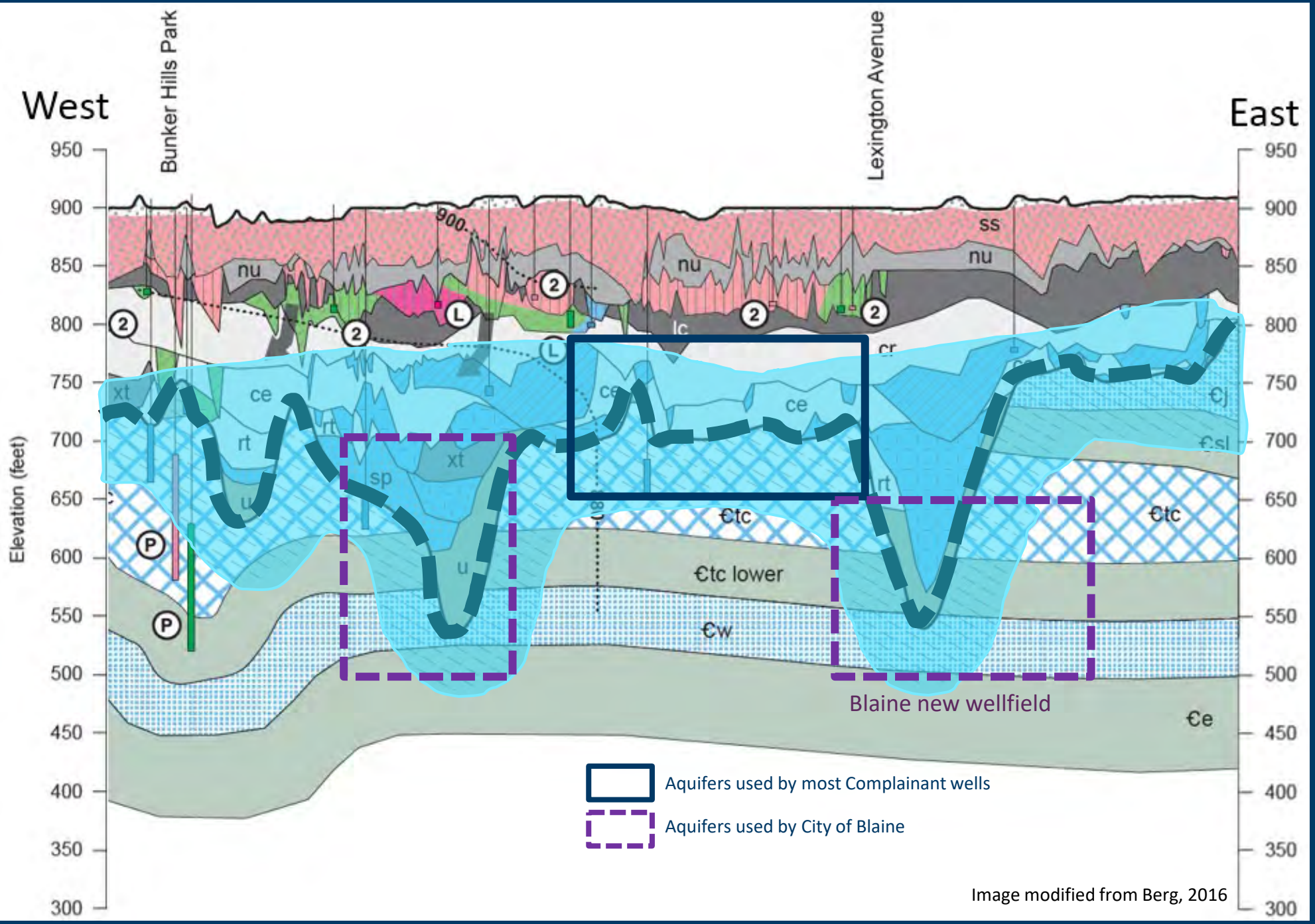


Scope of investigation

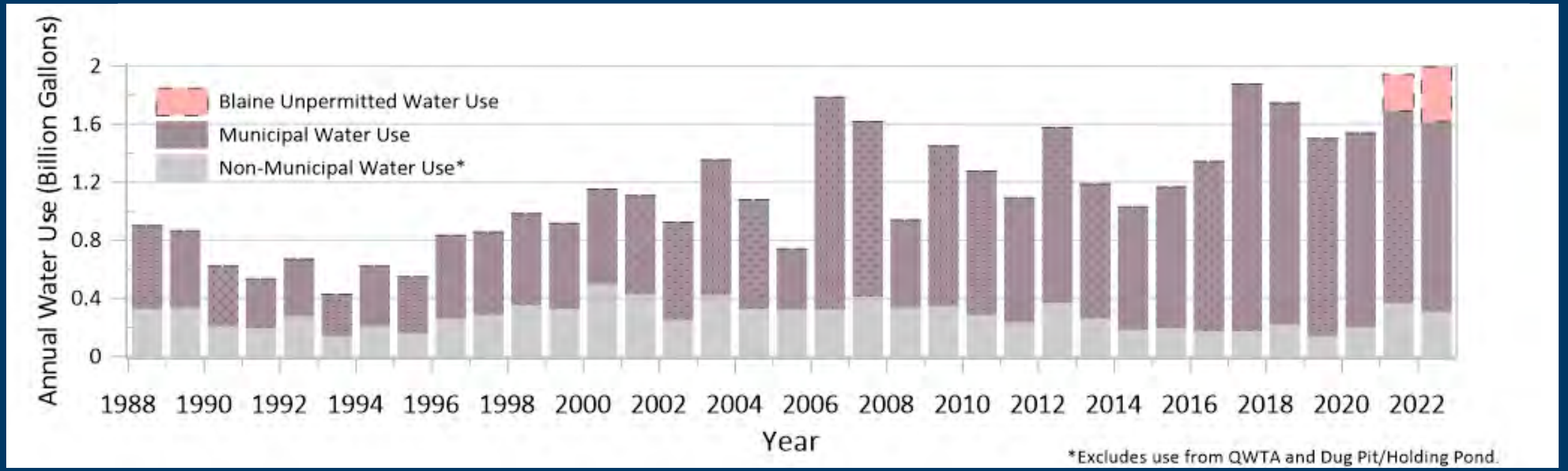


Geology

Aquifers are connected



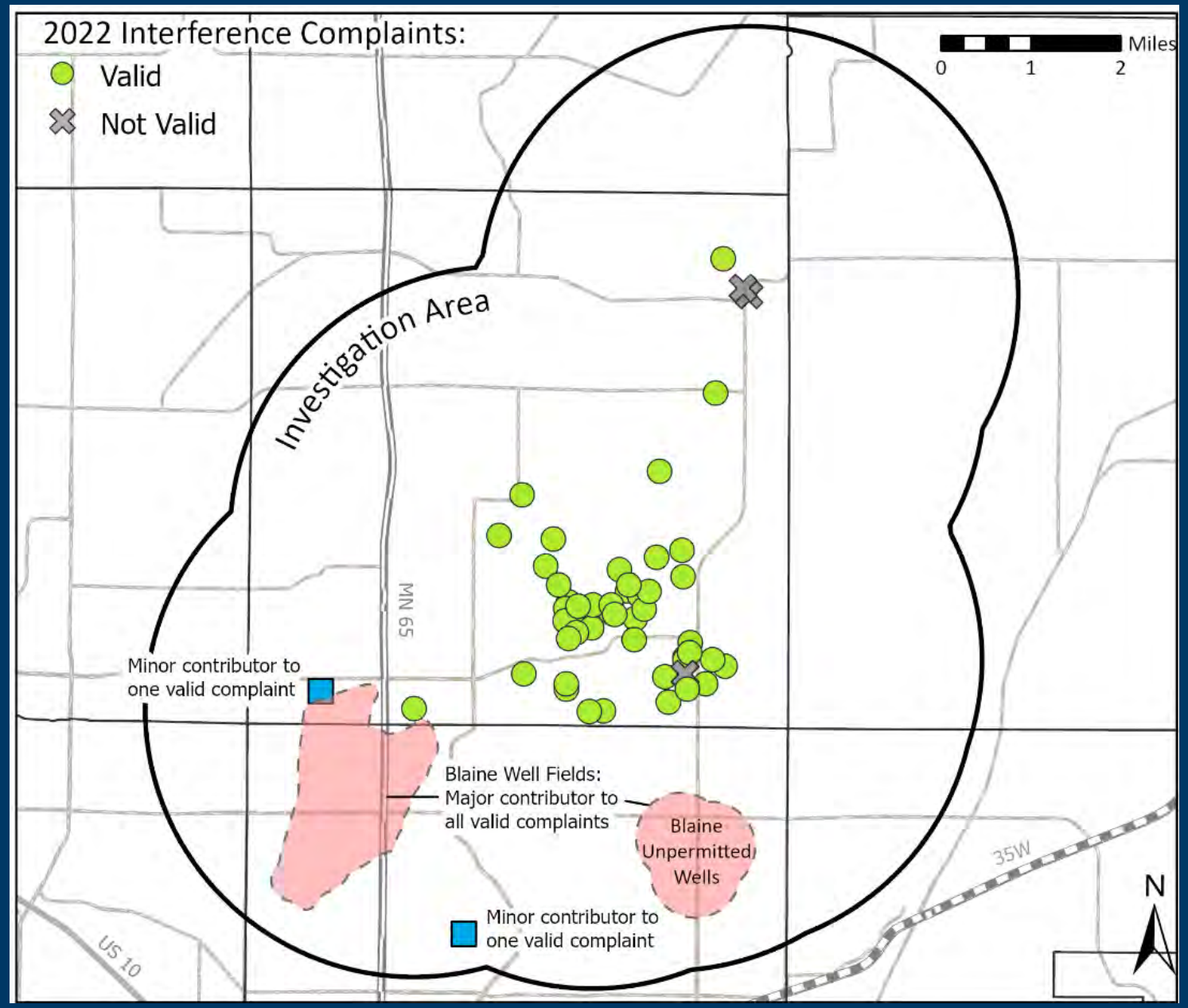
Water use



Lowest water levels on record in 2022

Findings

- Bedrock aquifers connected to glacial aquifers
- High groundwater use = low groundwater levels
- Pumping can affect wells several miles away



Results

- 50 complaints
  - 47 valid
  - 3 not valid
- Main cause: Blaine's pumping
- Minor contributor: two golf courses

Next steps

- Well interference resolution process
- Investigate outstanding and future complaints.
- More work needed before Blaine can use the new wells

DEPARTMENT OF NATURAL RESOURCES

Questions?

