Clean Water Council Meeting Agenda
Monday, June 17, 2024
9:00 a.m. to 2:00 p.m.

IN PERSON with Webex Available (Hybrid Meeting)

9:00 Regular Clean Water Council Business

- **(INFORMATION ITEM)** Introductions
- **(ACTION ITEM)** Agenda - comments/additions and approve agenda
- **(ACTION ITEM)** Meeting Minutes - comments/additions and approve meeting minutes
- **(INFORMATION ITEM**) Chair and Council Staff update
    - Policy and Budget and Outcomes Committee Updates
    - Staff update

9:30 Agency Presentations for FY26-27 Clean Water Fund Recommendations

- Agricultural Research and Evaluation (MDA)
- Recreational Water Quality Online Portal (MDH)
- Stormwater BMP Performance Evaluation and Technology Transfer (UMN)
- Tillage, Cover Crop, and Erosion Evaluation (BWSR)
- Technical Evaluation [restoration evaluation] (BWSR/DNR)
- Tool Development and Evaluation [formerly Applied Research and Tools](DNR)
- Clean Water Council budget (MPCA)
- Legislative Citizen Commission (LCC) website maintenance

10:45 BREAK

11:00 General Discussion about CWF Programs, Recommendations Process, and Plan for Public Comment

11:45 Public Comments

12:00 Adjourn and Lunch

12:30 Field Trip to Health Department Public Health Lab & Department of Agriculture Lab

- 625 North Robert Street, St. Paul, MN

2:00 Tour Ends

Clean Water Council
June 3, 2024 Meeting Summary

Members present: John Barten (Chair), Steve Besser, Rich Biske (Vice Chair), Dick Brainerd, Gary Burdorf, Gail Cederberg, Steve Christenson, Tannie Eshenaur, Warren Formo, Brad Gausman, Kelly Gribauval-Hite, Holly Hatlewick, Annie Knight, Jason Moeckel, Ole Olmanson, Jeff Peterson, Glenn Skuta, Marcie Weinandt, Jessica Wilson

Members absent: Peter Schwagerl, Justin Hanson, Peter Kjeseth, Rep. Josh Heintzeman, Trista Martinson, Sen. Nicole Mitchell, Rep. Kristi Pursell, and Sen. Nathan Wesenberg

Others present: Paul Gardner (Clean Water Council), Annie Felix-Gerth, Julie Westerland (BWSR), Frieda Van Qualen (MDH), Kim Laing (MPCA), Margaret Wagner (MDA), Alycia Overbo (MDH), Barb Lusardi (UMN), Jan Voit (MN Watersheds), Jen Kader (Met Council), Morgan Johnson (MDH), Sheila Vanney (MASWCD), Carrie Raber (MDH), John Bilotta (U of MN WRC), Heather Johnson (MPCA), Paul Pestano (MPCA), Quinn Carr (MPCA), Erik Smith (MPCA), Jeff Anderson (Voyageurs Project), Steve Robertson (MDH), Vanessa Baratta (DNR), Mitch Hunter (Forever Green), Todd Biewen (MPCA)

To watch the Webex video recording of this meeting, please go to https://www.pca.state.mn.us/clean-water-council/meetings, or contact Brianna Frisch.

Regular Clean Water Council Business
- Introductions
- Updates
  - Chair and Council Staff update
    - Steven Besser provided an update on the presence of microplastics and the potential impact on reproduction of the species.
  - Policy & Budget and Outcomes Committee Updates
    - No updates
  - Staff update: Status of Supplemental Clean Water Fund Recommendations
    - Signed into law before the last meeting and no updates.
- Marcie Weinandt motioned to approve agenda and meeting minutes and seconded by Dick Brainerd.

Role of the Clean Water Council and Process of Budget Recommendations *(Webex 00:11:07)*
- Paul Gardner discussed the timeline for recommendations and the council's role in reviewing proposals for the Clean Water Fund and reviewed Minnesota Statutes including the role of the Clean Water Council and the allowable use of the Clean Water Fund. He provided brief background about the water management framework developed in 2014.
  Questions/Comments:
  - Dick Brainerd –It is important for us to keep in mind of the results and/or outcomes with 10 years left.
  - John Barten – We need to look at the appropriate balance between protection versus restoration, surface water versus groundwater, and traditional BMPs versus new ideas like Forever Green. How do we allocate the funds to meet all of these goals to the best of our ability? We will have fewer dollars this round.
  - Steve Christenson – How much is available to spend in the next biennium and will we have a backup list in case there are more or fewer funds? *Answer John Barten:* That was the approach last time. It was easy to adjust upward with a surplus, but adjusting downward is a more challenging. We have 4.8% less this time.
  - Dick Brainerd – We need to be cognitive about emergency situations.

Agency Presentations for FY26-27 Clean Water Fund Recommendations
- Aquifer Monitoring for Water Supply Planning (DNR) (*Jason Moeckel, DNR) (Webex – 00:39:29)*
  - We have added 634 monitoring wells with the CWF. We have an active network of 1,254 wells and of those 854 have continuous monitoring. We work on a county-by-county basis with SWCDs. Of these, 310 wells that have 20 years of data for trend analysis. We anticipate a $4 million request plus inflation.

Questions/Comments:

- Dick Brainerd: There are a lot of wells in central Minnesota. *Answer:* The wells are concentrated where there is a heavy reliance on groundwater.
- Rich Biske*:* For this next biennium your proposal is for 50 new wells. How many new wells do you anticipate for the program? *Answer:* Our target is roughly 1,700 wells. The CWF covers 50 new wells and the groundwater general fund budget covers the other half plus monitoring and maintenance.
- Rich Biske: What's the annual for maintenance costs for personnel and operation? *Answer*: I would have to get back to you on that, but we are spending roughly $600,000 to $800,000 a year on the new well installation. It's about $1.1 million to maintain the network.

- Buffer Map Maintenance (DNR) (*Jason Moeckel, DNR) Webex (00:54:46)*
  - We update the buffer map on our website. We may not have a request this time.
- Stream Flow Monitoring (DNR) (*Jason Moeckel, DNR) Webex (00:56:13)*
  - The CWF supports 177 continuous sites out of 271 total; 141 of these sites are real time sites. We have taken 17,705 full measurements. We are in the process of upgrading equipment to communicate with satellites. We are not adding new sites.

    Questions/Comments:
    - Marcie Weinandt: Are these 15 staff members paid by the CWF, or is this one leveraged? *Answer:* The 15 staff members are supported by the CWF, but our team is larger.
    - Steve Christenson: What does the million dollar increase cover? *Answer:* I will get back to you.
- Private Well Initiative (MDH) (*Tannie Eshenaur and Frieda Van Qualen, MDH) (Webex – 01:02:24)*
  - Minnesota Department of Healths (MDH) vision is that Minnesota private well users are confident their water is safe for everyone in their household. There are at least 1.1 million private well users in Minnesota. There are huge disparities in safeguards over the lifespan of a well. Initially, they are tested for nitrate and for arsenic but after that any testing of water quality depends on the vigilance of that private well owner. We are concerned for coliform bacteria, nitrate, arsenic, lead, and manganese. There is no systemic program for addressing private wells. We are working on a statewide system that offers free testing to every private well owner over the next ten years and provide financial support for mitigation. We would like to expand education and outreach with the University of Minnesota, provide technical assistance, have a better understanding and explanation of the occurrence and distribution of contaminants in private wells, develop and strengthen partnerships, and make private well water quality data available to public. We received $3 million this biennium and we anticipate an increased request.

    Questions/Comments:
    - John Barten: Do that include folks who may have multiple water sources such as a municipal and a lake shore cabin that is a private well, and consider the health implications? *Answer:* No, it doesn't include people who own lake shore cabins. Every community water system submits an estimated population to MDH, so we total up all those estimated populations and we take the state population, and we subtract the number of people that are being served by a community water supply.
    - Marcie Weinandt: Are CWFs leveraging other funds? *Answer:* We did get a competitive grant from CDC and some of those dollars are going towards training realtors and data visualization.
    - Marcie Weinandt: Has the Legislature appropriated anything else for this large task? *Answer:* There was $2.8 million from the general fund appropriated to the Department of Agriculture for mitigation in southeast Minnesota, but CWFs support technical assistance, outreach, and education at MDH.
- River and Lake Monitoring and Assessment (MPCA), (*Kim Laing, MPCA) (Webex – 01:29:06)*
  - We work with local partners to evaluate watersheds and identify areas for protection and restoration. We target lakes of greatest use, large, publicly accessible waters, and highest local interest. We pass through about 50% to local partners like SWCDs and counties. We monitor for contaminants of emerging concerns. We have long term trends for about 60 sites.

    Questions/Comments:
    - Paul Gardner: Does the $18.1 million include the bump that you got from the supplemental for $326,000? *Answer:* No, and it also does not include the $2 million for the nitrate sensor network.
    - Marcie Weinandt: The program includes 46.5 FTEs. Is that reflected in the pass-through dollars and Holly Hatlewick, do SWCDs get support from this? *Answer:* We don't do any monitoring in house, but

my understanding is yes, that it's 10% of the time from this grant, and 10% from another grant to cover specific monitoring.
    - Marcie Weinandt: There is a lot of grant administration going on. Answer: Yes
    - Annie Felix Gerth: Could you elaborate a little bit on the local partners. Are those primarily SWCDs, watershed districts, or counties? *Answer:* It is a mix. It is not tribal partners. We offer it up to our local partners and depending on limitations they may take streams but not lakes. It really depends on the community and what they can do. We provide the training and equipment.
    - Annie Felix Gerth: If you don't get enough local participation, do you have to pick that up? *Answer:* We attempt to but that is difficult. We can only do so much.
    - Dick Brainerd: Where did the $3 million increase go towards? *Answer:* PFAS monitoring was part of it and a large chunk of it was inflation. We had a lab that went up 50%.
- Groundwater Assessment (MPCA) (*Paul Pestano, MPCA) (Webex – 01:42:59)*
    - Currently we have 270 wells across the state. Every year our staff visit 40 of these wells to measure contaminants of emerging concern. We visit all wells annually. Monitoring comprises the majority of the cost. We work directly with MDA and MDH. We are keeping steady with funding costs, and we anticipate inflation with laboratory costs as well as increased capacity that labs need.
      Questions/Comments:
        - Dick Brainerd: We've heard about a lot of wells. How many of these wells are used by various departments? *Answer:* Yes, we do partner with the Ag to sample for pesticides; they coordinate with our staff to provide equipment and some of the sampling locations. *Answer:* The MPCA collects data, water levels, and chemistry. We (DNR) install wells in places where there's water use to measure for changes in aquifer levels. Those are not necessarily compatible with the same locations where the MPCAs monitoring will not be established. We do share all data so we can pull that information and use it and incorporate it into the analyses that we need to do.

Agency Presentations: Watershed & Groundwater Restoration/Protection Strategies

- Watershed Restoration and Protection Strategies(WRAPS) (MPCA) (*Heather Johnson, MPCA) (Webex – 01:56:40)*
    - The Total Maximum Daily Load (TMDLs) reports are required by the federal Clean Water Act and Clean Water Legacy Act (CWLA), and the WRAPS updates are required by the CWLA for all waters of the state. Some of the funding also goes towards a healthier watershed website that look at TMDL status, wastewater treatment plant progress, and BMP practices implemented by watershed. Organizations that had WRAPS updates indicate that the updates were valuable and important for protection efforts. We are asking for an increase of funds due to inflation.
      Questions/Comments:
        - Dick Brainerd: The proposal mentions a pathogen project with the University. *Answer:* They are sampling right now with $500,000 over two years. It's the microbial source tracking done by one of our TMDL writers and bacterial specialist. They are doing extensive sampling and microbial source tracking and five locations. We should have results next year around this time.
        - Dick Brainerd: Why is a $1 million increase so important? *Answer:* It is the staff cost. It is really the core projects of updating TMDL and WRAPS. We are not looking for special projects at this point.
        - Rich Biske: The heat map is interesting, and the lake monitoring was informative too. What's the feedback loop between MPCA, BWSR, and those local units of government to understand the keys to success that you're demonstrating there? *Answer:* It is really just trying to communicate with our local partners to get the WRAPS and TMDLs information used.
- Watershed Restoration and Protection Strategies (DNR) (*Jason Moeckel DNR) (Webex – 02:17:03)*
    - The DNR supports the WRAPS work. The MPCA is doing a lot of the water quality and biology in streams. The DNR does the biology in lakes because we have this survey with fishery individuals all around the state. Most of our data collection and analysis focuses on stream geomorphology and hydrology aspects of watershed health. We help partners identify, plan, and design projects to address root causes of water quality and water management problems related to streambank erosion, stream stability, floodplains, stream habitat, and water storage.
      Questions/Comments:

- John Barten: How many individuals and/or effort did it take to do that Wells Creek Watershed? *Answer:* I don't know, we don't track to that specific level, but it's a substantial amount.
- John Barten: Realistically, how many of these could you do? *Answer:* I don't know as we've only done one with that level of intensity and I don't know that we would need to do that everywhere. The point is to target that kind of work where it's most valuable and most needed and where you've got partners that want that stuff and can readily do something.
- Holly Hatlewick: On the geomorphology survey where you've talked about the 11% being non channel erosion, in that 89%, does that take into effect that there is alternative drainage going into that system? *Answer:* In the Wells Creek watershed, I don't know that there's a whole lot of subsurface drainage, so that would be different. I guess in terms of the Minnesota River and the amount of water running off versus sediment, what we're measuring in the river is going to include the sub surface inputs to the total runoff. What you really want to do is look at any one watershed and understand what's changed, and what are the dynamics that we're seeing being expressed?
- Brad Gausman: Regarding sediment activity from bank erosion or open fields, is the buffer law helping? *Answer:* As a scientist, I would like to have data, but I will say that it's making a difference. Well buffered areas matter for those overland sources and they matter for holding water.

- Source Water Protection (MDH) (*Stephen W. Robertson, MDH) (Webex – 02:38:17)*
  - The program develops and maintains Drinking Water Supply Management Areas (DWSMA). Future directions include working at the watershed scale, providing technical and financial assistance, and conducting ambient monitoring for drinking water sources.
    Questions/Comments:
    - Dick Brainerd: What's the total amount in grants? *Answer:* On the slide the green bar indicates the total amount of grant support. The reason why the graph is small is because the ceiling for a grant is $10,000. So, it's a big effort but those small grants make a huge difference.
    - Dick Brainerd: Why is the max $10,000? *Answer:* We established that amount at the onset of the program.
    - Marcie Weinandt: Is there a waiting list? *Answer:* Generally, there is a waiting list at the end of each year and then we meet that in the next cycle, if we can.
    - John Barten: You had identified roughly 450,000 acres of sensitive land in a DWSMA needed protection. Has there been success working with property owners on different land management. *Answer:* There have been land use changes that have occurred that have produced positive water quality outcomes. We work closely with MDA to determine how much land use change is needed in a DWSMA to achieve positive water quality outcomes.
    - John Barten: Are local water folks aggressively approaching landowners or is it MDH or MDA? *Answer:* It is most effective when the local landowner is contacted by a local entity. We work with SWCDs and MN Rural Water Association to support.
    - Dick Brainerd: It looks like the grant has been cut in half for FY24-25? *Answer:* The information for this biennium isn't complete and you are only seeing one fiscal year.
    - Alycia Overbo: People can view past Source Water Protection Grants through our online dashboard (which has an update in process the last fiscal years' data): https://www.health.state.mn.us/communities/environment/water/cwf/grants/dashboard.html
- Groundwater Restoration and Protection Strategies (MDH) (*Carrie Raber, MDH) (Webex – 02:56:15)*
  - The Groundwater Restoration and Protection Strategies (GRAPS) are one of the only coordinated voices on groundwater informing the One Watershed One Plan (1W1P) with planning, implementation, and building capacity for local governments. Our goal is to develop a GRAPS report for each watershed that participates in the 1W1P. The program focuses on building capacity through education and outreach, developing regional groundwater models, and providing grants for local partners.
    Questions/Comments:
    - Dick Brainerd: Can you talk a little bit about the second-generation work? *Answer:* Our goal is to ensure that each watershed has a GRAPS reports. The second-generation is taking it to the next level with regional groundwater models and identifying a 50-year time of travel. We would be able to identify where recharge happens.

    - Jessica Wilson: Can you describe the county well index data gap? What would it take to close it? *Answer:* There is a backlog in recording private well locations. Minnesota Geological Survey (MGS) hires interns to help upload this information, but there's not a continuous improvement to ensure that information gets put into the database in a timely manner. We propose to modernize the system.
- One Watershed One Plan (1W1P) (BWSR), (*Julie Westerlund, BWSR) (Webex – 03:17:12)*
    - 1W1P program brings together local governments, watershed districts, municipalities, and tribal governments to collaboratively develop and implement a shared plan for managing water resources. The program aims to prioritize and target activities based on data and information gathered, with the goal of effectively using the CWF for measurable results in protecting and restoring water.
      Questions/Comments:
        - Dick Brainerd: How did you figure the lower priority of drinking water stewardship and invasive species management? *Answer:* This was from the Mississippi Headwaters plan and what they did was generate a long list of issues and prioritized their efforts. It's a local process and all watersheds are different in their priorities of concern.
        - Dick Brainerd: When you approve a plan what does that really mean? *Answer:* Our staff reviews the plan against our requirements. If it meets all requirements, we recommend it to the Board of Water and Soil Resources for approval.
- County Geologic Atlases Part A (UMN) (*Barbara A. Lusardi, UMN) (Webex – 03:37:56)*
    - A geological atlas will show roads, lakes, and rivers but it also shows gravel pits or quarries, and the distribution of rocks and sediment. The data gives the ability to look at the sediment layers and the cross sections and identify how contaminants are likely to behave.
- County Geologic Atlases Part B (DNR) (*Jason Moeckel, DNR) (Webex – 03:48:27)*
    - Part B starts with Part A and then we add water chemistry information to interpret pollution sensitivity, age of the water, and ground water use for planning, resource management, and education.
      Questions/Comments:
        - Dick Brainerd: It takes five years and $500,000 to do Part A. Is Part B included? *Answer:* No.
        - Dick Brainerd: How much is it? *Answer:* Our timeline is more like three to four years for the Part B instead of the five for Part A. It also depends on workload. There has been staff turnover and adjustments during Covid. The cost of Part A comes from drilling and *the* cost of Part B comes from analytical sampling for our chemistry.
- Research Inventory Database (MDA) (*Margaret Wagner, MDA) (Webex 03:56:48)*
    - This database is a one-step, searchable inventory of water research relevant to Minnesota that includes both peer-reviewed articles as well as reports. Currently, there are 3,756 articles and reports in the Minnesota Digital Water Research Library (MNWRL).
      Questions/Comments:
        - Dick Brainerd: You have the outcomes as of May 2024. Is that cumulative? *Answer:* Yes, that is cumulative. The early investment was scoping the project and then actually building the platform.
        - Dick Brainerd: Have you seen the numbers continuously go up each year and what do you think will happen next year? *Answer:* I don't know year to year, I think these are good numbers, but I don't know what I would use as a benchmark. I will get that answer to the BOC on Friday.
        - Steve Christensen: Why is the MDA the home for this rather than BWSR? *Answer:* We had staff that were convened on the project early. There isn't a statutory authority linking this to MDA.
        - Rich Biske: I don't recall this coming up for the communications plan for the council, but I wonder if there is good representation and cross posting on other state agency websites and platforms, because I don't see it show up everywhere. I am wondering if we could get increased presence on other agency sites? *Answer:* I can bring that back to see how we are encouraging all the agencies to use this.
- Forever Green Initiative (UMN) *(Margaret Wagner, MDA) (Webex 04:06:08)*
    - Forever Green initiative develops perennial and cover cropping systems specific to Minnesota that are necessary to protect and restore the state's surface and groundwater resources while increasing efficiency, profitability, and productivity of Minnesota farmers. The MDA administers the distribution of funds to the University and coordinates reporting on progress, results, and outcomes. Funding directly supports the University of Minnesota Forever Green Initiative.
      Questions/Comments:

- John Barten: For the Hastings example what was the difference in price between the Kernza and the corn rotation. Answer: Over three years it was $31,000 that they left on the table for the 80 acres. The difference between the two bids that came in was $31,000 and the board bid on that and said the water quality benefit was greatest. That is a $30.00 to $40.00 an acre that the bid was lower. The farmer knew the risk potential relative to cash corn and soybean.
- Dick Brainerd: Regarding the partnerships, how did you get the city rolled into this program? *Answer*: Hastings came up in a discussion about our resources with Forever Green and knowing that MDA has resources, we wanted to put those together. We have a great contact with the Dakota SWCD and the county had additional resources and relationships.
- John Barten: What is your plan to communicate that on a statewide basis for other communities? How would you envision that in terms of another 80 acres that is next to a city and how do you expand that? *Answer:* Working through trusted relationships to carry out the message. That allowed us to meet with public works individuals with the city. At the meeting we were able to make our points clear and expressed their interest in the value of clean water and the potential cost of cleaning it up in the future if they had to upgrade a water treatment plant.
- John Barten: Does the city plan on tracking the actual acre profit from the course of the contract compared to the corn soybean rotation? *Answer:* What we are going to track is the cost growing the Kernza and the cropping system. It will be on the partnership and the individual farmer to track the acre profitability rather than the city.

Presentations pushed to next meeting: Agricultural Research and Evaluation (MDA), Recreational Water Quality Online Portal (MDH), Stormwater BMP Performance Evaluation and Technology Transfer (UMN), Clean Water Council budget (MPCA), and Legislative Citizen Commission (LCC) website maintenance.

Adjournment *(Webex: 04:22:19)*

Directions: Public Health Lab & Freeman Building

JUNE 11, 2024

Address

The Public Health Laboratory is connected to the Freeman Building (where Minnesota Department of Health and Minnesota Department of Agriculture are located).

601 Robert St. N.
St. Paul, MN 55164-0975

Transportation Options

- **Light Rail:** The Green Line stops in front of the MDH Freeman and Public Health Lab Building. Trains runs about every 15 minutes. Metro Green Line schedule (https://www.metrotransit.org/route/green).
- **Buses:** There are several buses that run routes near the Capitol Complex and downtown St. Paul.
- **Metered parking** is available near the Freeman Building. Meters are $2 per hour ($8 daily rate) and are enforced until 4:30 p.m. Parking suggestions include:
  - **Metered Centennial Ramp**, Orange Level, on Rev. Dr. Martin Luther King Jr. Boulevard.
  - Surface lot (**Lot U and W**) on East 14th Street, north of the Stassen Revenue Building and west of Jackson Street.
  - Metered street parking along Cedar Street and Rev. Dr. Martin Luther King Jr. Boulevard.
  - Map of parking options is on next page and available at Public Parking (https://mn.gov/admin/citizen/buildings-grounds/parking/).

Driving directions

See Directions to the Freeman Building (https://www.health.state.mn.us/about/locations/freeman.html).

You will need to check in when you arrive

You will enter the Freeman building and need to check in at the front desk. We will inform them you are coming, but you will need to sign your name and receive a visitor badge.

DEPARTMENT OF ADMINISTRATION
FACILITIES MANAGEMENT

mn.gov/admin/government/buildings-grounds

NORTH

Centennial Office, Freeman Office, Judicial Center and Ag/Health Lab Buildings Detail

- Bicycle Fix-It Station
- Bicycle Locker
- Bicycle Rack
- Bus Route
- Contract Parking Only
- Electric Vehicle Charging Station
- Facilities with Public Metered Parking
- X Loading Dock
- Metro Green Line
- Metro Green Line Station
- Public City Meters
- Public Disability Parking
- Public Metered Parking

COMPLEX.07.1

Clean Water Fund Appropriations

as of 6/12/2024

leg	#	Agency	Title	Request	FY26-27	FY24-25 supple-mental	FY24-25	FY22-23	FY20-21	FY18-19	FY16-17	FY14-15	FY12-13	FY10-11
1	**4**	MDA	Monitoring for Pesticides in Surface Water and Groundwater	same			700	700	700	700	700	700	700	675
2	15	MDA	Nitrate in Groundwater	up		1,000	6,000	5,170	5,170	4,171	5,171	5,000	1,700	1,125
3	34	MDA	AgBMP Loan Program	up		3,402	9,598	150	150	150	150	400	9,000	4,500
4	32	MDA	Technical Assistance	same			3,000	3,000	3,000	2,250	2,250	3,000	1,550	2,665
5	**56**	MDA	MN Water Research Digital Library [aka Research Inventory Database]	same			80	80	100	100	100	250	350	-
6	33	MDA	MN Agricultural Water Quality Certification Program	same			7,000	6,000	6,000	5,000	5,000	3,000	-	-
7	17	MDA	Irrigation Water Quality Protection	same			300	270	300	220	220	220		
8	**81**	MDA	Forever Green Agricultural Initiative (U of MN)	same			6,000	4,000	4,300	1,500	1,000	-	-	-
9	**307**	MDA	Pesticide Testing in Private Wells	same			1,000	870	2,000	2,000	-	-	-	-
10	NEW	MDA	Conservation Equipment Assistance	up			3,500	-	-	-	-	-	-	-
11	NEW	MDA	Expand MN Ag Weather Station Network	down			3,000	-	-	-	-	-	-	-
12	**56**	MDA	Agricultural Research/Evaluation	down			1,500	-	-	1,325	1,575	2,100	2,100	-
13	**10**	MPCA	River and Lake Monitoring and Assessment	same		326	18,100	14,832	16,300	16,550	16,700	15,200	15,000	15,000
14	**9**	MPCA	Watershed Restoration & Protection Strategies (includes TMDL development)	same			12,700	13,451	15,100	19,000	20,200	18,800	18,800	18,000
15	**11**	MPCA	Groundwater Monitoring and Assessment	same			2,000	1,900	2,364	2,363	2,364	2,250	2,250	2,250
16		MPCA	St. Louis River AOC	down			1,500							
17	37	MPCA	NPDES wastewater/stormwater point-source implementation (combined from 2 previous programs)	same			3,000	2,200	2,200	2,250	2,350	1,800	-	-
18	43	MPCA	Enhanced County inspections/SSTS corrective actions	same		1,950	7,100	5,824	6,750	6,870	7,245	6,900	-	-
19	38	MPCA	Chloride Reduction	same		1,000	1,300	520	500	-	-	-	-	-
20	62	MPCA	Clean Water Council	same			675	600	220	100	100	73	-	-
21	92A	MPCA	National Park Water Quality Protection Program	same			2,000	1,400	1,550	2,000	-	3,500	-	-
22	**NEW**	MPCA	Nitrate Sensors			2,000	-	-	-	-	-	-	-	-
23		MPCA	River Watch for Friends of the MN Valley			50	-							
24	**5**	DNR	Stream Flow Monitoring Program	same			5,100	4,000	4,000	3,900	4,000	4,000	3,700	1,500
25	**6**	DNR	Lake Index of Biological Integrity	same			2,900	2,000	2,500	2,500	2,600	2,600	2,300	1,320
26	**6**	DNR	Fish Contamination Assessment	up		90	910	350	270	270	270	270	270	270
27	**10**	DNR	Watershed Restoration and Protection Strategies-DNR Portion	same			4,300	3,800	3,800	3,772	3,880	3,700	3,500	2,100
28	**18**	DNR	Aquifer Monitoring for Water Supply Planning	same			4,000	3,700	4,150	2,750	2,750	2,750	3,000	1,100