Ellen Considine, PG

ellen.considine@state.mn.us

Groundwater Protection Rule, Ag BMP Loans, MAWQCP and Pesticide Monitoring in the Metro Area

Margaret Wagner

Manager, Fertilizer Non-Point Section

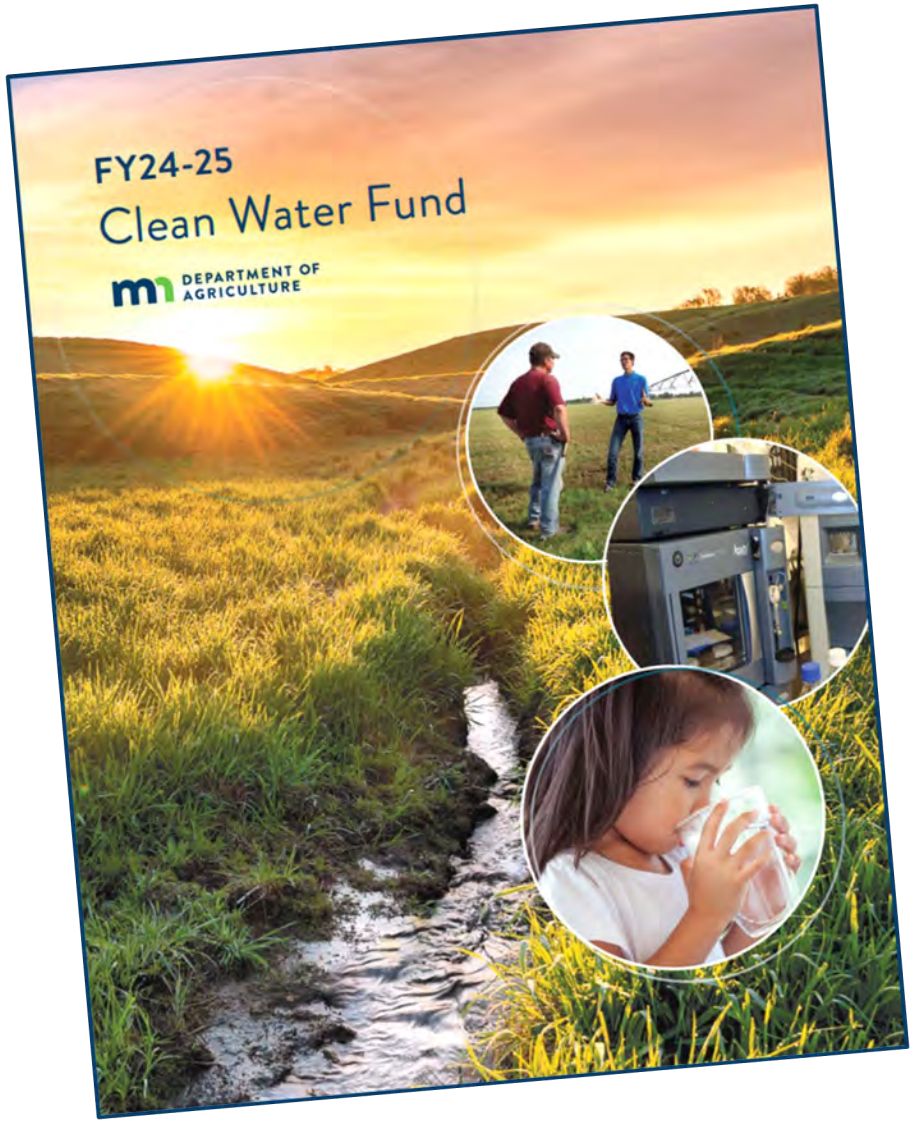
September 18, 2023

DEPARTMENT OF AGRICULTURE

CLEAN WATER LAND & LEGACY AMENDMENT

Overview

- Overview and update on Groundwater Protection Rule
- AgBMP Loan Program
- Minnesota Ag Water Quality Certification Program(MAWQCP)
- Pesticide Monitoring

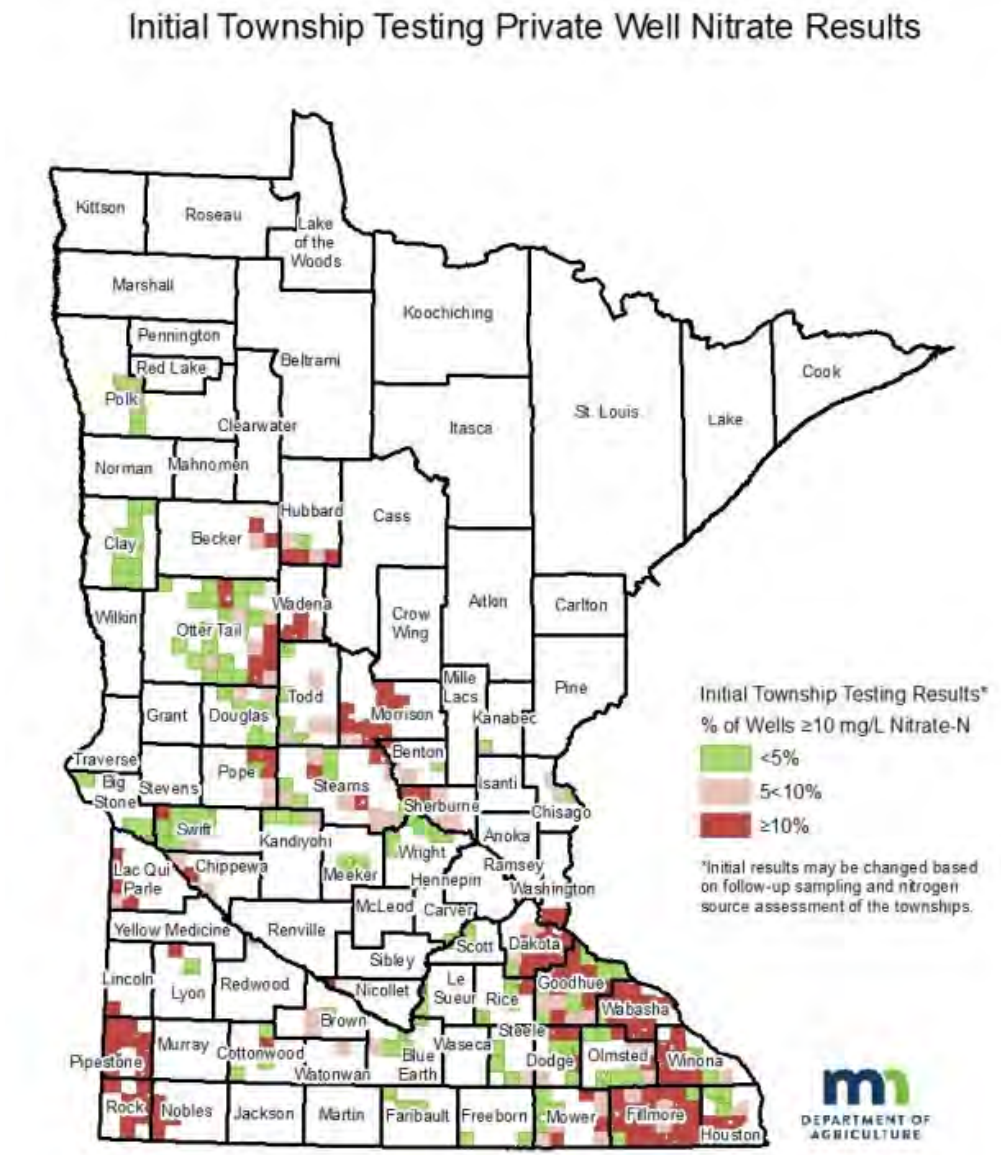


Nitrate in Groundwater

Promoting agricultural practices that will reduce nitrate in groundwater and drinking water in vulnerable areas and areas with elevated nitrate.

A Concern in Vulnerable Areas

- Nitrate in groundwater is a concern in certain areas of Minnesota
- Nitrate in groundwater is a challenge that starts with geology and soil texture



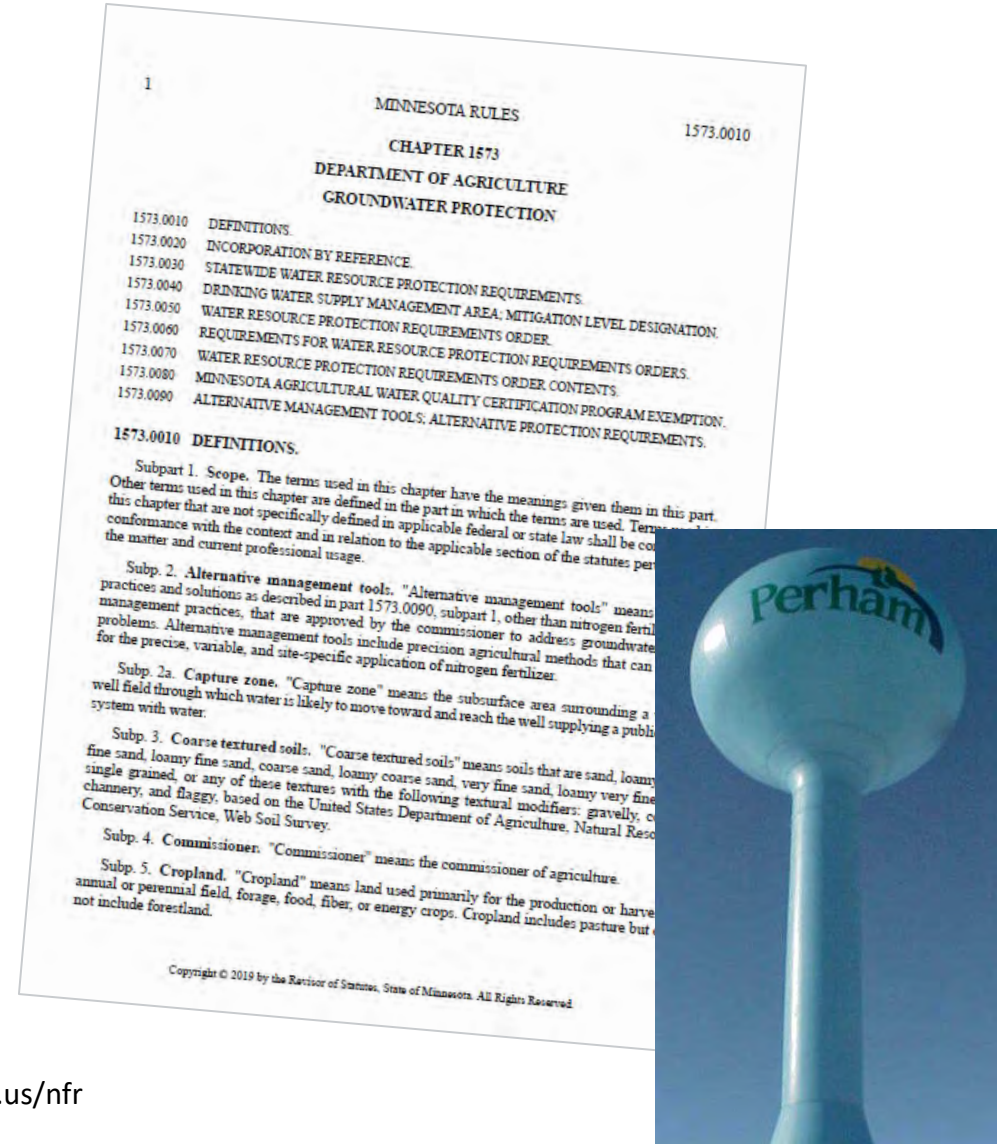
Nitrogen Fertilizer Management Plan (NFMP)

Minnesota's blueprint to minimize groundwater impacts from the use of nitrogen fertilizer

- **Local Advisory Teams**: problem solving with local insights
- **Key Considerations:**
  - Nitrate in groundwater is a challenging problem
  - Under row crop production in vulnerable soils, nitrate leaching will occur
  - Lag times (*months to years)* between changes in practices and changes in groundwater quality
  - **There is no simple solution**

Minnesota's Groundwater Protection Rule

- The Groundwater Protection Rule (Rule) applies to the use of nitrogen fertilizer
- It focuses on protecting groundwater in areas vulnerable to groundwater contamination
- It went into effect on June 24, 2019
- The Rule contains two parts. Each part contains separate criteria and requirements



1

MINNESOTA RULES 1573.0010

CHAPTER 1573
DEPARTMENT OF AGRICULTURE
GROUNDWATER PROTECTION

1573.0010 DEFINITIONS.
1573.0020 INCORPORATION BY REFERENCE.
1573.0030 STATEWIDE WATER RESOURCE PROTECTION REQUIREMENTS.
1573.0040 DRINKING WATER SUPPLY MANAGEMENT AREA; MITIGATION LEVEL DESIGNATION.
1573.0050 WATER RESOURCE PROTECTION REQUIREMENTS ORDER.
1573.0060 REQUIREMENTS FOR WATER RESOURCE PROTECTION REQUIREMENTS ORDERS.
1573.0070 WATER RESOURCE PROTECTION REQUIREMENTS ORDER CONTENTS.
1573.0080 MINNESOTA AGRICULTURAL WATER QUALITY CERTIFICATION PROGRAM EXEMPTION.
1573.0090 ALTERNATIVE MANAGEMENT TOOLS; ALTERNATIVE PROTECTION REQUIREMENTS.

1573.0010 DEFINITIONS.

Subpart 1. **Scope.** The terms used in this chapter have the meanings given them in this part. Other terms used in this chapter are defined in the part in which the terms are used. Terms this chapter that are not specifically defined in applicable federal or state law shall be co conformance with the context and in relation to the applicable section of the statutes per the matter and current professional usage.

Subp. 2. **Alternative management tools.** "Alternative management tools" means practices and solutions as described in part 1573.0090, subpart 1, other than nitrogen fertil management practices, that are approved by the commissioner to address groundwate problems. Alternative management tools include precision agricultural methods that can for the precise, variable, and site-specific application of nitrogen fertilizer.

Subp. 2a. **Capture zone.** "Capture zone" means the subsurface area surrounding a well field through which water is likely to move toward and reach the well supplying a publi system with water.

Subp. 3. **Coarse textured soils.** "Coarse textured soils" means soils that are sand, loamy fine sand, loamy fine sand, coarse sand, loamy coarse sand, very fine sand, loamy very fine single grained, or any of these textures with the following textural modifiers: gravelly, c channery, and flaggy, based on the United States Department of Agriculture, Natural Reso Conservation Service, Web Soil Survey.

Subp. 4. **Commissioner.** "Commissioner" means the commissioner of agriculture.

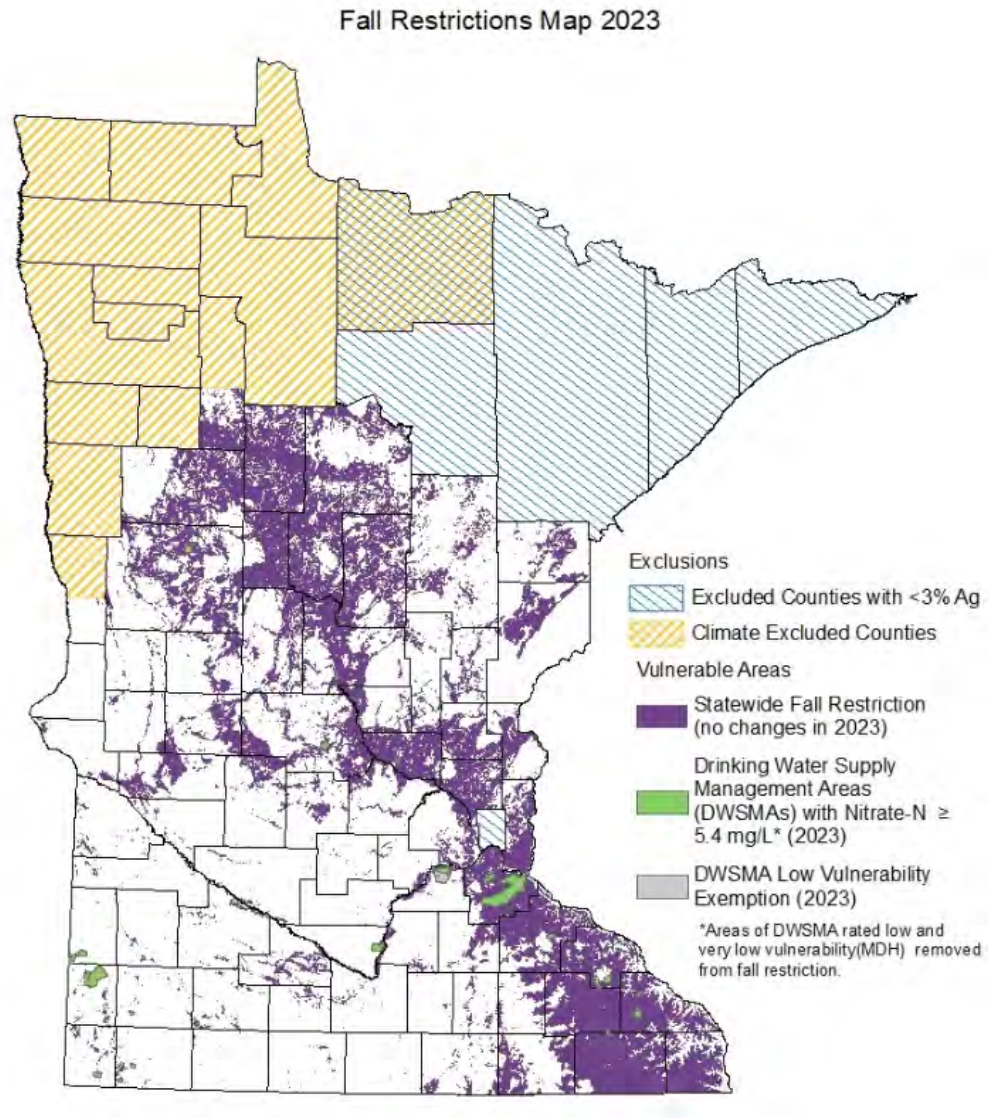
Subp. 5. **Cropland.** "Cropland" means land used primarily for the production or harve annual or perennial field, forage, food, fiber, or energy crops. Cropland includes pasture but not include forestland.