29	34	DNR	Non-point Source Restoration and Implementation	same			3,200	2,500	2,000	1,900	2,000	2,000	2,400	500
30	**57**	DNR	Tool Development and Evaluation [Formerly Applied Research and Tools]	same			1,300	1,065	1,400	1,350	1,350	1,350	790	550
31	**76**	DNR	Buffer Map Maintenance	same			50	50	200	200	650	-	-	-
32	**59**	DNR	County Geologic Atlas Part B	same			200	-	300	250	500	1,200	-	1,000
33	NEW	DNR	Freshwater Mussel Restoration	same			600	-	-	-	-	-	-	-
34	NEW	DNR	Water Storage	?			1,000	-	-	-	-	-	-	-
35	NEW	DNR	Culvert Replacement Cost Share	up			2,000	-	-	-	-	-	-	-
36	17	BWSR	Grants to Watersheds with Approved Comprehensive Watershed Plans (Watershed-based Implementation Funding)	up			79,000	43,564	26,966	9,750	-	-	-	-
37	26	BWSR	Surface and Drinking Water Protection/Restoration Grants: (Projects and Practices)	same			17,000	22,266	32,000	19,500	20,380	21,400	29,100	6,000
38	18	BWSR	Accelerated Implementation	up			11,000	9,682	8,000	7,600	12,000	8,000	6,600	-
39	23	BWSR	Measures, Results and Accountability	same			2,500	2,500	2,000	1,900	1,900	1,900	2,100	590
40	24	BWSR	Buffer Law Implementation	same			4,000	3,872	5,000	5,000	5,000	-	-	-
41	25	BWSR	Working Lands Floodplain Easements [formerly Riparian Buffer-Permanent Conservation Easements]	up		3,434	5,000	3,872	9,500	9,750	9,750	13,000	12,000	6,900
42	37	BWSR	Targeted Wellhead/Drinking Water Source Protection	up		1,000	5,000	5,000	4,000	3,500	3,500	2,600	3,600	2,300
43	**43**	BWSR	Technical Evaluation [restoration evaluation]	same			200	84	168	168	168	168	168	-
44	16	BWSR	Watershed Management Transition (One Watershed, One Plan)	down			3,500	5,808	4,000	3,990	4,200	900	-	-
45	19	BWSR	Conservation Drainage Management and Assistance	same			2,000	1,700	1,700	1,500	1,500	-	-	-
46	21	BWSR	Critical Shoreland Protection-Permanent Conservation Easements	same		4,000	3,000	2,468	2,550	2,000	2,000	-	-	-
47	**80**	BWSR	Tillage, Cover Crop and Erosion Evaluation	same			850	723	850	850	1,000			
48	27	BWSR	Watershed Partners Legacy (WPL) Grants	up		2,000	1,000	1,000	-	-	1,500	3,000	3,000	-
49	NEW	BWSR	Wetland Restoration Easement	up			10,000	5,660	-	-	-	-	-	-
50	28	BWSR	Enhancing Soil Health and Landowner Adoption of Cover Crops for Drinking Water & Groundwater Protection	up			12,077	4,200	-	-	-	-	-	-
51	NEW	BWSR	Great Lakes Restoration LAMP	same		1,000	-	-	-	-	-	-	-	-
52	**23**	MDH	Contaminants of Emerging Concern	up		384	10,100	2,400	3,400	2,200	2,200	2,300	2,040	1,300
53	9	MDH	Private Well Initiative	up			3,000	-	1,500	800	650	650	-	-
54	**24**	MDH	Source Water Protection	same			7,500	7,884	5,494	5,470	3,800	3,230	2,830	2,400
55	**74**	MDH	Groundwater Restoration and Protection Strategies	up			1,500	1,126	1,100	400	250	300	-	-
56	40	MDH	Future of Drinking Water (formerly Drinking Water Protection)	same			500	500	500	300	-	-	-	-

57	NEW	MDH	Recreational Water Portal	same			600	-	-	-	-	-	-	-
58	**new**	MDH	Nitrate response in SE Minnesota**	moving		2,790	-	-	-	-	-	-	-	-
59	42	MC	Metropolitan Area Water Sustainability Support Program	up			2,250	1,838	2,000	1,900	1,950	2,000	1,000	800
60	35	MC	Water Demand Reduction- Efficiency - Grant Program	same			1,500	1,250	750	-	500	-	-	-
61	**61**	UMN	County Geologic Atlas Part A	same			1,000	900	500	250	-	1,230	-	305
62	**82B**	UMN	Stormwater Research and Technology Transfer Program	same		1,000	2,000	1,500	1,500	1,500	550	-	-	-
63	63	LCC	Legislative Coordinating Commission Website	same			6	8	9	15	-	30	13	25
64	7	PFA	Point Source Implementation Grant (PSIG) Program	up			16,500	15,936	18,000	15,750	18,000	18,000	30,920	30,200
65	41	PFA	Small Community Wastewater Treatment Program	same			200	200	250	250	500	4,000	2,500	2,500
						$25,426	**$318,396**							

FY24-25 base budget	$ 318,396	
plus supplemental FY24-25 that has tails (in red above)	$ 4,590	
minus completed St. Louis River AOC (in blue above)	$ (1,500)	
FY24-25 base budget (revised)	**$ 321,486**	
MMB revenue estimate for FY26-27	**$ 307,422**	
Difference between FY24-25 revised base and FY26-27 estimate	$ 14,064	4.4%

* in 1st column = order of programs in appropriations bills

** SE MN Nitrate Response to be combined in FY26-27 with Private Well Initiative

FY26-27 CLEAN WATER FUND PROPOSAL

Tillage, Cover Crop, and Erosion Evaluation

BWSR	Program Number: 80
Program Contact Name: Udai Singh	Phone: 507-766-5020
Contact E-mail Address: udai.singh@state.mn.us	
Person filling out form: Annie Felix-Gerth	Phone: 651-201-0677
Person filling out form e-mail address: annie.felix-gerth@state.mn.us	

Purpose

Program to systematically collect data and produce statically valid estimates of the rate of soil erosion state-wide and tracking the adoption of high residue cropping systems in the 67 counties with greater than 30% of land in agricultural row crop production, with future expansion to forested zone, and Quantify and track, on multiple scales, trends in average annual and daily soil loss due to wind and water erosion. Provide data to support targeting of conservation programs.

Webpage

Tillage and Erosion Survey Project | MN Board of Water, Soil Resources (state.mn.us)
https://www.mda.state.mn.us/environment-sustainability/pesticide-monitoring-increased-capacity-and-capability

Rationale/Background

Please describe how this program will protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater from degradation, or protect drinking water sources.

Applied use of this data are: 1) MPCA for creating residue mass for WRAPS and to inform HSPF modeling, 2) maps for One Watershed, One Plan development, 3) data on crop residue and cover crop for MN Nutrient Reduction Strategy, and 4) Daily Erosion Project which has potential for developing forestry component & climate change scenarios.

PRIOR APPROPRIATIONS	
FY10-11	
FY12-13	
FY14-15	
FY16-17	$1,000,000
FY18-19	$850,000
FY20-21	$850,000
FY22-23	$723,000
FY24-25	$850,000
TOTAL APPROPRIATED TO DATE	**$4,273,000**

FY26 Request	FY27 Request	FY26-27 TOTAL REQUEST
		TBD

[Don't fill out the FY26-27 until you receive agency approval. We will update the form at that time.]

Alignment with Clean Water Council Strategic Plan

Please indicate which strategy in the Clean Water Council's most recent Strategic Plan applies to this proposal.

- Drinking Water Source Protection Vision, Goal 1: Public Water Systems, Strategy: Support prevention efforts to protect groundwater in DWSMAs.
- Surface Water Protection and Restoration Vision, Goal 2: Protect and restore surface waters, Strategy: Identify and refine strategies required to meet water quality standards in each HUC-8 watershed; Strategy: Prioritize waters for protection and restoration using comprehensive watershed management plans (One Watershed One Plan or other approved plans) iii updated every ten years.
- Vision: All Minnesotans value water and take actions to sustain and protect it: Goal 1: Build capacity of local communities to protect and sustain water resources, Strategy: Maintain and increase capacity of Minnesotans to improve water quality.

Outcomes

Describe the likely measurable outcomes of this proposal. (If this program has been funded previously by the Clean Water Fund, please describe the measurable outcomes, outputs, or results achieved to date and how close the program is to a goal, when applicable.)

Track tillage trends, cover crop adoption, and land cover in the 67-county area with greater than 30% of land dedicated to row crop production, with future expansion to forested zone; quantify and track trends in average annual and daily soil loss due to wind and water erosion; provide data to support targeting of conservation programs.

Long-term funding vision

If this proposal is funded, should the Clean Water Council expect future requests to increase, decrease, stay about the same, or not be needed? (Do not factor inflation into your answer.)

Steady

Non-CWF Funding

Will this program receive or request other funding from non-CWF sources, or eventually leverage non-CWF sources? If so, please describe. If not, leave blank.

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Supplement vs. supplant

Minnesota Statutes 114D.50 Subd. 3 requires that "any state agency or organization requesting a direct appropriation from the clean water fund must inform the Clean Water Council and the house of representatives and senate committees having jurisdiction over the clean water fund, at the time the

request for funding is made, whether the request is supplanting or is a substitution for any previous funding that was not from a legacy fund and was used for the same purpose." **Indicate if this proposal will supplement or supplant previous funding.**

Supplement

Past Funding Recipients

If this funding will be disbursed through competitive grants, loans, or contracts, or if recipients are not yet known, please list what entities have received this funding in previous fiscal years and how much.

State Employees

Indicate the number the full-time state employees supported by the CWF for this program.

FY10-11	
FY12-13	
FY14-15	
FY16-17	0.5
FY18-19	0.5
FY20-21	0.5
FY22-23	0.5
FY24-25	0.5
FY26-27	

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FY26-27 CLEAN WATER FUND PROPOSAL

Technical Evaluation [Restoration Evaluation]

BWSR	Program Number: 43
Program Contact Name: Wade Johnson	Phone: 651-259-5075
Contact E-mail Address: wade.a.johnson@state.mn.us	
Person filling out form: Annie Felix-Gerth	Phone: 651-238-0677
Person filling out form e-mail address: annie.felix-gerth@state.mn.us	

Purpose

For a technical evaluation panel to conduct 10 restoration evaluations under Minnesota Statues, section 114D.50, subdivision 6. BWSR passes funding to DNR to conduct evaluations of CWF projects. DNR staff share the evaluation results with the local practitioners to improve the quality of Legacy Fund restorations in Minnesota (report). DNR staff also provide training to local practitioners to improve project outcomes.

Webpage

Restoration Evaluation Program | Minnesota DNR (state.mn.us)
https://www.mda.state.mn.us/environment-sustainability/pesticide-monitoring-increased-capacity-and-capability

Rationale/Background

Please describe how this program will protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater from degradation, or protect drinking water sources.

Supports local project managers as they work to maximize on-the-ground project outcomes.

PRIOR APPROPRIATIONS	
FY10-11	
FY12-13	$168,000
FY14-15	$168,000
FY16-17	$168,000
FY18-19	$168,000
FY20-21	$168,000
FY22-23	$84,000
FY24-25	$200,000
TOTAL APPROPRIATED TO DATE	**$1,124,000**

FY26 Request	FY27 Request	FY26-27 TOTAL REQUEST
		TBD

[Don't fill out the FY26-27 until you receive agency approval. We will update the form at that time.]

Alignment with Clean Water Council Strategic Plan

Please indicate which strategy in the Clean Water Council's most recent Strategic Plan applies to this proposal.

Drinking Water Source Protection Vision: Drinking water is safe for everyone, everywhere in Minnesota.

Goal 1.

- Strategy: Support the Ground Water Protection Rule (GPR).
- Strategy: Support prevention efforts to protect groundwater in DWSMAs.

Goal 2.

- Strategy: Support selected mitigation activities for private well users.

Surface Water Protection and Restoration Vision: Minnesotans will have fishable and swimmable waters throughout the state.

Goal 2.

- Strategy: Prioritize waters for protection and restoration using comprehensive watershed management plans (One Watershed One Plan or other approved plans) iii updated every ten years.

Goal 3.

- Strategy: Support competitive grants for protection and restoration activities.

All Minnesotans value water and take actions to sustain and protect it.

Goal 1.

• Strategy: Maintain and increase capacity of Minnesotans to improve water quality.

Outcomes

Describe the likely measurable outcomes of this proposal. (If this program has been funded previously by the Clean Water Fund, please describe the measurable outcomes, outputs, or results achieved to date and how close the program is to a goal, when applicable.)

Up to 10 evaluations per year, results compiled into an annual report. Provide webinars and trainings to communicate on findings and recommendations.