Minnesota's Groundwater Protection Rule

Part 1-
Restricts nitrogen fertilizer application in fall and on frozen soils

1. Areas with vulnerable groundwater, and
2. Protection areas around community wells with elevated nitrate - called DWSMAs

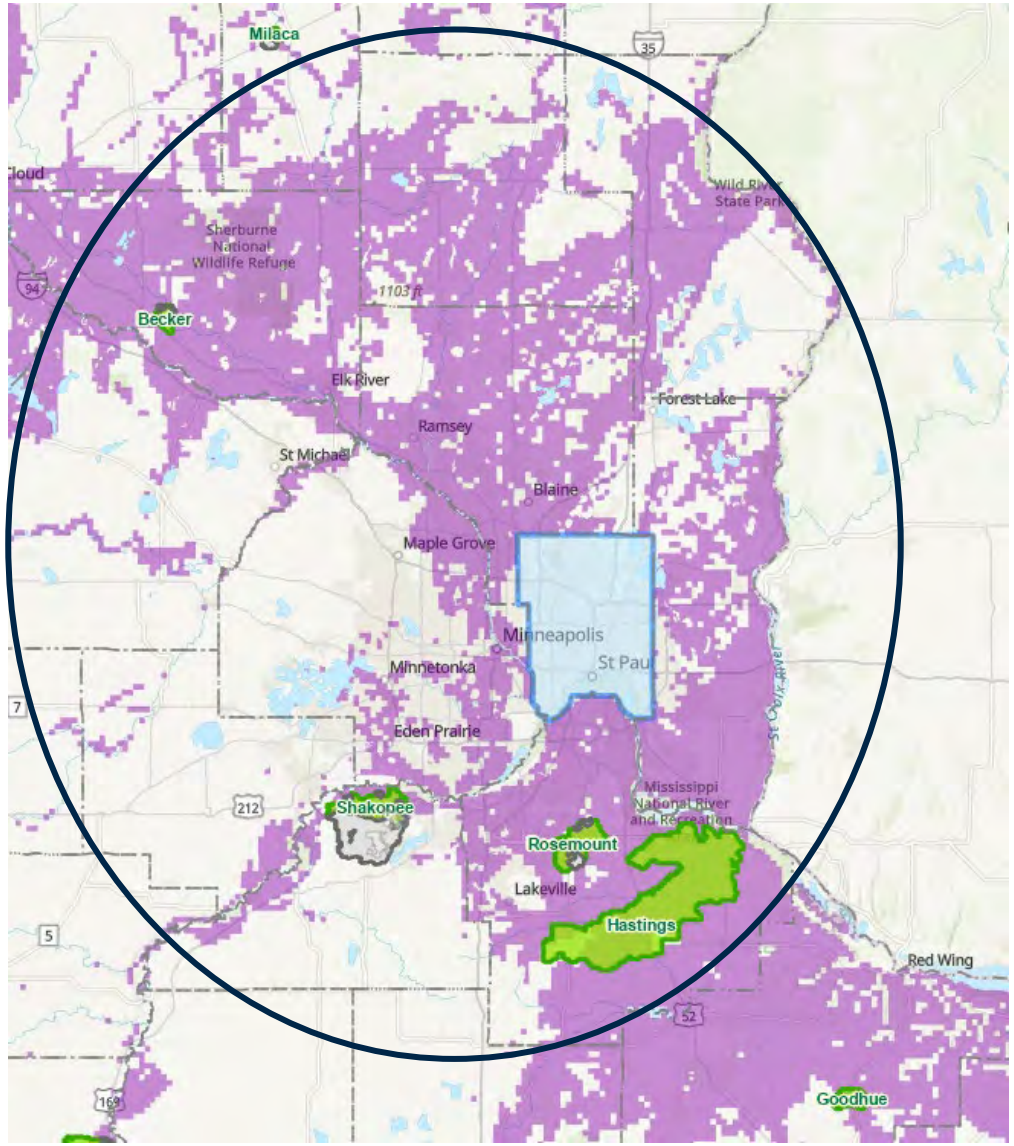
- Restrictions begin September 1 each year
- Some exceptions:
  - Fertilizer type (MAP/DAP, micronutrients)
  - Specific crops (winter annuals, perennials)



Areas with Vulnerable Groundwater in the Metro

Interactive Online Map

www.mda.state.mn.us/vulnerableareamap



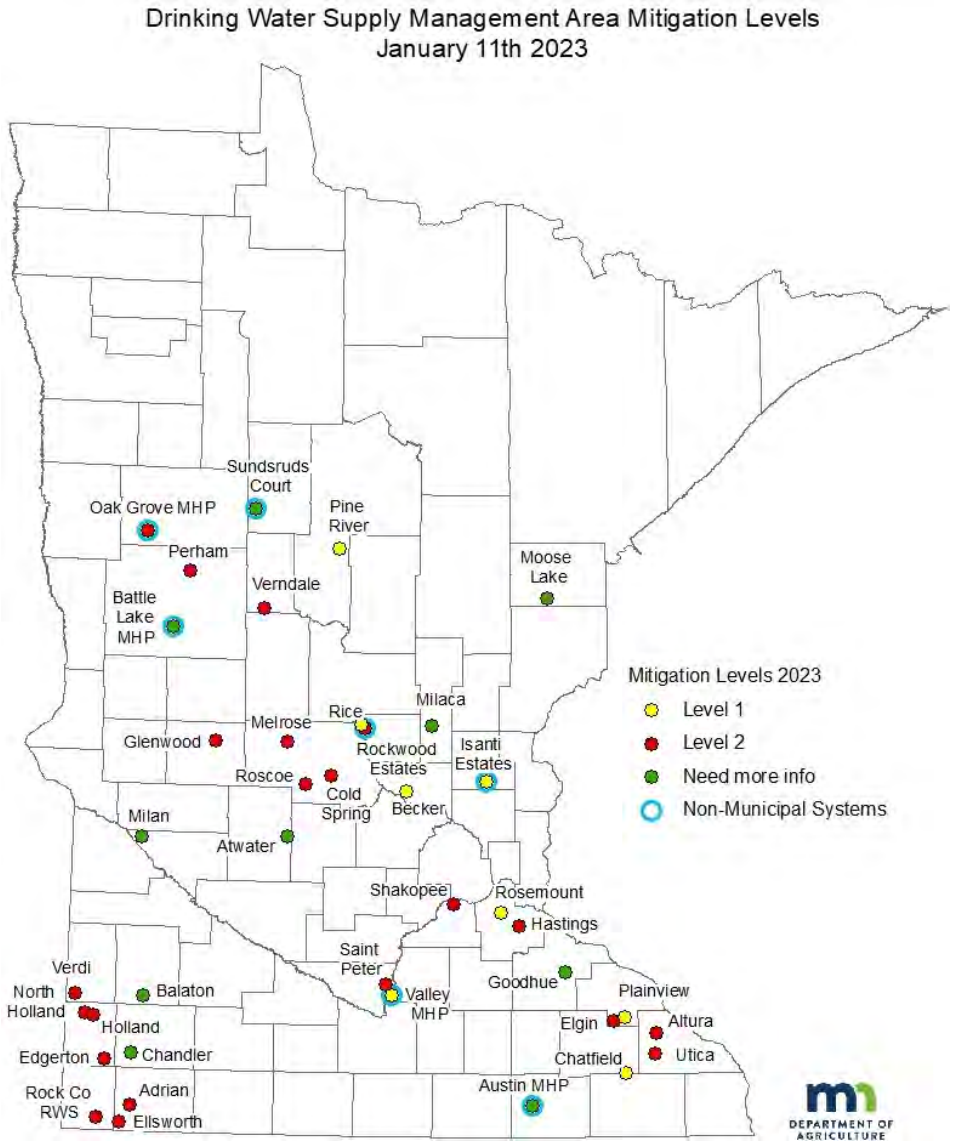
Minnesota's Groundwater Protection Rule

Part 2-

- Applies to DWSMAs with elevated nitrate-N levels in the well water
- MDA will partner with local farmers and agronomists to identify best management practices to improve water quality

Mitigation Level map updated each year on January 15:

- Mitigation Level 1: Eight (8) DWSMAs
- Mitigation Level 2: Twenty-one (21) DWSMAs
- Needs more information: Ten (10) DWSMA



Best Management Practices (BMPs)

Years of U of M research provides regional guidance on **nitrogen fertilizer Best Management Practices (BMPs)**:

- Range of nitrogen fertilizer rates based on the "Maximum Return to Nitrogen" approach;
- Timing
- Placement
- Source
- When to use nitrification inhibitors and slow-release products

Alternative Management Tools (AMTs)

A major goal of this approach is to promote BMPs and practices that go beyond the fertilizer BMPs. These are called AMTs.

- Increased low nitrogen vegetative cover (perennial crops, forages, and cover crops)
- Taking targeted land out of production
- Methods to reduce or manage nitrogen precisely – precision agriculture, new hybrids, management software, inhibitors

The Role of the Local Advisory Team (LAT)

Problem solving with local insights

- Local farmers and agronomists
  - Know practices, limitations, and opportunities
- Help direct implementation
  - Identify information farmers and agronomists need
  - Recommend best practices to protect groundwater
- **Key to positive outcomes in the process**

Computer Modeling and Groundwater Monitoring

Computer Simulation Modeling

- MDA staff have calibrated models (EPIC and SWAT) and are running scenarios to evaluate impacts on nitrate leaching losses after implementing BMPs and AMTs
- Models are a tool for local teams and MDA to evaluate and quantify the effects of different practices on groundwater quality

Groundwater Monitoring

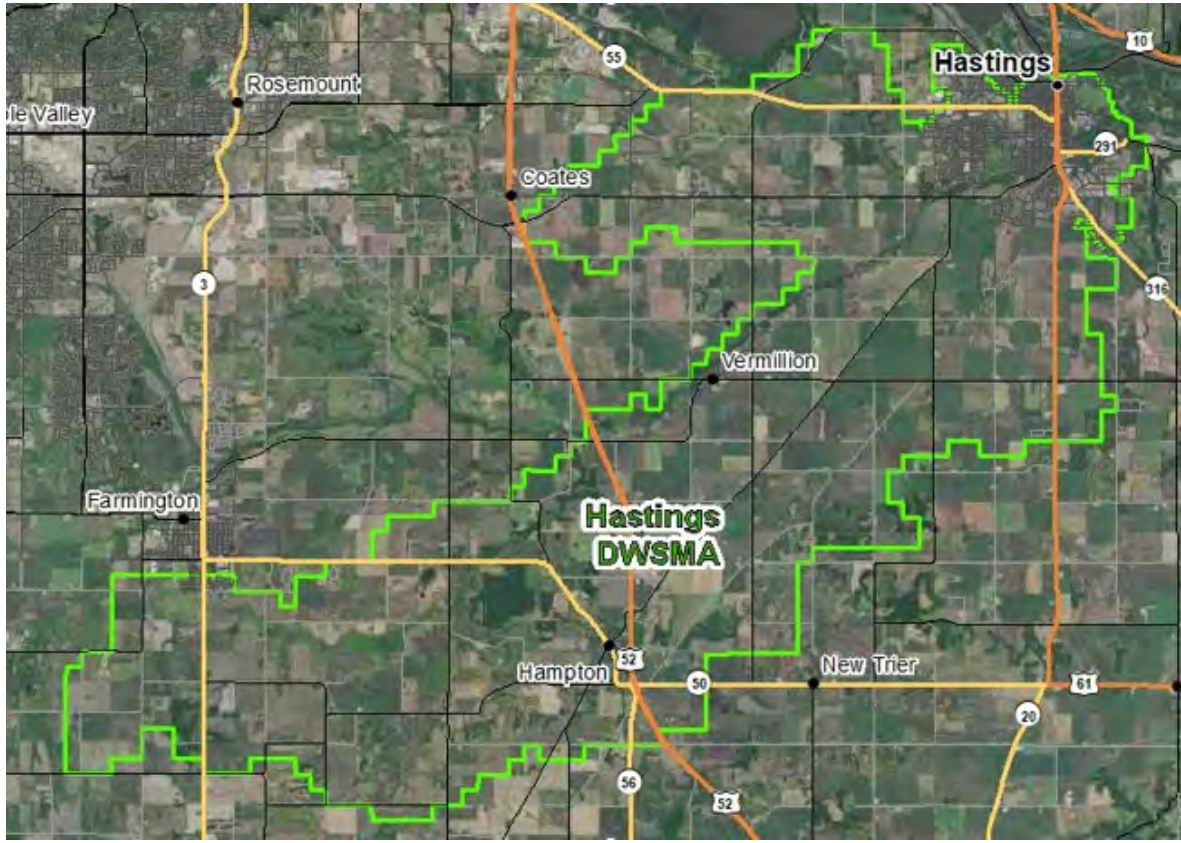
- Regional and local groundwater monitoring is conducted to determine nitrate trends in vulnerable areas

Groundwater Protection Rule: Recent Activities

- Installed monitoring networks in 3 DWSMAs
- Estimated lag times for all Level 2 DWSMA
  - Initiated age dating study with USGS in southeast
- Surveyed farmers and crop advisers in DWSMAs
- Computer modeling completed in 5 DWSMAs
  - Spreadsheet developed to compare practices
- 18 Local Advisory Teams (LATs) are formed and meeting
- 3 DWSMA-specific BMP lists developed with LATs
- Demonstrating and promoting BMPs and targeted conservation practices

Hastings Example

- Designated a Mitigation Level 2 on January 15, 2020
- The DWSMA is approximately 61,791 acres and is a high vulnerability area
- There are approximately 300 - 400 cropland owners and 100-150 operators within the DWSMA
- Located in Dakota County
- The MDA is currently developing a groundwater monitoring network within this DWSMA
- Of the 6 primary public wells, 1 has tested above 8 mg/L and 3 have tested above 10 mg/L within the past 10 years

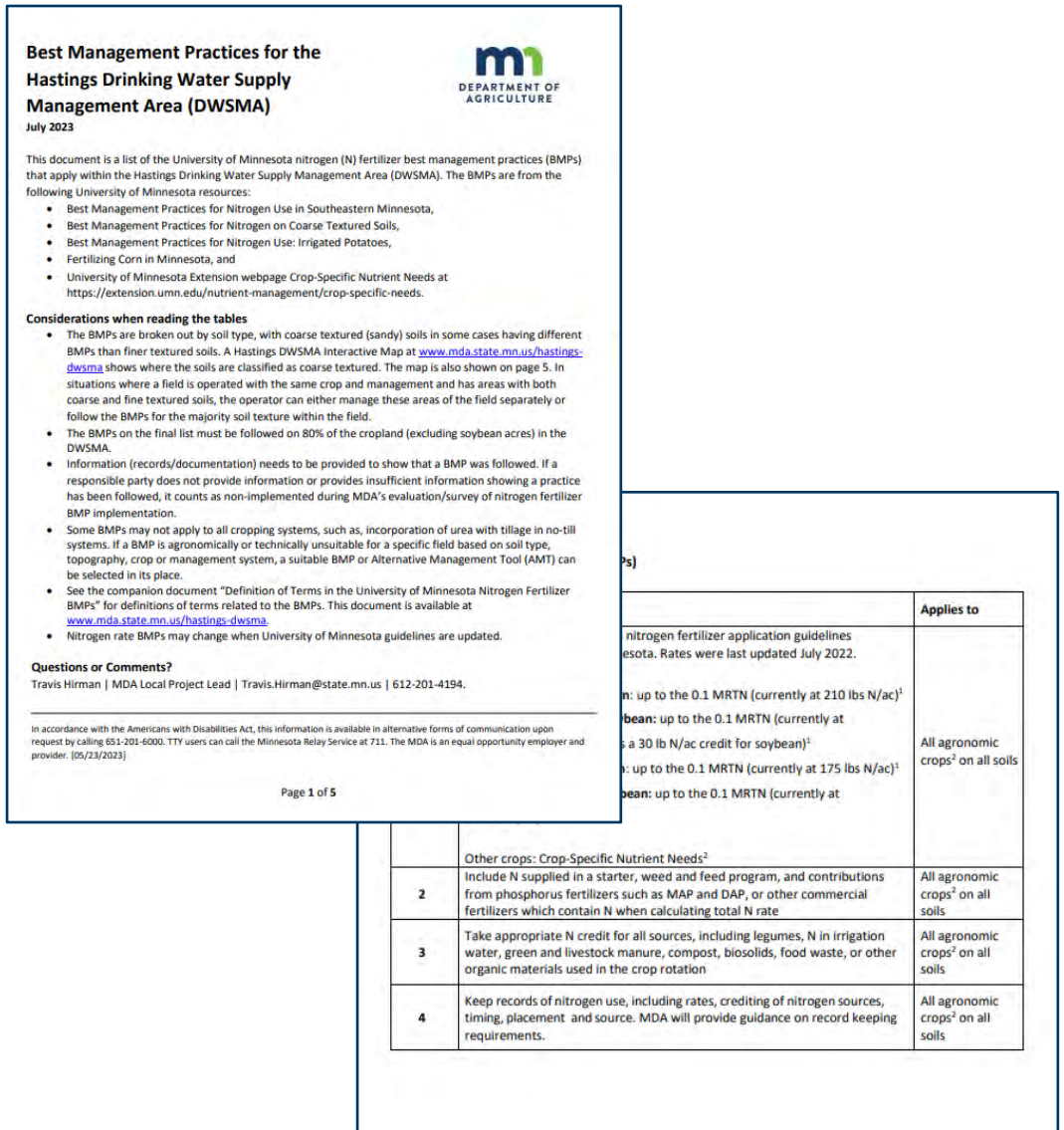


Hastings Local Advisory Teams

Working together:

- Held 6 LAT meetings
- Hosted Open House event to gather input
- Completed fertilizer dealership surveys
- Utilized current BMP practices for computer modeling
  - Determine effectiveness of practices
  - Strategies that can protect groundwater
- **Developed and published BMP list for DWSMA**

BMP lists for each DWSMA



Best Management Practices for the Hastings Drinking Water Supply Management Area (DWSMA)

DEPARTMENT OF AGRICULTURE

July 2023

This document is a list of the University of Minnesota nitrogen (N) fertilizer best management practices (BMPs) that apply within the Hastings Drinking Water Supply Management Area (DWSMA). The BMPs are from the following University of Minnesota resources:

- Best Management Practices for Nitrogen Use in Southeastern Minnesota,
- Best Management Practices for Nitrogen on Coarse Textured Soils,
- Best Management Practices for Nitrogen Use: Irrigated Potatoes,
- Fertilizing Corn in Minnesota, and
- University of Minnesota Extension webpage Crop-Specific Nutrient Needs at https://extension.umn.edu/nutrient-management/crop-specific-needs.

Considerations when reading the tables

- The BMPs are broken out by soil type, with coarse textured (sandy) soils in some cases having different BMPs than finer textured soils. A Hastings DWSMA Interactive Map at www.mda.state.mn.us/hastings-dwsma shows where the soils are classified as coarse textured. The map is also shown on page 5. In situations where a field is operated with the same crop and management and has areas with both coarse and fine textured soils, the operator can either manage these areas of the field separately or follow the BMPs for the majority soil texture within the field.
- The BMPs on the final list must be followed on 80% of the cropland (excluding soybean acres) in the DWSMA.
- Information (records/documentation) needs to be provided to show that a BMP was followed. If a responsible party does not provide information or provides insufficient information showing a practice has been followed, it counts as non-implemented during MDA's evaluation/survey of nitrogen fertilizer BMP implementation.
- Some BMPs may not apply to all cropping systems, such as, incorporation of urea with tillage in no-till systems. If a BMP is agronomically or technically unsuitable for a specific field based on soil type, topography, crop or management system, a suitable BMP or Alternative Management Tool (AMT) can be selected in its place.
- See the companion document "Definition of Terms in the University of Minnesota Nitrogen Fertilizer BMPs" for definitions of terms related to the BMPs. This document is available at www.mda.state.mn.us/hastings-dwsma.
- Nitrogen rate BMPs may change when University of Minnesota guidelines are updated.

Questions or Comments?

Travis Hirman | MDA Local Project Lead | Travis.Hirman@state.mn.us | 612-201-4194.