Long-term funding vision

If this proposal is funded, should the Clean Water Council expect future requests to increase, decrease, stay about the same, or not be needed? (Do not factor inflation into your answer.)

Same

Non-CWF Funding

Will this program receive or request other funding from non-CWF sources, or eventually leverage non-CWF sources? If so, please describe. If not, leave blank.

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Supplement vs. supplant

Minnesota Statutes 114D.50 Subd. 3 requires that "any state agency or organization requesting a direct appropriation from the clean water fund must inform the Clean Water Council and the house of representatives and senate committees having jurisdiction over the clean water fund, at the time the request for funding is made, whether the request is supplanting or is a substitution for any previous funding that was not from a legacy fund and was used for the same purpose." **Indicate if this proposal will supplement or supplant previous funding.**

Supplement

Past Funding Recipients

If this funding will be disbursed through competitive grants, loans, or contracts, or if recipients are not yet known, please list what entities have received this funding in previous fiscal years and how much.

State Employees

Indicate the number the full-time state employees supported by the CWF for this program.

FY10-11	0.0
FY12-13	0.5
FY14-15	0.5
FY16-17	0.5
FY18-19	0.5
FY20-21	0.5
FY22-23	0.5
FY24-25	0.5
FY26-27	

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FY26-27 CLEAN WATER FUND PROPOSAL

Tool Development and Evaluation [formerly Applied Research and Tools)

DNR	Program Number: 57
Program Contact Name:	Phone:
Contact E-mail Address:	
Person filling out form: **Jason Moeckel**	Phone: **651-259-5240**
Person filling out form e-mail address **Jason.moeckel@state.mn.us**	

Purpose

The DNR maintains and provides access to LiDAR-derived elevation data that is widely used for targeting and designing implementation projects and for watershed modeling. We develop fine-scale watershed models that enhance our understanding of the effects of drainage, soil health, and different BMPs on water flow and water quality. We also assess relationships among disturbance patterns, BMP applications, and water quality in forested watersheds.

Webpage

https://www.mda.state.mn.us/environment-sustainability/pesticide-monitoring-increased-capacity-and-capability

Rationale/Background

Please describe how this program will protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater from degradation, or protect drinking water sources.

LiDAR (Light Detection and Ranging) elevation data provides a fine-scale, detailed digital representation of the landscape. This extremely valuable dataset is used to identify and design implementation projects, reducing the need for field assessments and enhancing accuracy of the predicted effectiveness of those projects. LiDAR data is also used as a foundation for watershed models. Modeling at the watershed scale using LiDAR requires additional modification of the data to replicate how water flows across the land. (In its raw form, the LiDAR data does not accurately represent water flowing under high points like road crossings). Recent work has focused on how to automate this process so the data is available for use in models and other targeting tools.

• Watershed Modeling. DNR modeling experts are using a high resolution computer model that replicates water and sediment flow. This model is much more detailed than the larger scale watershed model used by the MPCA, which means that it takes a relatively big effort to model a relatively small area. These fine scale model results are more robust and they take subsurface drainage into account. These results can be used to reduce the uncertainty in the larger scale

models, improving the state's ability to predict the sources of pollution problems and the effectiveness of our implementation efforts.

• Forestry Best Management Practices. We monitor the implementation of forest management guidelines and BMPs at selected logging sites in Minnesota's forested watersheds, with a focus on potential impacts to water resources. We analyze data on BMP implementation along with watershed characteristics (slope, soils, etc.) and disturbance patterns (logging, blowdown, fire, etc.) to identify risks to water quality and strategies to reduce these risks. The final step is outreach to forest landowners, managers and loggers aimed at mitigating these risks and ensuring full implementation of water quality BMPs.

PRIOR APPROPRIATIONS	
FY10-11	$550,000
FY12-13	$790,000
FY14-15	$1,350,000
FY16-17	$1,350,000
FY18-19	$1,350,000
FY20-21	$1,400,000
FY22-23	$1,065,000
FY24-25	$1,300,000
TOTAL APPROPRIATED TO DATE	**$9,155,000**

FY26 Request	FY27 Request	FY26-27 TOTAL REQUEST

[Don't fill out the FY26-27 until you receive agency approval. We will update the form at that time.]

Alignment with Clean Water Council Strategic Plan

Please indicate which strategy in the Clean Water Council's most recent Strategic Plan applies to this proposal.

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Outcomes

Describe the likely measurable outcomes of this proposal. (If this program has been funded previously by the Clean Water Fund, please describe the measurable outcomes, outputs, or results achieved to date and how close the program is to a goal, when applicable.)

Developed the standard for hydrologically modified digital dams to make LiDAR data useful in watershed modeling and for accurate travel time analysis.

Collection of 750,000 state funded breachlines associated with digital dams.

Long-term funding vision

If this proposal is funded, should the Clean Water Council expect future requests to increase, decrease, stay about the same, or not be needed? (Do not factor inflation into your answer.)

Non-CWF Funding

Will this program receive or request other funding from non-CWF sources, or eventually leverage non-CWF sources? If so, please describe. If not, leave blank.

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Supplement vs. supplant

Minnesota Statutes 114D.50 Subd. 3 requires that "any state agency or organization requesting a direct appropriation from the clean water fund must inform the Clean Water Council and the house of representatives and senate committees having jurisdiction over the clean water fund, at the time the request for funding is made, whether the request is supplanting or is a substitution for any previous funding that was not from a legacy fund and was used for the same purpose." **Indicate if this proposal will supplement or supplant previous funding.**

Supplement

Past Funding Recipients

If this funding will be disbursed through competitive grants, loans, or contracts, or if recipients are not yet known, please list what entities have received this funding in previous fiscal years and how much.

State Employees

Indicate the number the full-time state employees supported by the CWF for this program.

FY10-11	2.0
FY12-13	2.3
FY14-15	2.3
FY16-17	2.3
FY18-19	2.3
FY20-21	2.3
FY22-23	2.3
FY24-25	2.3
FY26-27	

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(Full compilation of what we received over the past few months. Agencies gave verbal responses for those that are blank. Staff is happy to update this list as needed.)

Minnesota Department of Agriculture

Monitoring for Pesticides in Surface Water and Groundwater

- **How many pesticides for cropland are in commerce today in Minnesota?**

In 2022, there were approximately 495 unique pesticide active ingredients registered for use on crops in Minnesota. They vary in how widely they are sold and used (see MDA sales data).

The MDA Lab water methods currently analyze for approximately 186 pesticides and degradates. The MDA targets those pesticide compounds that are the most commonly used, or those that pose the greatest risk to water resources based on their chemical properties and toxicological profile.

- **How many are we finding that are too high?**

In groundwater there are two pesticide related compounds that exceed reference values with any frequency, total cyanazine (the sum of all cyanazine degradates) and 4-hydroxychlorothalonil (a degradate of the fungicide chlorothalonil). Cyanazine is no longer used and MDA is increasing monitoring and evaluation of the 4-hydroxychlorothalonil detections. The MDA is also working with MDH on the appropriate response for detections of 4-hydroxychlorothalonil in private drinking water wells.

- In 2023 there were 37 instances where total cyanazine exceeded the chronic HRL (1,000 ng/L) in private drinking water wells, occurring in 4 counties: Dakota (21 wells), Goodhue (13 wells), Scott (2 wells) and Otter Tail (1 well). Overall, there has been 175 exceedances statewide since monitoring began in 2019; an average of ~35 per year.
- In surface water there are currently 11 pesticide impairments, 10 for chlorpyrifos (insecticide) and one for acetochlor (herbicide).

To help address pesticides detected in groundwater and surface water that are of concern, the MDA can officially designate pesticides as a "common detection" pesticide in groundwater or as a "surface water pesticide of concern" in surface water. The approach, process, and outcomes of these designations are detailed in the Minnesota Pesticide Management Plan.

Currently, five pesticides are designated as "common detection" in groundwater based on detections of either the parent compound or their breakdown products (i.e., degradates):

- Acetochlor (herbicide)
- Atrazine (herbicide)
- Metolachlor (herbicide)
- Metribuzin (herbicide)
- Alachlor (herbicide - no longer registered for use)

Five pesticides are designated as "surface water pesticides of concern:"

- Acetochlor (herbicide)
- Atrazine (herbicide)

- Chlorpyrifos (insecticide)
- Clothianidin (insecticide)
- Imidacloprid (insecticide)

In surface water there are a handful of pesticides that are routinely detected above the established reference values each year. Of these, imidacloprid and clothianidin, both neonicotinoid insecticides, are of greatest concern.

Of the 186 pesticide-related chemicals monitored, many are not detected or are detected at very low concentrations. MDAs 2023 Monitoring Report provides more detail.

Nitrate in Groundwater

- **Is there a groundwater N goal set for modeling and for what duration, e.g., <5 mg/L or 5-10 mg/L? What's the balance of permanence of practices nutrient management vs. perennial?**

MDA's approach to each Drinking Water Supply Management Area (DWMSA) is unique and based upon the BMP region, soil type/texture, and current crop management practices. By surveying farmers and crop advisers, the MDA begins the process with current information about crop management. The MDA uses current practices to estimate a "baseline" of nitrate leaching and then uses advanced computer modeling to estimate nitrate leaching under different management scenarios. While each DWSMA is different, the MDA sets an initial target of 10% reduction in leaching and then assesses what combination of new crop management practices can support that.

The computer modeling estimates the percent reduction in nitrate leaching in the vadose zone (unsaturated zone between soil surface and groundwater table) and does not estimate a reduction in nitrate concentration in a receiving water supply well. The tools available to estimate a reduction in concentration are not available although the MDA has supported efforts by the USGS to develop this type of technology using machine learning approaches.

A major goal for protecting groundwater is to promote best management practices (BMPs) and practices that go beyond the fertilizer BMPs. The MDA refers to these as alternative management tools (AMTs) which include cover crops, perennial vegetation, extended crop rotations, conservation land programs, precision agriculture, etc. The combination of BMPs and AMTs in each DWSMA varies. In three DWSMAs located in in the southwest region a majority of cropland is now in perennial cover (Adrian= 54%, Edgerton= 56%, and Rock County= 34 %).

- **When will data from groundwater monitoring be available to determine nitrate trends in vulnerable areas?**

Groundwater monitoring nitrate data is collected each year at different scales, including public water supply wells, regional private well volunteer networks, and monitoring networks in high nitrate Drinking Water Supply Management Areas (DWSMAS) (Hastings, Rock County Rural Water and St. Peter).

Each of these sources of nitrate monitoring data are analyzed and reported annually. Generally reporting is available in late February of the following year of data collection.

Trends can be calculated annually for public water supply wells and regional private well volunteer networks, while wells in the high nitrate DWSMAs do not yet have enough data to calculate meaningful trends.

- **Have the computer models estimating N reductions from practices been calibrated to estimate accuracy?**

In anticipation of the Minnesota Groundwater Protection Rule, the MDA entered into an agreement with the U of M in 2015 (continued into 2023) to provide extensive modeling expertise and assist the MDA's efforts of modeling N leaching losses and develop N leaching reduction strategies in DWSMAs.

University of Minnesota researchers initially calibrated models using available research and monitoring data in specific landscapes and provided MDA with those model input parameters. The accuracy of the model estimates was assessed using a split dataset approach, where part of a data series is used for calibrating the model and the remainder of the data series is used for output verification. Through discussions with the University, and based on local information and survey data, MDA may adjust model parameters to better represent a specific situation and match provided yield information.

As with other computer modeling applications, the output should only be used to provide a relative comparison of loss between the different management systems provided rather than an absolute measure of loss below an individual agroecosystem.

- **If N rate is the most important practices, how many of the LATS have recommended reductions?**

Each DWSMA will identify a nitrogen rate for the area. The selected nitrogen rate varies but is often at or near the 0.1 MRTN value, which is the middle of the University of Minnesota recommendations for corn production. The number of producers that are currently applying above or below that recommended rate is different in each DWSMA. For example, the MDA identified the 0.1 MRTN rate in the list of BMPs required in Hastings DWSMA to achieve a reduction in nitrate leaching. According to survey information and computer modeling output, nitrogen rates on 28% of irrigated corn acres would need to be reduced by 15 lbs./acre and the nitrogen rate on 16% of irrigated corn acres could be reduced by 25 lbs. Approximately 5% of irrigated corn acres would need to reduce by more than 25lbs N/acre. Similarly, 53% of dryland corn acres would need to be reduced up to 15 lbs. for corn following corn and up to 10 lbs. for corn following soybeans. Nitrogen rates on approximately 10% of dryland corn acres would need to be reduced by up to 35 lbs. for corn following corn and up to 20 lbs. for corn following soybeans.

- **Are federal funds available and have they been pursued?**

Federal funding has been secured for programs that complement work related to reducing nitrate in groundwater. This includes two USDA Regional Conservation Partnership Program (RCPP) awards for the Minnesota Ag Water Quality Certification Program and for enhanced irrigation technology, both programs provide technical and financial assistance for groundwater protective practices in DWSMAs. The MDA also partners with the Forever Green Initiative which leverages large federal grants of development of new and existing perennial and winter annual crops. Federal funding including from USDA has also been secured by U of M scientists who continuously research and document new crop production practices that protect water quality.

AgBMP Loan Program

1. What is the repayment rate for these funds? Or the default rate?
2. Does the program count outcomes like Lyon County did? They did a nice job.

3. How can we track what loans involved the CWF vs the other part of the funding (PFA) 10 years ago? Like easements, it's hard to connect the dots between the CWF and outcomes here.

Technical Assistance

1. Has any monitoring been done on runoff quality and quantity from the targeted implementation areas with the 16 control basins, 100,000 feet of grassed waterways? What would it cost/year to set up monitoring systems to capture this data?

MN Water Research Digital Library [aka Research Inventory Database]

- **How is MNWRL promoted for increased awareness and use?**

The MDA has engaged with professional organizations, local units of government, and other state agencies to promote the value of the MnWRL to those who work or have interest in the most up-to-date information about water related topics in Minnesota. Additionally, staff attend conferences and annual meetings of relevant organizations to promote awareness of the library. Other state agency staff also promote the use of MnWRL and work with colleagues to utilize the library and submit documents for inclusion.

The underlying software of MnWRL was recently updated. The MDA is developing an outreach plan to introduce partner organizations to the new features and functionality and to remind partners of the value of the MnWRL and to encourage expanded usage of the library.

MN Agricultural Water Quality Certification Program

- Have practices been evaluated to determine impact to surface and groundwater?

In the most literal sense of the question, that has not been done on all acres certified through the MAWQCP. All practices' effectiveness have been evaluated, the same as all practice standards and metrics are maintained the same as all NRCS/SWCD/BWSR etc. practices (they are the same thing), and of course MPCA records the official water quality data for Minnesota. Still, recognizing our responsibility to effect water quality improvement, we are presently contracting with the University of Minnesota Super Computing Institute to develop means for quantifying the proximate impact of individual practice and management changes on receiving waters, surface and/or ground. Other than expensive and labor-intensive in-field/edge-of-field/in-stream monitors, the MAWQCP--in fulfilling our CWF responsibility to quantify outcomes--records the calculated impact of all practice and management changes per below (and conducted precisely the same as all other CWF implementation projects). Additionally, while limited in number, there are MAWQCP-certified farms with water quality monitoring in place, in particular certified farms participating in Discovery Farms and designated research sites, including the Root River Field to Stream project. Finally, with the GIS mapping of all new MAWQCP-instigated implementation activities (along with many/most pre-existing practices), coupled with the longer term 10-year (and potentially 20+ year) participation, we maintain a constantly updated data set of physical sites that are available for any applicable metrics or calculations that can be applied.

MAWQCP certifications (thru 3-29-24)
1,471 producers certified
1,049,468 acres certified
2,857 new practices, achieving annual outcomes (thru 3-8-24) of:
47,835 tons of sediment prevented per year
142,806 tons of soil saved per year

59,691 lbs of Phosphorous loss prevented per year, and
Nutrient management resulting in 45% reduction in Nitrogen loss
51,939 C02-equivalent metric tons of GHG emissions reduced per year
…and 25% higher profits than non-MAWQCP certified farms (Minnesota State Colleges)

- **Could you clarify what a "whole-farm" assessment means? This program means that farmers have to excel in ALL parts of a farm's operation to get certified, and that those achievements are better than most conventional practices, right? We need to stress how certification tells us that a farm is performing higher than their neighbors and if everyone did it, we would know that we're doing just about everything we can.**

Yes. Whole-farm risk assessment process on all acres, rented or owned, under all cropping and production scenarios on the farm, means physical and management challenges are addressed as and where they exist. Mitigating present issues employs conservation practices, but starts with the issue that exists, not with a promoted practice. The one-to-one and 10-year nature of MAWQCP further enables and ensures risk remains mitigated and any evolving challenges are treated.

- **What do you need to provide outreach to renters? We are leaving half the crop acres on the table without having a way to reach them systematically.**

All land rented or owned in a farming operation must be certified. When we certify farms, we certify renters: a majority of certified farms have rented land. In particular, we are especially interested in reaching landlords because MAWQCP provides "conservation leases" that ensure stewardship and resiliency in their heritage (or investment) farmland, and can literally be incorporated as appendices to lease documents. We've partnered with organizations across the spectrum, from Women, Food and Ag Network to pursuing efforts to work with land management firms (albeit, still seeking success there).

- **Can you do a drainage endorsement or do you have enough standards already in the program? I'm thinking side inlets, controlled tile drainage, etc.**

A drainage endorsement has been the subject of MAWQCP planning, most specifically as recorded in the Minnesota Environmental Quality Board (EQB) State Water Plan. The endorsement has not been created, but, to the question, there is "space" between risk-mitigation relative to presence of drainage that must occur to earn MAWQCP-certification, and advanced management and practices that could be components of an endorsement. For instance, water retention and re-use systems, subsurface irrigation, controlled drainage systems with added redundancy or "back-up" for system bypass conditions, etc. We are absolutely not opposed to a drainage endorsement, to date there has been some challenge in successfully obtaining stakeholder participation in the effort to create an "endorsed" endorsement. [NOTE: the MAWQCP endorsements have all been created through an expert panel of stakeholder organizations and entities; for instance, the Wildlife endorsement was developed through a consensus process of a working group made up of representatives of species organizations, habit/conservation NGOs, pollinator advocates, local conservation districts, fish and game agencies, etc.)

- **Starting year was 2014. With the 10-year contracts, what % of the contracts have stayed intact? Is there a penalty for severing the contract?**

There is no penalty for severing the contract, except and appropriately in the case of public financial assistance being provided and the activity supported by the project was not undertaken, completed, or

maintained in accordance with the agreement. In such a case funds must be returned (the MAWQCP certification contract provides specific terms and legal actions to fulfill this requirement). Our first certification was in June of 2014, so no recertifications have yet occurred, but our area certification specialists are naturally actively communicating and working with concluding certifications in their regions. No certified farms have yet reported that they will not seek re-certification. [NOTE: re-certification will occur under current assessment process and values. We have always committed to improve and refine processes to better access and mitigate agricultural risk. In short, in select aspects, re-certification will be more rigorous than the original].

Irrigation Water Quality Protection

- **Would be interesting to compare "trained irrigator" water use vs "untrained" to determine water use efficiency through program**.

Advanced (trained irrigator) compared to standard (untrained irrigator):

- In an on-farm study by the U of M in Stearns County in 2021 and 2022 technologically advanced, variable rate irrigation was compared to standard irrigation practices. The advanced method reduced water use by 35% while yield was reduced 3% compared to the standard method. The economic return per acre was nearly identical between advanced and standard. The $100,000 capital expenditure for the advanced technology is not included in the economic analysis (Sharma and Herbert, 2023).

- **This idea also makes sense, but can we see or estimate outcomes?**

Good irrigation scheduling helps save water:

- A three year-study (2016-2018) at Westport, MN found that it is economically feasible to reduce irrigation application rates up to 25% (average across years =15%) with good irrigation scheduling (Dr. Sharma, presentation at the 2024 Minnesota Irrigator Program).
- A three-year (2019-2021) study for corn at Becker and Westport, MN showed a water saving between 3 and 9% without impacting yield. In a more aggressive use of an irrigation scheduler, that same study found a reduction in water use of 51%, a reduction in nitrate leaching losses of 62%, but also a yield loss between 0.5 and 30%. The researchers are currently refining the latter scheduler (Singh et al. 2023).
- A 2022 study from Nebraska showed a savings in water applied to the crop between 8 and 25% without impacting corn yield when using a weather station-based irrigation scheduling system (the Nebraska scheduler and its use of weather data is very similar to the U of M IMA scheduler) (Mohammad et al., 2023).

- **Are Federal funds available and have they been pursued:**

Federal funds for implementing irrigation scheduling and irrigation water management practices are available. MDA is leading a USDA NRCS-funded Regional Conservation Partnership Program (RCPP) to implement irrigation water management practices.

The program received $3,510,000 from the NRCS. MDA leveraged $1,200,000 Clean Water Fund dollars for this funding.

- The project is an MDA-led partnership with 33 partners, including 20 Soil and Water Conservation Districts.
- The project area is 19 counties in central and eastern Minnesota.
- The objectives are to:
    - Provide cost share to irrigators for irrigation conservation practices,
    - Train SWCD and NRCS technical staff in new irrigation practices and technology, and certifying irrigation practices,
    - Outreach, field days and FFA workshops related to irrigation.
- MDA is leading a second (2024) USDA NRCS-funded Regional Conservation Partnership Program to implement irrigation water management practices. The MDA is working with partners and anticipates submitting a $7M grant proposal.

- **How are water savings being tracked?**

For individual studies:

- Water savings information is often based on university research, in some cases from university field trials, and in other situations on-farm research. Water savings are tracked based on flow meters and infield catch cans.
- Individual irrigation wells do not typically have flow meters installed. Water use is often estimated based on power consumption or pump run-time. A study by the DNR in Little Rock Creek has shown these methods may overestimate pumping 10-12% (this is DNR's study, so they may want to provide details). We are seeing irrigators are increasingly using clamp-on flow meters to confirm flow rates for better scheduling, irrigation management practices and water use reporting.

For state-wide tracking

- This is probably a question for the DNR.
- As part of the Irrigation RCPP we are working on quantifying the environmental, economic and social outcomes of implementing conservation irrigation practices, but information is not available yet.

- **Can "replenishment" be tracked similar to what private industry does for water quantity conservation?**

For local or on-farm water management:

- The replenishment of soil water can be tracked using soil moisture sensors.
- Soil moisture sensors are installed as part of the ag weather station network expansion. Soil moisture level trends will be posted on the weather network website. Information from the weather station network will also be utilized by e.g., the US drought monitor.
- Soil moisture sensors are also used by individual irrigators to track soil water replenishment.
- There are several manufacturers of soil moisture sensors, and several systems are marketed to irrigators.
- Soil moisture sensors are typically available with an app where soil water content information is available.
- The cost is typically $2,000 - $6,000 per field per year.

For statewide recharge of groundwater:

- The DNR is tracking that through their observation well and they can speak to that.

Forever Green Agricultural Initiative (U of MN)

- **Benefits from this program are likely to happen after 2034 on a large scale. Should we expect any measurable results on water quality or groundwater quality before 2034 when the Legacy Amendment expires? Should we expect some crops to succeed wildly and some to fail to meet expectations? (I'm OK with that, I just want to be clear about the risks and benefits.)**

While it is true that the water quality benefits of Forever Green crops are likely to be greater in the future, when farmer adoption increases, there is a lot of potential to make significant impacts before 2034.

First, targeted plantings can provide substantial benefits on a short timescale. For example, after 40 acres of Kernza perennial grain were planted in the wellhead protection area in Edgerton, MN, the Edgerton water treatment plant observed a meaningful reduction in nitrate concentration. Likewise, the effort in Hastings, MN to transition ~80 acres of land that previously grew corn and soybeans into a perennial mix of alfalfa and Kernza is likely to reduce nitrate loading in the Hastings water treatment plant, since there is only a ~1 year transit time for nitrate leaching out of that field. Through the EECO Program, Forever Green is working to target plantings in DWSMAs and other vulnerable areas, where a modest number of acres can make a real difference.

Second, the winter oilseed crops, winter camelina and pennycress, are likely to rapidly scale up before 2034. These crops have been shown to reduce spring nitrate leaching by 80-90% when grown between wheat or corn silage and a subsequent, relay-planted soybean crop. Interest in these crops has increased as private- and public-sector actors aggressively pursue low-carbon alternative fuels that provide additional sustainability benefits. This year, over 2,000 acres of winter camelina were grown in the region as part of a partnership between Forever Green and Cargill, Inc. It is likely that the acreage of winter camelina will increase substantially this fall. Cargill has also invested $2,500,000 in Forever Green's research into the winter oilseeds, signaling their strong interest and providing robust private sector match to Clean Water Fund dollars.

The recently released report titled Putting Down Roots (https://fmr.org/CLC-Report) estimates the potential water quality benefits of various scenarios of adoption of Forever Green crops.

Pesticide Testing in Private Wells

- **Why not have pesticide manufacturers and retailers pay for this?**

The MDA collects fees on pesticide sales that are used to fund the majority of the regulatory and ambient groundwater and surface water monitoring programs. The MDA also receives funding from US EPA for pesticide programs including monitoring. The Clean Water Funds are supplemental and allow MDA to conduct additional work on pesticides. As a result, the MDA currently has one of the most comprehensive pesticide monitoring programs in the country.

- **Are you looking at combination of pesticides in private wells? As producers change products, each compound may have a low concentration, but cumulatively may be problematic.**

Phase 1 of the Private Well Pesticide Sampling Project (2016-2020) included analysis of over 125 different pesticide chemicals from approximately 5,700 wells in 50 counties in vulnerable geologic areas. Data collected from Phase 1 was submitted to the MDH for cumulative risk assessment evaluation. Results from Phase 1 indicated that the degradates of the legacy herbicide cyanazine, represented the greatest risk to drinking water. To reduce laboratory costs, Phase 2 of the project is focused specifically on cyanazine, atrazine and their degradates. The MDA continues to work with the MDH risk assessors for pesticide cumulative risk assessment review.

- **Would it make sense to expand testing to include all households receiving N tests to get pesticide testing?**

The MDA does sample for nitrate in private wells targeted for pesticide sampling. However, because of the relatively high cost of pesticide analysis (currently $250/sample vs. $20 for nitrate), the MDA attempts to target wells that are believed to be at highest risk for elevated pesticide presence. Targeting will typically be based on previous results (elevated nitrate/pesticides), proximity to nearby wells with elevated pesticide levels, and wells in a particular geologic setting or aquifer.

- **Are federal funds available and have they been pursued?**

The MDA has secured supplemental funding for this project from EPA in the past. Two different EPA multipurpose grants were obtained in 2020 and 2022. The EPA funds were used to analyze samples from additional wells that fell outside the scope of the previous CWF appropriation language.