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider. (05/23/2023)

Page 1 of 5

		Applies to
	nitrogen fertilizer application guidelines esota. Rates were last updated July 2022.	
	n: up to the 0.1 MRTN (currently at 210 lbs N/ac)[1]	
	bean: up to the 0.1 MRTN (currently at	
	a 30 lb N/ac credit for soybean)[1]	All agronomic crops[2] on all soils
	: up to the 0.1 MRTN (currently at 175 lbs N/ac)[1]	
	bean: up to the 0.1 MRTN (currently at	
	Other crops: Crop-Specific Nutrient Needs[2]	
2	Include N supplied in a starter, weed and feed program, and contributions from phosphorus fertilizers such as MAP and DAP, or other commercial fertilizers which contain N when calculating total N rate	All agronomic crops[2] on all soils
3	Take appropriate N credit for all sources, including legumes, N in irrigation water, green and livestock manure, compost, biosolids, food waste, or other organic materials used in the crop rotation	All agronomic crops[2] on all soils
4	Keep records of nitrogen use, including rates, crediting of nitrogen sources, timing, placement and source. MDA will provide guidance on record keeping requirements.	All agronomic crops[2] on all soils

BMP lists developed in consultation with LAT

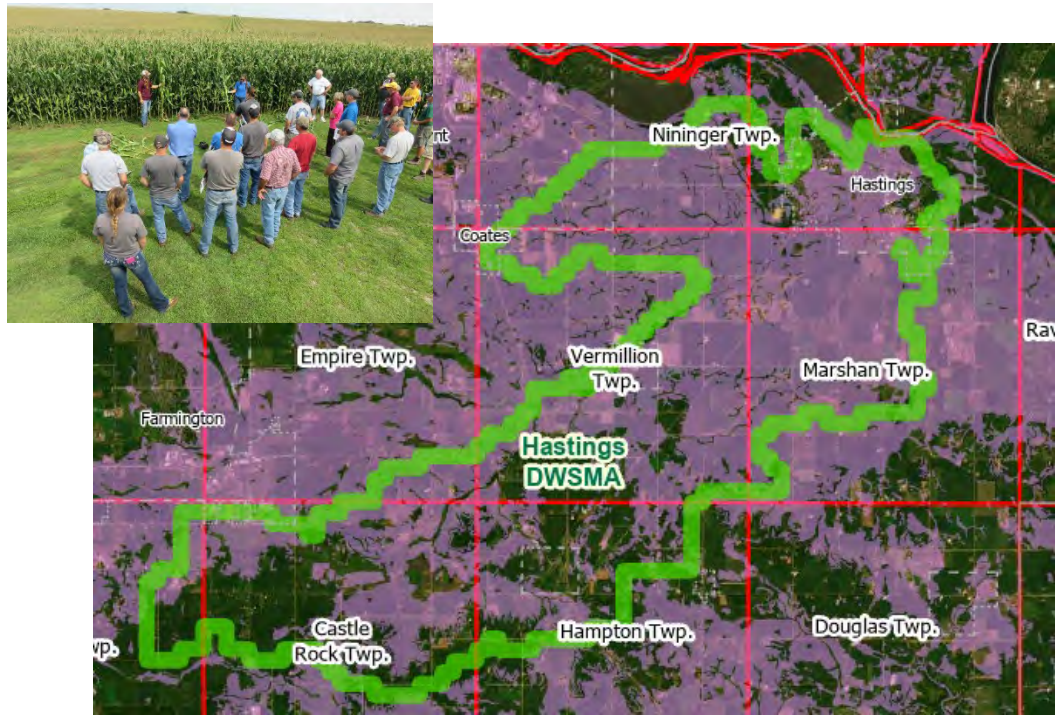
Computer modeling is used to estimate the nitrate reduction of practices

Hastings BMP list includes:

- **N rate recommendation**
  - **175 lbs/acre N for corn/corn**
  - **140 lbs/ acre N soybean/corn**
- **Split application of nitrogen on coarse textured soils**
- MDA will evaluate BMP adoption of practices after no less than three growing seasons.

Working in Hastings

- Promoting vegetative cover to reduce nitrate leaching
- Meeting with crop advisers and retailers
- Communication with landowners
- Education and outreach to support adoption of BMPs
- Alternative Management Tool discussion
- Partnerships for high impact projects
- Funding vegetative cover and other practices



Partnerships and Outreach

Working together

- SWCDs
- Cities and Counties
- Individual Farmers and Crop Advisers
- University of Minnesota- Extension
- State and Federal Agencies (funding)

CLEAN WATER LAND & LEGACY AMENDMENT

Minnesota's Groundwater Protection Rule

Coordination to address high priority DWSMAs

- State agencies using criteria from the Rule to prioritize areas for groundwater grant funding
- Incorporating criteria from the Rule and the Nitrogen Fertilizer Management Plan into local water plans
- Great examples of local leadership in DWSMAs and adoption of practices to protect groundwater in DWSMAs
  - Adrian, Edgerton, Cold Spring, Stearns County and others
- DWSMAs are a priority for implementation of Forever Green crops
  - 1,172 acres of Kernza planted in Minnesota by 33 new growers, 378 acres (32%) planted in a DWSMA
- Leveraging funding through partnerships and grants

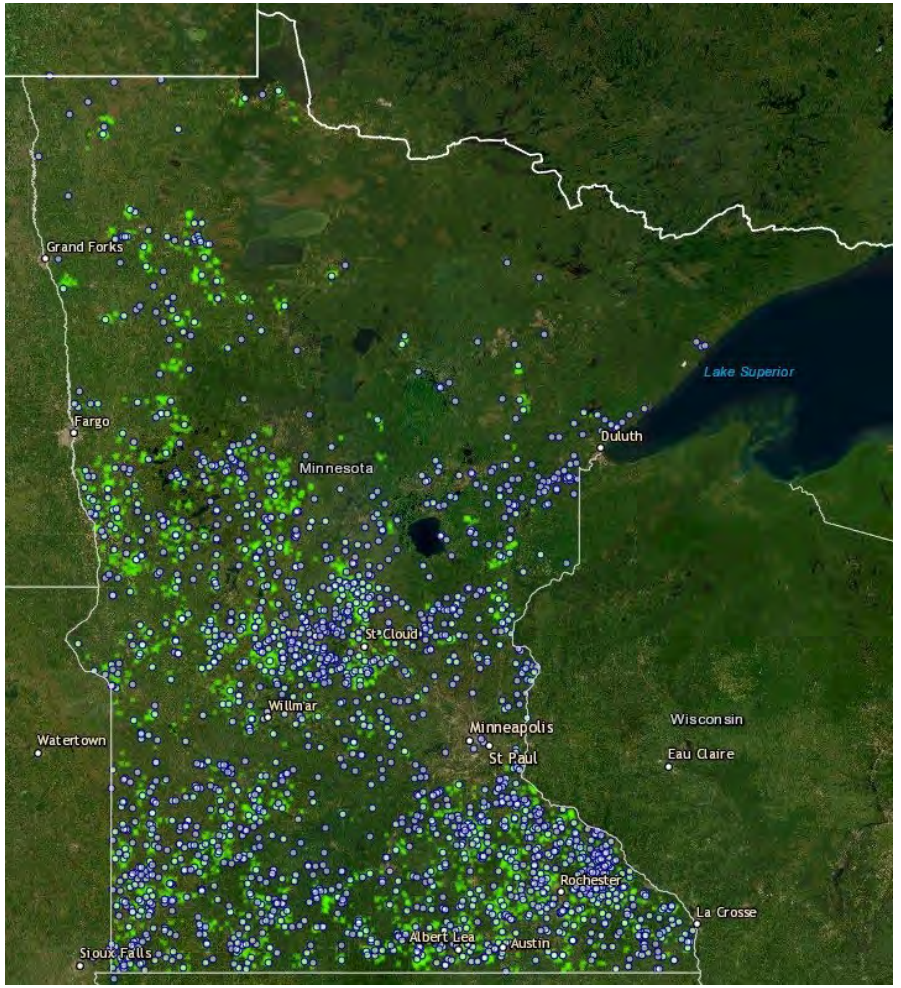
CLEAN WATER LAND & LEGACY AMENDMENT

Minnesota Agricultural Water Quality Certification Program

Minnesota Department of Agriculture

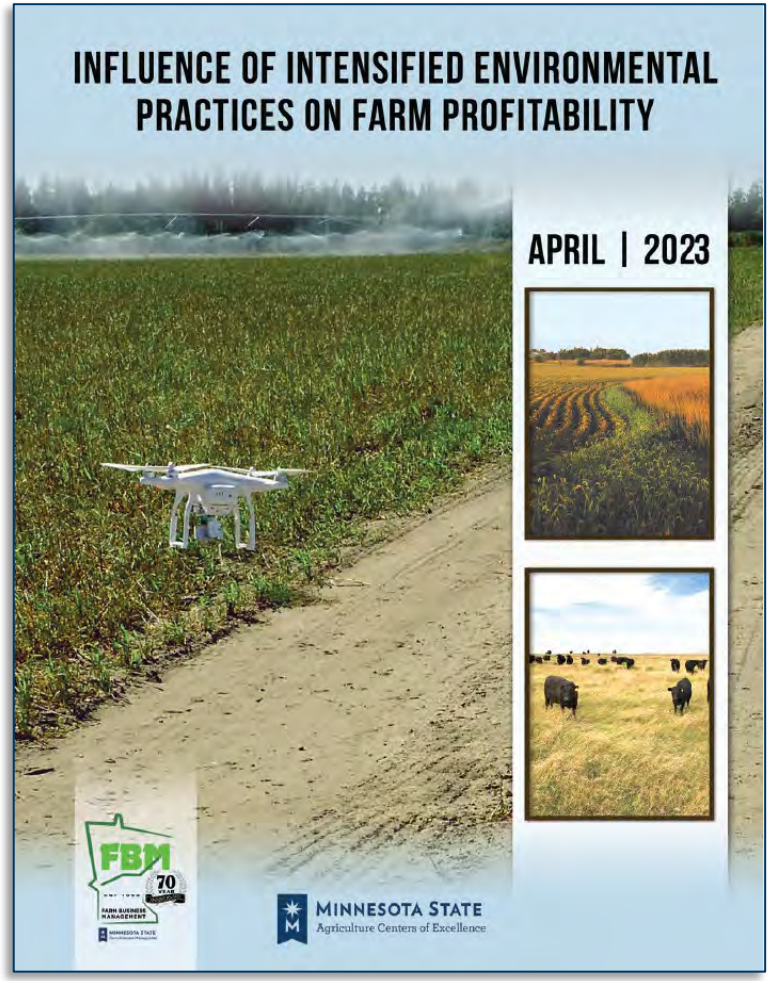
MAWQCP Outcomes

- **1,384** certified producers **997,380** acres (9-5-23)
  - 2,690 new practices
  - Soil loss reduced 139,341 tons per year
  - Sediment reduced 46,951 tons per year
  - Phosphorus loss reduced 58,452 lbs. per year
  - As much as 49% reduction in nitrogen loss
  - 50,190 C02-equivalent tons GHG reduced per year
- **433** Endorsements:
  - 146 Climate Smart
  - 123 Soil Health
  - 92 Integrated Pest Management
  - 68 Wildlife
  - *NEW* 4 Irrigation Water Management (UofM MIP course)