Conservation Equipment Assistance

1. Sounded like funds from this program can be used for equipment that is used “for hire” by owner. Is using public funds for equipment to develop a private business “ethical”?
2. Do all transaction meet the “but for” test? Meaning, but for the Clean Water Fund grant, farmers would not have done the BMP?
3. Will you go back to grant recipients after 2-3 years (like MAWQCP) to see if they are still using the equipment? Are there requirements in a contract for this, such as if they aren’t using it after a while they have to give it back?
4. What situations exist where AgBMP loans don’t work and someone needs a grant?

Expand MN Ag Weather Station Network

- **What other funding sources are available or could be used for this?**

The MDA has utilized funds from the Pesticide Regulatory Account to support staff working on the Minnesota Ag Weather Network (MAWN).

Once the network is operating, MAWN may seek funding from the National Mesonet Program. Funding from the National Mesonet Program can assist with ongoing operations and maintenance costs once the weather network data is available to be ingested into the National Mesonet.

- **How will water quality and quantity effectiveness be determined?**

The University of Minnesota has shown significant reductions in total water use, and nutrient efficiency when proper irrigation scheduling is used. MAWN will also provide much greater coverage and spatial resolution for 6” soil temperature values which are important for fertilizer and manure application timing

to protect groundwater. The MDA is still evaluating the best parameters to use to determine the effectiveness of the MAWN at protecting groundwater and surface water resources.

- **Is there a need for a user survey to determine application and effectiveness?**

User surveys are one of the options MDA is considering to measure the use and value of the MAWN data for agricultural producers, watershed managers, and researchers. The surveys could determine which data and tools are being used, and how the data influences producer's agronomic decisions related to water quality/quantity protection.

- **How are you tracking users?**

The MAWN is working closely with the North Dakota Agricultural Weather Network (NDAWN). NDAWN is able to track website traffic data on their main webpage and have had more than 1,000,000 visits in a given year. The growing season months (May, June, July and August) are the busiest. NDAWN stated traffic volume is under-estimated as visits on Apple devices are not able to be tracked with Google Analytics. We plan to have similar analytics available.

There is an opportunity to have users sign up for periodic weather summaries from each individual station that would be sent via email. This population could also be surveyed on the data use and value.

- **How many and what sector do they represent**?

Since MAWN is still being developed we don't have data on this yet. We anticipate many groups beyond agricultural producers will benefit from the collection of this data including, for flood damage reduction, emergency preparedness, emergency and disaster response and relief. Other uses include:

- MAWN will be installing weather and soil monitoring equipment in rural areas of Minnesota that are underrepresented and under served with current data collection methods.
- The data will be used for improving weather forecasts, issuing severe weather and flood alerts as well as improved inversion period prediction for pesticide application and improved runoff risk advisory forecasts.
- The better resolution on climate data will also be used by researchers and modelers to better estimate and predict environmental conditions associated groundwater leaching and runoff for improved water planning, protection and management.

- **How is data being used?**

The goal of the Minnesota Ag Weather Network is to provide reliable, real-time local weather information and tools to agricultural producers to inform agronomic decision making and minimize the agricultural impacts to water resources. The weather data, associated tools and forecasts are used to guide decisions related to managing fertilizer inputs, water usage, application of pesticides and manure and will provide data to support precision agriculture technologies and best management practices. This optimization of agronomic decisions protects surface water by preventing or reducing off-site movement of pesticides that can drift to nearby surface water, preventing loss of manure and crop chemicals in runoff to surface water, minimizing leaching of nitrate, manure, and crop chemicals to groundwater, and maximizing irrigation water usage efficiency. Current and historical weather and soil data are also used for estimating drought progression, flood risk, runoff risk, mapping localized weather conditions and input into various computer modeling efforts used in water resource management and planning.

- **How will you evaluate effectiveness for water resource management?**

Discussed above.

- **Are there other funding sources like ag general fund?**

The general fund is a possible option for supporting this work, however, the uncertainties between biennial appropriations is a concern for maintaining and operating a consistent network.

- **Has a reduction in irrigation water been realized with use of the network?**

We anticipate as the network comes online there will be a reduction in water use and associated leaching. The University of Minnesota has shown significant reductions in total water use, and nutrient efficiency when proper irrigation scheduling is used (see examples provided under "Irrigation Water Quality Protection" above). The U of M should be able to provide the number of acres where the irrigation scheduler has been implemented or is being used.

- **This idea makes sense, but we know the cost-effectiveness, e.g., $$ per pound of reduced N, P, pesticides, etc.**

We anticipate the MAWN will provide important data to assist producers with making agronomic decisions on millions of acres of cropland. While it is not possible to provide a cost per unit value, we are confident producers will be able to be more efficient with fertilizer, pesticides, and water inputs using this data. Estimates from North Dakota put the value of their Ag Weather Network (NDAWN) at more than $100 million per year. This amount is based on increased timeliness of crop inputs, planting and harvest, runoff forecasting, and also public planning of water resources and water management.

- **How many fiscal years would you be asking for CWFs?**

Expansion of the MAWN will occur FY24/25 and FY26/27 and there is a significant, upfront capital investment costs for equipment and supplies. The MDA will seek additional funds for the operation of the network in the future, however, it will be much less than the start-up costs.

- **Is this bondable?**

Possibly, the MDA did not pursue bonding for the development of the MAWN.

- **Are federal funds available and have they been pursued?**

The MAWN may seek funding from the National Mesonet Program once the weather network expansion is well under way. Funding from the National Mesonet Program can assist with ongoing operations and maintenance costs once the weather network data is available to be ingested into the National Mesonet.

Agricultural Research/Evaluation

Minnesota Pollution Control Agency

River and Lake Monitoring and Assessment

How much of program is dedicated to informing local water plan implementation?

- All, we measure waterbody condition and change. Without that information we would not know where to go or whether implementation has been effective.

Another heavy lift for CWFs

- Monitoring needs were among the major reasons for creating the CWF since no other source could fund it. Monitoring and assessment is just a sliver of the CWF, for FY24/25 we comprised 5.7% of the CWF at $18.1M, down from 9.6% in FY10/11 ($15M).

How much of a change in W.S. load is detectable over how long of a time period for your network to measure?

- Our oldest sites have been running since 2007. Most of our major/basin sites were operational by 2012. Most of our subwatershed sites were going by 2015 or 2016. Year to year changes to load are very detectable. We get a discrete value every year so we can track those year-to-year changes quite closely.
- Load trends are difficult to track because they are a yearly statistic, and when you have a dataset of at most 16 data point (years) it's hard to do any actual statistics on them. It is possible to model some load trends with the Weighted Regressions on Time, Discharge, and Season (WRTDS) model though, and we will be doing that for the monitoring site on the Mississippi River at Winona this summer. MPCA's Dave Wall is also working on a multi-agency statewide load summary for the Nutrient Reduction Strategy, of which the Winona analysis will be a part. A handful of our older sites have enough data to run WRTDS on, and that's something we are hoping to explore this fall.
- Watershed Pollutant Load Monitoring Network (WPLMN) Data Viewer | Tableau Public – On this viewer you can see flow weighted mean concentration, mass, and yield.
- Long-term Stream Trends | Tableau Public - On this viewer you can see where trends have increased or decreased concentrations.

- **Let us know about your interaction with the tribes.**

Our goal is to work with Tribal Nations to the extent they are amenable to monitor, assess, and produce Watershed Restoration and Protection Strategies (WRAPS) for waters that are within, or partially within, the boundaries of Tribal Nations. Several Tribal Nations have received EPA delegated authority of Treatment as a State (TAS) to establish WQS under CWA 303(c). These include:

- Fond du Lac Band of Lake Superior Chippewa,
- Grand Portage Band of Lake Superior Chippewa,
- Leech Lake Band of Ojibwe, and
- Red Lake Band of Chippewa.

The following Tribal Nations have environmental departments that are fully capable of conducting their own independent monitoring and assessment work and may be in process of seeking TAS:

- Lower Sioux Indian Community,
- White Earth Nation,
- Shakopee Mdewakanton Sioux Community,
- Mille Lacs Band of Ojibwe,
- Minnesota Chippewa Tribe,
- Upper Sioux Community,

- Prairie Island Indian Community, and
- Bois Forte Band of Chippewa.

The MPCA asks if collaboration on monitoring, assessment, and/or Watershed Restoration and Protection Strategies (WRAPS) is desired by each Tribal Nation as we are planning to enter individual watersheds to do this work. MPCA wishes to be a partner learning and collaborating in protecting and restoring surface waters.

Highlights of collaboration:

- Red Lake Band of Chippewa
  - On-going partnerships with Red Lake Nation's Water Resources Program. For many years we have partnered on nutrient and algal monitoring on Lake of the Woods, including a special project this year with Red Lake, MPCA, and the Science Museum, funded by EPA Region 5's Tribal programs.
  - Draft Site-Specific Nutrient standards for Upper and Lower Red Lake is another ongoing partnership between the 3 Organizations – we are awaiting publication of a paper on the project before proceeding to the next steps in the Site-Specific Standards process; this is led by Red Lake (Shane and Kayla Bowe).
- Leech Lake Band of Ojibwe
  - Collaboration on Joint Powers Agreement with Clean Water Funds to monitor water quality. This JPA gave Leech Lake ownership of the water quality data collected within the reservation.
- Prairie Island Indian Community
  - We are working to collect fish for analysis of PFAS in the lower Vermillion River when spawning is over in the early summer 2024. We are working with Prairie Island to identify key locations, species, and whether whole fish or fillet will be analyzed.

- **We have a world-class monitoring network, but we could always use more data. How do you decide what monitoring is cost-effective and what brings diminishing returns? Have you changed methods because something wasn't worth doing for the money or because you found a better way to do it? Just thinking about continuous improvement as we approach 2034.**

We are continuously looking for ways to improve, streamline, and save resources. Here are some of the changes that have been made.

- We have dropped parameters or monitoring that were once collected at the start of the intensive watershed monitoring sticking to those that are assessed primarily, long-term needs, or standard development.
  - no longer collect total suspended volatile solids (TSVS) at any of Watershed Pollutant Load (WPLMN) sites or watershed chemistry sites,
  - no longer collect turbidity measurements,
  - no longer collect Dissolved Organic Phosphorus (DOP) at subwatershed Watershed Pollutant Load sites,
  - reduced our chloride monitoring in lakes to just once a year vs every month,
  - no longer collect stream flow measurements at watershed biological stations,

        - no longer collect quantitative habitat at watershed biological stations,
        - no longer collect Biological Oxygen Demand (BOD) in Large River monitoring,
        - no longer collect parameters of ammonia, calcium, hardness, magnesium, sulfate, organic carbon, and chloride at WPLMN sites,
        - reduced the number of sentinel lakes for chemistry monitoring.
    - We now conduct one year of lake monitoring and then decide whether a second year is warranted for full assessment purposes, rather than automatically doing a second year.
    - After the first ten year cycle the MPCA reduced the number of monitoring sites by a third, and then uses the savings to monitor things at the request of partners to see if restoration efforts are working. The requests out pace the resources to monitor.
    - We are looking into sample counts to see if we can reduce in any capacity and still have statistically significant results.
    - We have moved primarily from paper data collection to electronic data capture. Annually, this saves approximately 1100 hours of manual data entry and QAQC of the manual data entry in the biological monitoring alone. Additionally, it reduced nearly 8,000 pieces of paper, allowed staff to be more efficient and update tracking of sites in "real-time".
    - The MPCA continues to operate the volunteer water monitoring program (VWMP) and added online data entry and enrollment in 2020 thus saving staff resources of entering that information.
    - We have also recently split the water quality unit that was in St. Paul and had statewide responsibilities, to locations in Brainerd and St. Paul to reduce travel time.
    - We have changed watershed reporting and are working to be adaptive to the needs of the consumers of the information. A new web tool was released early 2021 to allow for local access to assessment decisions, documentation, prioritization, and other water related data (Water Quality Assessment Results Data Viewer | Tableau Public).
    - We offer monitoring contracts to local partners to build capacity locally. This is also advantageous because it reduces travel time.
- **Are federal funds available and have they been pursued?**

  Yes, we utilize EPA grant Clean Water Act Section 106 funds and Clean Water Act Section 604(b) funds. And only the CWF could support the comprehensive watershed approach and the federal money complements it.

    - 106 funds are used generally for probabilistic condition monitoring.
        - NLA MPCA National Lake Assessment Tableau Data Viewer | Tableau Public
        - Depressional Wetland Condition Assessment and Minnesota Wetland Condition Assessment Wetland monitoring | Minnesota Pollution Control Agency (state.mn.us)
        - Minnesota Probabilistic Stream Survey Minnesota Probabilistic Stream Survey | Tableau Public
        - Funds have also been used to further statewide information on sulfate and dissolved organic carbon.
            - During 4 years of monitoring work, Minnesota field crews successfully completed ambient sulfate monitoring at 150 sites using Section 106 funding. Nearly 900 sulfate samples were submitted for analysis over the 4 years, including more than 300 samples from 60 sites in 2023.

- Dissolved Organic Carbon (DOC) is increasingly a needed parameter for equation-based standards. Minnesota currently has limited DOC data form its streams. MPCA is planning to initiate DOC sampling across Minnesota streams to support standards development and implementation for metals.