IRRIGATION WATER MANAGEMENT · CLIMATE SMART · SOIL HEALTH · WILDLIFE · INTEGRATED PEST MANAGEMENT

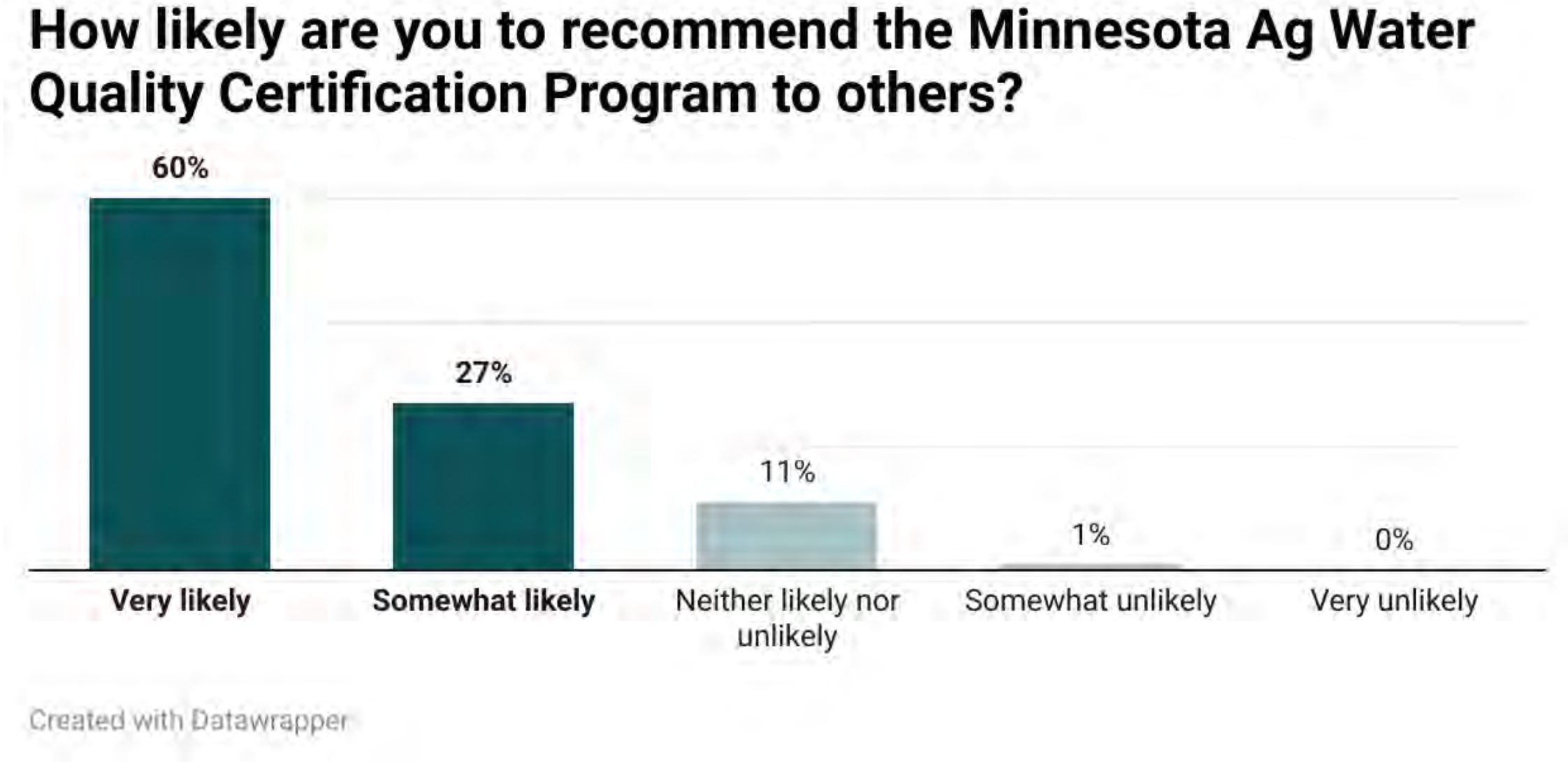
MAWQCP Outcomes



- Farm Business Management data for 2019, 2020, 2021 and 2022 show stronger financial outcomes for MAWQCP farms

- **MAWQCP farm average net income over the 4 years is $25,000 higher than non-certified farms**

MAWQCP Outcomes - Survey



MAWQCP Outcomes - Survey

Have you implemented additional conservation practices since becoming certified?

These practices do not include those required for certification.

Nearly **75% of producers** implemented additional conservation practices after earning certification

Partnership

Minnesota Farmers Union

The Nature Conservancy
Protecting nature. Preserving life.

Farmers' Legal Action Group

USDA NRCS

DEPARTMENT OF AGRICULTURE

Field to Market
The Alliance for Sustainable Agriculture

WOMEN CARING FOR THE LAND

Environmental INITIATIVE
Powerful Partnerships, Effective Solutions

STEARNS COUNTY SOIL & WATER SWCD CONSERVATION DISTRICT

RCPP
Regional Conservation Partnership Program

Board of Water and Soil Resources

Department of Natural Resources

Pollution Control Agency

MBOLD
MINNESOTA: LEADING THE WAY TO THE FUTURE OF FOOD

AgCentric
CONNECTING EDUCATION & AGRICULTURE

CLEAN RIVER PARTNERS

MASWCD

SWCD RICE

ECOSYSTEM SERVICES MARKET CONSORTIUM

CFS
CENTRAL FARM SERVICE

HOUSTON ENGINEERING INC.

CERTIFIED CROP ADVISER

Minnesota Milk
Producers Association

MIDWEST Dairy

UNIVERSITY OF MINNESOTA EXTENSION

Minnesota Agricultural Services

TRUTERRA

syngenta

STEELE SWCD

Hormel Foods

CANNON RIVER AGRICULTURAL COLLABORATIVE

COMPEER FINANCIAL

MOWER SWCD Soil and Water Conservation District

MINNESOTA SOIL HEALTH coalition

PHEASANTS forever

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY







AgBMP Loan Program

MINNESOTA

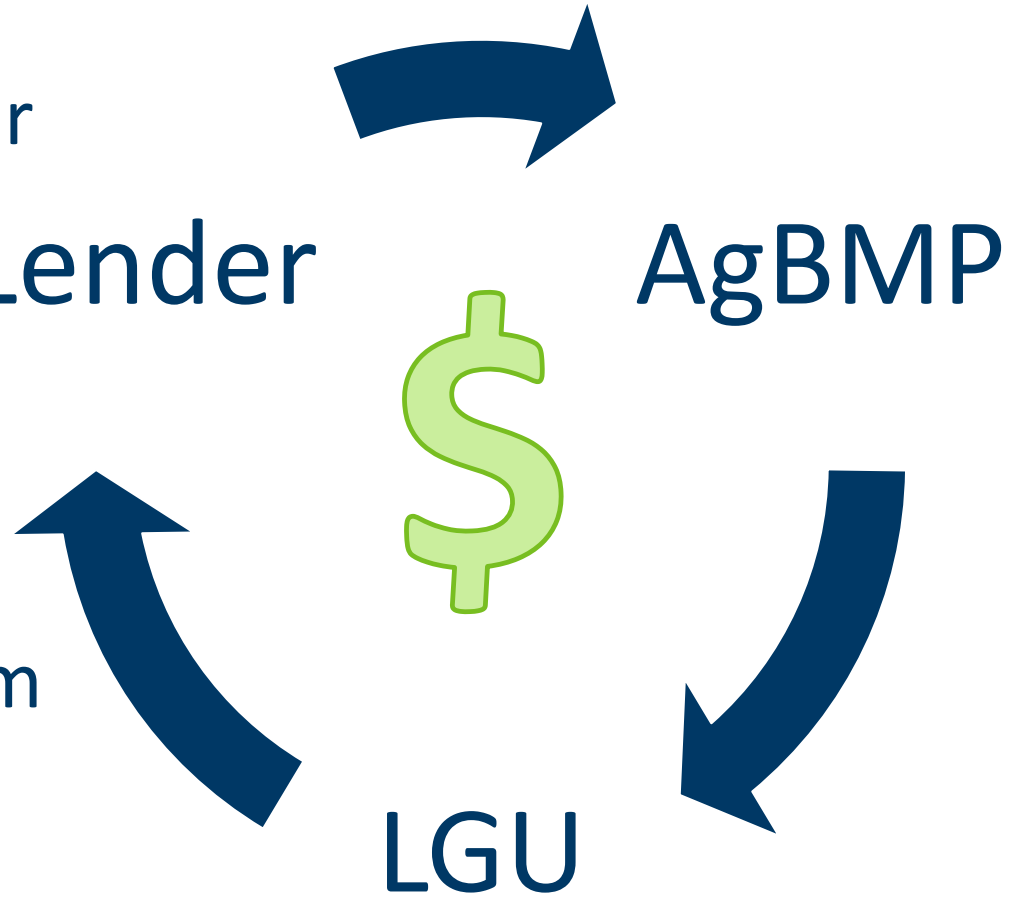
CLEAN WATER LAND & LEGACY AMENDMENT

Simple Framework

- **LGU approves effective projects**
- **LENDER evaluates creditworthiness**
- **MDA manages the funds**
- **The BORROWER implements the project**

AgBMP Loan Program

- Approximately 15% revolving / year
- Loans must be repaid
  (No prior default of repayments)
- Maximum $200,000
- Up to a maximum of a 10-year term
- Maximum of 3% interest + fees



Summary of AgBMP Loans Issued by Category

Funding: State Clean Water Fund - 5
7/1/1995 - 9/15/2023

Category	Number of Loans	Amount of Loans	% by Amount	% by Number
Ag Waste Management	2	$94,200.00	2.4%	0.8%
Conservation Tillage Equipment	4	$262,800.00	6.6%	1.6%
Septic Systems	217	$3,313,781.46	83.4%	87.5%
Other Practices	25	$300,671.71	7.6%	10.1%

Monitoring for Pesticides in Groundwater and Surface Water (MDA Lab)

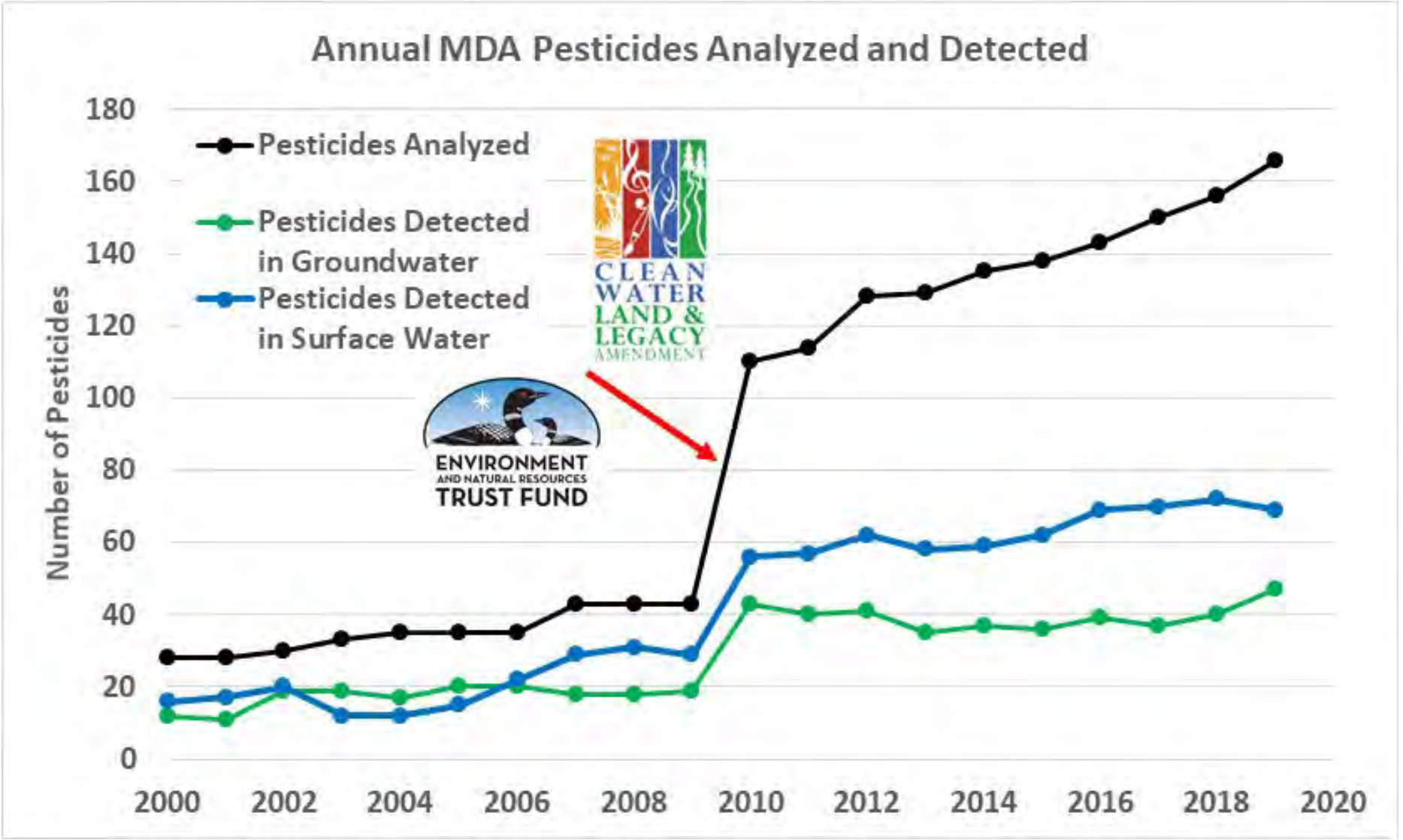
Monitoring for Pesticides in Surface Water and Groundwater

- MDA has monitored groundwater, lakes, rainfall, rivers, and wetlands
  - Stream network in completely developed watersheds and ag. areas around the metro
  - Partner with MPCA for monitoring wells
- CWF allowed for more samples, and more analytes including several neonicotinoids
- Currently analyze for 188 pesticide compounds
- Most detections are herbicides or herbicide breakdown products; very low concentrations relative to drinking water/aquatic life reference values
- Some insecticides are detected in streams over the EPA aquatic life benchmark

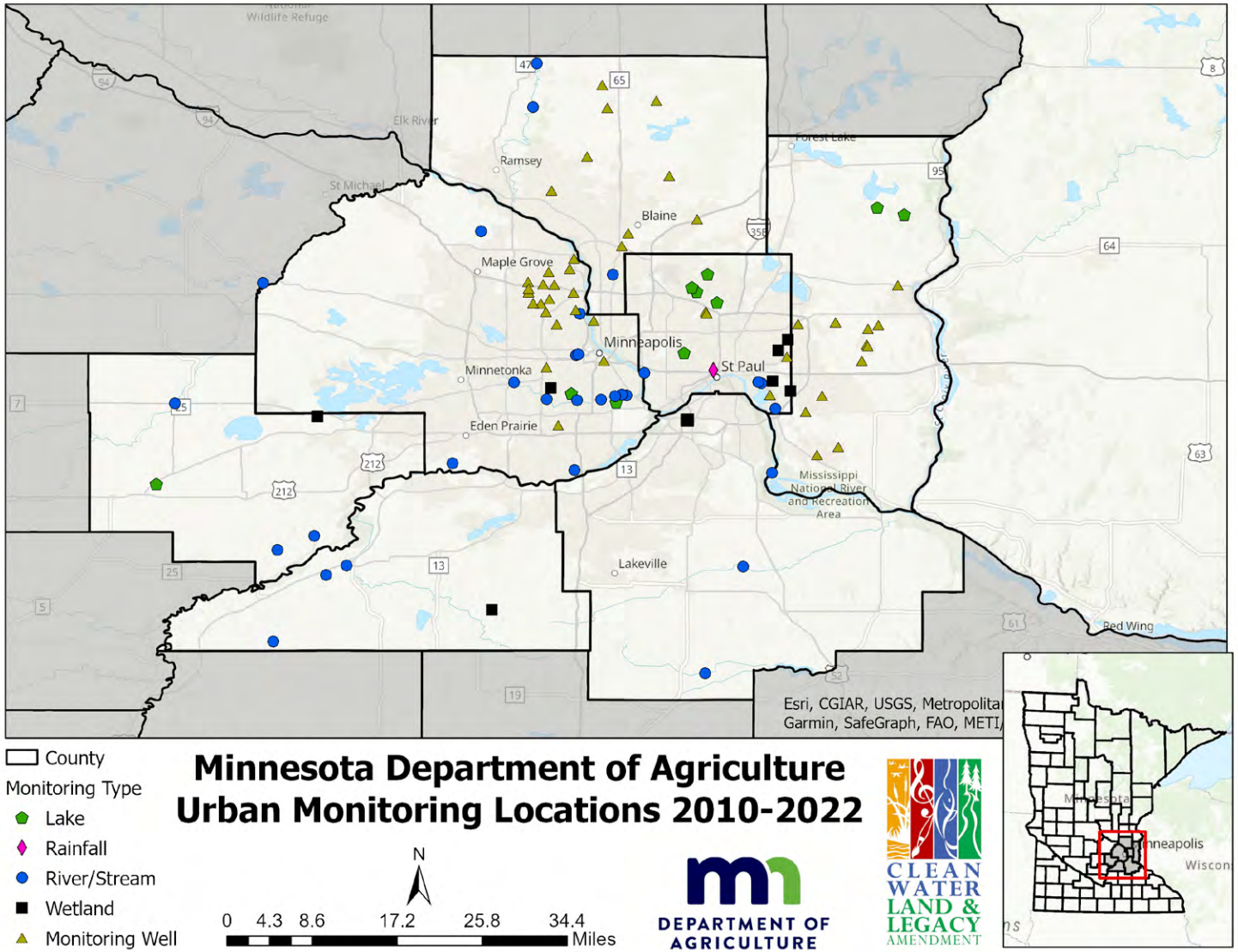
Monitoring for Pesticides in Surface Water and Groundwater

Outcomes

- More Pesticides
- More Samples
- More Results



MDA Pesticide Water Quality Monitoring in the Metro



Thank you!

Margaret Wagner - *Margaret.Wagner@state.mn.us*

MDA's Clean Water Fund Website - *www.mda.state.mn.us/cleanwaterfund*