- CWA Section 604(b) funds are provided to states for water quality management planning. MPCA has utilized funds for volunteer water monitoring coordination, water quality data management, technical coordination, and research, and longitudinal PFAS monitoring along the Mississippi River.
  - Volunteer Water Monitoring coordination. This grant supports a Volunteer Water Monitoring Program Coordinator at the MPCA. This position is responsible for recruiting and maintaining a statewide network of 1,000+ volunteer water monitors. Volunteers collect transparency readings, rate visible algae levels/water clarity, and recreational suitability levels of waters across Minnesota. Advanced volunteers collect water chemistry samples and measure temperature and dissolved oxygen levels on a small subset of lakes. Data collected by volunteers is utilized by MPCA to determine the recreational use and support for aquatic life and recreation within lakes and streams in Minnesota. For some lakes and streams, data collected by volunteers are the only data available, making this work indispensable.
  - Water quality data management. This grant supports one staff position responsible for managing the Minnesota Pollution Control Agency (MPCA) Minnesota's Environmental Quality Information System (EQuIS™), developed by EarthSoft, Inc., to manage water quality data collected on Minnesota streams, lakes, wells, and remediation sites (e.g., closed landfills). Data stored within EQuIS is available to the public through the MPCA Environmental Data Access website.
  - Technical coordination and research. Finally, this grant supports a portion of an MPCA Technical Coordinator. This position provides support for the State of Minnesota's Impaired waters list and Statewide Mercury TMDL. This position also serves as the technical/research assistant for water quality rule review, adoption and implementation, and research publications and updates the web in support of Agency reports, other Agency activities and required submissions to EPA.
  - Longitudinal PFAS monitoring along the Mississippi River for reaches located within MN State boundaries or along MN's borders (Lake Itasca to Iowa border). Sampling efforts are beginning in 2024 and will include quality assurance controls and standard operating procedures for sample collection and data analysis. Sampling efforts are scheduled to begin in the spring of 2024.

- We applied for an EPA Exchange Network grant application with an estimated completion date of 07/01/2026 if approved by EPA. Our first goal proposes to adapt an existing Lake Observer mobile application for use by the MPCA's Volunteer Water Monitoring Program (VWMP). The VWMP is a robust program of volunteers that gather critically important water clarity data on Minnesota waterbodies. For some bodies of water, volunteer monitoring provides the only data available to the MPCA and citizens of Minnesota, making this work indispensable. During the summer, volunteers measure water clarity using a Secchi disk or tube at designated locations on lakes or streams. At each site, they record their reading and observations on physical and recreational conditions of the water body. They submit the information at the end of each monitoring season, which we believe the mobile application

will allow more immediate reporting and thus, data available sooner. Anyone can do it — no prior experience is needed. MPCA uses volunteer-collected data to make decisions on watershed protection and restoration. By expanding the ease of reporting data through a mobile application, the MPCA anticipates new growth of its volunteer monitoring program from the current 1145 to well over 1500.

- Our second proposed goal will redesign and combine the MPCA's three existing and outdated surface WQ information web services into one service. By combining services, we will create a centralized and robust nexus for stakeholder use. The modernized version of the web service will provide real-time data and information regarding surface water quality from multiple sources for public use via the MPCA website.

Watershed Restoration & Protection Strategies (includes TMDL development)

- **Is civic engagement a component of WRAPS?**

It is a component of the WRAPS and WRAPS Update process but it has been scaled back. Our initial WRAPS entailed more civic engagement, but we heard from our LGU partners through WRAPS annual surveys that the amount of civic engagement didn't need to be as large as we initially had done. The approach for WRAPS Updates is to tailor efforts, including civic engagement, to the specific needs of each watershed.

Beyond individual watershed efforts, we are supporting LGUs in their civic engagement efforts as they continue to get more into their 1W1P. One great example of this was two workshops we sponsored last fall with BWSR on how to get more public participation. This was asked for by LGUs, for LGUs to connect and learn from each other. This effort was successful, and we are looking to do something similar later this year in different locations to engage more local partners.

We Are Water CWF all comes from the WRAPS budget, and is the premier statewide civic engagement effort of the CWF.

WRAPS funds were also used to support the "Keep It Clean" initiative to address the issue of water pollution from ice fishing waste.

- **How many TMDLs need to be completed statewide, and what is the approximate cost to complete?**

There are 2,942 impairments that currently need a TMDL. Please note, this number is impaired WIDs, not necessarily entire waterbodies. Some WIDs have more than one impairment so the overall number of WIDs with one or more impairments is 2,072. This information is all linked at this website: https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list

EPA Category 5 on the impaired waters list means that there is an impairment and a TMDL is still needed.

MPCA commits to having 107 TMDLs (WIDs, not reports) either in progress or EPA-approved by 9/30/2026. This list includes 73 mercury TMDLs, and the remaining are nutrients, E. coli, TSS, or chloride. This is the minimum number of TMDLs that MPCA expects to be working on in this period, MPCA expects to complete additional TMDLs for impairments on the impaired waters list as part of our ongoing Watershed Approach.

Here is the FY25-26 TMDL commitment list: Minnesota's TMDL Commitment List FY25–26, available from our TMDL and WRAPS guidance webpage.

Over the last two fiscal years (FY23-FY24) MPCA has spent about 400k-500k on contracted TMDL work. We also have the costs of three full time TMDL writers on staff. For the foreseeable future, we think this dollar amount will continue.

- **Are 1W1Ps evaluated for use of the WRAPS and are results reported?**

MPCA Project Managers (PMs) are involved throughout the 1W1P process and represent MPCA's perspective and WRAPS info/priorities. At the time the 1W1P goes through interagency review, PMs ensure that the plans are consistent with the WRAPS, and if they find inconsistencies, they comment in the MPCA letter that goes back to the local partners. If there are still inconsistencies, we will point them out in our final letter with the understanding that it is a local plan and we do not have authority over what is in it. We feel that results at least in a qualifiable way are documented through our agency letters.

From 2019-2022, the MPCA surveyed 142 partners in 24 Comprehensive Watershed Management Plans (1W1Ps) approved during that four-year period. The purpose of the survey was to understand: 1) if the water quality goals and priorities of the Plans were consistent with the WRAPS to address water quality concerns in their watersheds, and 2) how useful did local partners find the specific products of the WRAPS process to inform their local planning efforts.

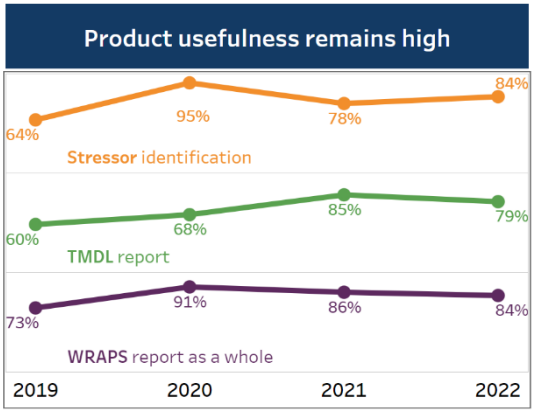
Here is a summary of survey results from 2019-2022 for approved 1W1Ps:

*Consistency with the WRAPS – An average of 91% of local partners over the four surveys agreed that 1W1P's water-quality elements were consistent with the WRAPS on addressing water quality concerns in their watersheds, and in informing the goals and priorities of their plans.

*Product Usefulness – The individual products of the WRAPS process had a range of usefulness, but overall scores grew with each survey and remained high as 1W1Ps and WRAPS got more in sync over the four-year survey period.

Here are the average scores for key products of the WRAPS process for responses to the question, "How useful were the products of the WRAPS process in guiding the development of the (Local Water) Plan?"

- WRAPS report as a whole: 84% agreed
- TMDLs: 73% agreed
- Stressor Identification: 80% agreed
- Monitoring and assessment: 83% agreed



Survey results from 2019-2022 have shown that the products of the WRAPS process, including these three key reports, have received high scores for their usefulness in 1W1P development.

In addition, MPCA staff are active participants in 1W1P advisory groups, sharing information about WRAPS and WRAPS Update products with local partners throughout the plan development process. This involvement helps align 1W1Ps with WRAPS to facilitate better consistency between these two efforts.

- **Will there be a delisting summary for streams like was done for lakes?**

The MPCA does not have anything specific like this in the works at this time.

- **Can the heat map for implementation be updated more frequently, and if so, how frequently?**

The heat map was a product made specifically for the Mississippi River – St. Cloud WRAPS Update. It could be updated more frequently (we would need to decide how frequently – perhaps yearly), though it would take some effort on behalf of our GIS staff and Healthier Watersheds webpage staff. We are certain it could be done if needed and asked for by local partners.

Big picture, if the CWC wanted this done statewide, it would take significant effort. This project compared strategies in the Cycle 1 Mississippi River - St. Cloud WRAPS strategy tables to the strategies implemented in the Healthier Watersheds dataset. The Healthier Watersheds dataset shows the strategies implemented in each subwatershed but does not show whether those strategies were recommended in the Cycle 1 WRAPS tables. To do a heatmap project like this statewide, we would first need to gather the information from all the strategy tables in each WRAPS report and put it in one location. This would be quite the effort because not all the strategy tables include the same information (ex. the earlier WRAPS tables differ from the more recent ones). It is something that our group can consider and are talking about now. If we were able to get all the strategies in one location, then we could probably develop something like this statewide. We would want to connect with BWSR on this as well as they are implementation leads.

Here is a summary of the heatmap development directly from the Mississippi River St. Cloud WRAPS Update - (Pages 82-84:) https://www.pca.state.mn.us/sites/default/files/wq-ws4-99a.pdf

- **Will WRAPS cycle 2 have a ten-year timeline like cycle 1, or will it go faster the second time around? Or is cycle 2 including things that weren't in cycle 1 and therefore adds even more value?**

While Monitoring and Assessment is on a fixed 10-year cycle, WRAPS Updates are not. In fact, BWSR and LGUs asked for flexibility on the timing of updates depending on where the LGUs are at in their

planning/implementation work, so some will be slower to be produced intentionally. We have a soft self-imposed goal (not statutory deadline) that is also in the CWC Strategic Plan, to address WRAPS Updates for all 80 watersheds by the end of the CWF term. Updates are more targeted at more specific local needs, rather than the standard watershed-wide baseline deliverable of the first round, so are bringing a different kind of value. Also, they get at describing change in water quality over time and effectiveness of BMPs where possible.

Groundwater Monitoring and Assessment

NPDES wastewater/stormwater point-source implementation

The work performed under this program is unique as it creates a bridge between point source regulatory work and nonpoint source programs and supplements the work that those programs are individually able to perform. The states historic investment through the Clean Water Legacy Fund in water quality efforts has enhanced the level of watershed based work completed, such as TMDLs and WRAPS. This has resulted in an increased amount of wasteload allocations and other pollutant reduction requirements for wastewater treatment plants and municipal stormwater systems. This funding has been critical in meeting the increase in pollutant reduction implementation and has resulted in huge phosphorus reductions, nitrogen reduction planning, water quality trading guidance and projects. Continued support for the program allows for additional pollutant reductions in statewide surface waters in a more timely manner than would otherwise be possible.

- **How do we do more credit trading programs?**

This program is essential to growing water quality trading in the state.

Water quality trading is complex and technical and, as a result, it is critical to have specialized staff coordinating this work. The work funded by this program, and in particular, the Water Quality Trading Coordinator connects those with the opportunity to generate credits with those who need credits and help them through the process.

Having positions dedicated to providing this support to water quality trading projects and the partners is essential for these projects to move forward and be successful. New regulations, especially for expensive or difficult to treat pollutants will increase the need for water quality trading projects.

The Stormwater and Wastewater programs have developed and published a water quality trading framework, which describes the process a trade proposer can follow to have a trade approved. The programs stand ready to assist and evaluate water quality trades, and those proposals need to start at the permittee level, supported by the Wastewater/Stormwater TMDL Implementation program. We also continue to develop tools to accurately credit a variety of practices, which will be useful in implementing a trade. The trading framework can be found here: https://www.pca.state.mn.us/sites/default/files/wq-gen1-15.pdf

- **This program is about breaking down silos between regulated and unregulated contaminant sources so that permittees have accurate effluent/MS4 limits in their permits, right? It's kind of confusing.**

The effluent limits in permits are accurate, but the essential work funded under this program ensures that local partners developing and implementing watershed plans and BMPs to reduce pollutants within a watershed and those implementing point source regulatory programs are coordinated. This is critical

work connects existing programs that don't exist without Clean Water funding. Supporting this program results in creating ways to reduce pollutants to meet our water quality goals by offering more options to reduce pollutants, including options that are more economically feasible, and more engagement and buy-in from stakeholders within a watershed.

Regardless of source of the pollutants within a watershed, there is substantial effort in the actual implementation of these studies and permit limits; selecting the proper approaches, accounting correctly and evaluating progress, developing future projects, and taking sometimes complex scientific studies and helping people meet those goals as efficiently as possible. This is complex work.

Additionally, this work and the associated staff funded by the CWF allows us to provide the assistance needed to coordinate with water quality trading project partners and find ways to make the pollutant reductions needed within a watershed or upstream of an impairment. Nonpoint source pollutant reductions become credits for a regulated WWTP/MS4 to meet a challenging discharge limit. This creates more opportunities for pollutant reductions that can simultaneously be a more cost effective way to meet our water quality goals. The newly hired Water Trading Coordinator will help project partners navigate the process, increase the number of water quality trading projects in Minnesota, and improve our ability to achieve our goals. The work funded by this appropriation also assists non-regulated stormwater practitioners; numerous non-regulated entities have indicated these tools are beneficial to their programs to reduce pollution statewide.

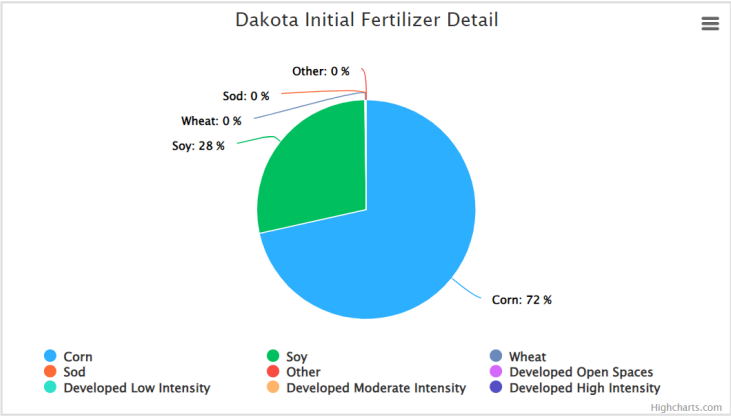
Enhanced County inspections/SSTS corrective actions

1. Is MPCA coordinating with the Voyageurs project?
2. Please talk more about the facilitator for under-sewered communities. How many of the ~860 communities will get in the queue for the next step like the Small Community Wastewater Treatment Program. It seems like we could check off a bunch of these communities for a small amount of facilitator funding.

Chloride Reduction

- **How are chlorides for fertilizer being addressed and is there a need to include chloride with MDA's effort to improve nitrate management?**
    - Fertilizer was only recently known to be a significant source of chloride in Minnesota, so as a whole we are in the "better understanding and creating awareness" phase for this source of chloride. The chloride coming from fertilizer is found in Potash/Potassium fertilizers. Nitrate and chloride behave similarly in water as they are both salts containing a negative charge. Therefor monitoring for both parameters might be efficient if resources are available.
    - In the MPCA's Chloride Management Plan while there were still many unknowns around fertilizer as a source of chloride to MN waters at the time of its development, we took the step to include background information about it as a source, guidance for estimating where the highest amounts of chloride-based fertilizer may be applied and describe the best practices for proper fertilizer use and management. MDA staff provided assistance with this section.
    - In the most recent update (2023) of the MPCA Smart Salting Tool we added a new section to the tool for estimating how much chloride is coming from fertilizer in any given area selected. This is further broken down by specific type of crop/land use to help

the user know where to focus their education and data collection efforts. There is also a section that provides background information, resources, surveys, and tools to help users better understand this source. Then when they select to create a chloride reduction action plan, the tool provides suggested strategies to reduce chloride-based fertilizers. https://smartsaltingtool.com/



Agricultural fertilizer is a large chloride pollution source in Minnesota. Chloride land-applied for agriculture, is likely transported to lakes and streams through runoff and shallow groundwater infiltration. The chloride from potassium chloride, or potash, is a common fertilizer ingredient. Potash applied on turfgrass and ornamental plants also makes its way to surface and groundwater. Chloride concentrations can be very high in animal manure. Surface and groundwater near feedlots, or where manure is applied, may be at risk of chloride pollution.

- We have integrated information about chloride-based fertilizers into the MPCA Smart Salting trainings where appropriate to continue to bring awareness about this as a source of chloride.
- The annual Salt Symposium hosted by Bolton & Menk has recently expanded the topics covered the past 3 years to include presentations about all sources of chloride. MPCA is a sponsor and on the planning committee for this event that has brought in many speakers to share their knowledge and expertise about fertilizer to help us all better understand what we might not know yet and help lay the groundwork for developing solutions together.
- Through the Technical Advisory committee developed for development of the MPCA Smart Salting Tool, fertilizer section, and the expansion of the Salt Symposium the MDA staff have incorporated chloride monitoring into their Discovery Farm program and looked for additional opportunities to better understand the use and movement of chloride-based fertilizers in agricultural landscapes. There are likely additional opportunities that could be explored to consider this component of fertilizer use. This is a good question/suggestion and the Chloride Reduction program staff plan to follow up with MDA staff to set-up period check-ins to create more opportunities for collaboration and learning.

- **Do we have any data estimating a reduction in road salt and softener salt following training program or certification program?**
  - Past participants have demonstrated a 30-70% reduction in de-icing salt use after attending training and implementing strategies. The minimum is for those organization that take the basic steps to improve their effectiveness and reduce salt use. Those who

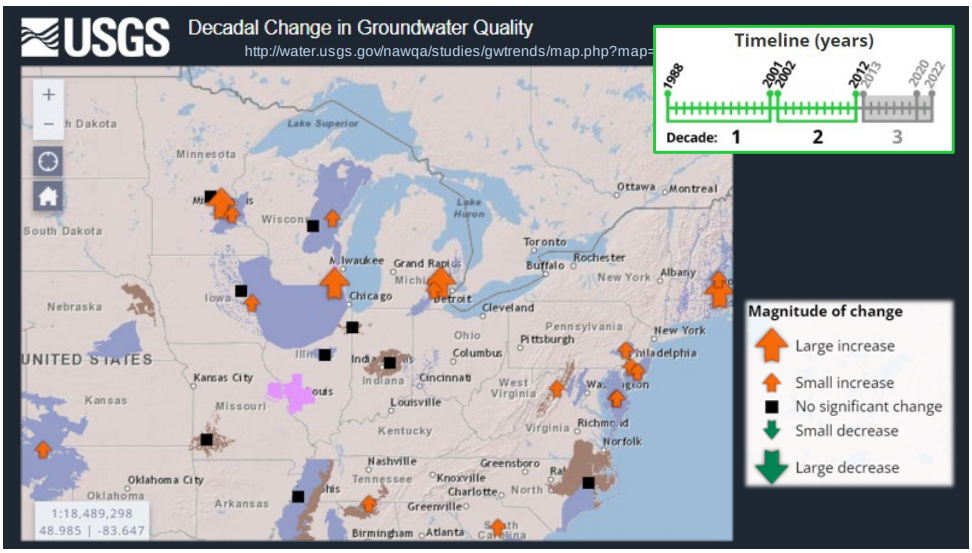
take a more aggressive approach, like implementing a liquids program typically achieve a 60-70% in salt use.

- Not all organizations track and document the changes made to their winter maintenance operations though and if they do track and collect data, sharing this data with the MPCA is voluntary. We are increasing our ability to track reductions with the following tools:
  - We are creating a reporting form, template, and process that we plan to use for emailing participants one year or so afterward training asking for them to share their results with us. This work is being supported by our shared GreenCorps members with the We Are Water program. It will also allow us to create "Success Stories" that will be accessed on the MPCA website in the future as a resource for others and an acknowledgement of the great achievements being made in chloride reduction, as well as a way to highlight how the MPCA's Chloride Reduction program can help organizations.
  - The Smart Salting Tool includes features that allows organizations to track these changes at a very detailed level and also provides an estimate salt reduction and cost savings.
  - Organizations that obtain the Level 2 Smart Salting certification do share their plans for future chloride reduction strategies and the potential salt reduction that can be achieved.
  - The 2020 MS4 permit requires permittees that have a chloride Waste Load Allocation (WLA) in a completed Total Maximum Daily Load (TMDL) study to track their salt use annually. This coupled with the requirement for all MS4s to have their winter maintenance staff be trained annually is starting to result in improved data collection. It is still voluntary to share at this point in time, the MS4 program does plan to request this data in their MS4 report eventually.
- We have a section in the MPCA's Chloride Management Plan that has a relatively exhaustive compilation of organizations that have documented chloride reductions. We have been working to make this more visible on our webpage and will continue the effort to document reductions by certified organizations.
- Smart Salting for Water Softening is still under development so has not been offered yet. However the research done and the data collected so far from the 2 water softening grants awarded by the MPCA's Chloride Reduction program indicate a reduction of 20-90% in salt use when water softeners are optimized properly or modified for maximum salt efficiency, depending on the age, settings, water hardness and the condition of the softener. These grant projects highlighted the limited knowledge and training that is available to water softening professionals and plumbers around reducing chloride discharge from water softeners. This education will provide the first necessary step to reducing chloride from water softening activities. Coupled with a community supported rebate program will provide the best opportunity for significant chloride reduction from this source.

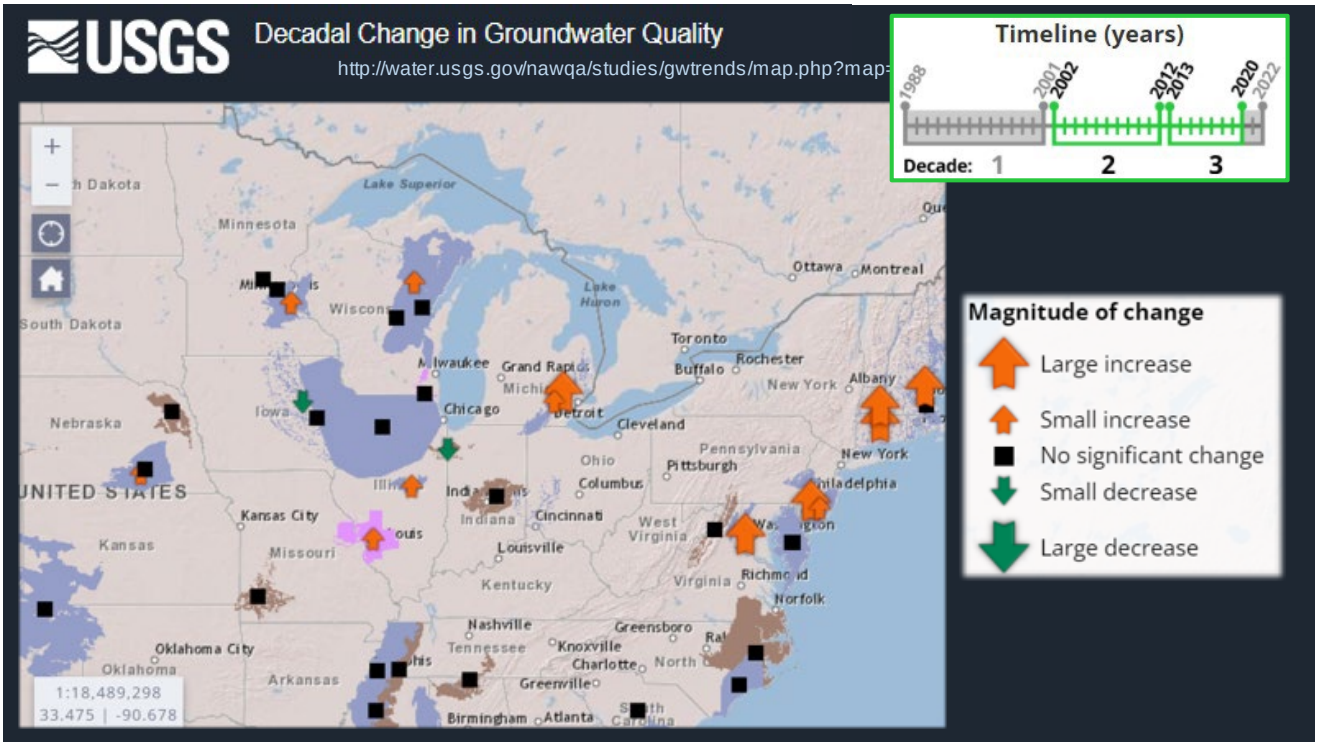
- **This is great, but how will we know that we are succeeding? I'm not even sure how we would measure efforts and their direct impact on specific public waters?**

- The MPCA and the Water Resources Center completed a Knowledge Attitudes Practices (KAP) study in Dakota County in 2011 to determine the effectiveness of the pilot training program that the Smart Salting Training program is modeled after. KAP studies can be used to plan a project, learn more about a specific audience, design educational and outreach strategies, and to identify barriers and constraints. KAP is an applied social science research tool that can also be used to evaluate the impacts of environmental projects on intended audiences. We tracked the effectiveness of Smart Salting training through two winters. Fourteen months after the county's snow plow drivers attended training, the evaluation showed measurable improvements. In the first season after the training, the county used 14,175 tons of salt for 35 snow events (average 405 tons/event). In the next season, the county used 9,585 tons of salt for 27 events (average 355 tons/event). This correlates to about 40 million gallons of freshwater protected from chloride contamination per snow event.
- Tracking salt usage is not always a good indication of changes in salt use due to intentional changes in practices as the amount of salt used is most dependent on winter conditions that can vary dramatically from year to year. For this reason, MPCA worked with EPA to use a performance based approach TMDL versus the traditional percent reduction approach for the TCMA Chloride TMDL. To support this approach and ensure that progress was being made we created the Smart Salting Tool. It was initially designed to help winter maintenance organizations to track the specific BMPs implemented as this is the best measure to demonstrate that the best possible practices are being implemented to reduce salt use and keep paved surfaces safe.
- After every training that we offer we include survey questions as part of the certification test to help us ensure we are meeting the needs of our audiences and that our training is impactful. One question that we ask is “As a result of this training approximately what percentage of the BMPs covered in training will you be able to implement?” Over the past 2 years of collecting this data 80% of participants state they feel they can implement 40% or more of the practices they learned about. And over 90% of participants stated that they will be able to reduce the environmental impacts of their winter maintenance activities as a result of attending this training. We will continue to conduct surveys for our trainings to improve our understanding of its impacts and ensure our program’s success.
- By tracking the progress in implementing BMPs/chloride reduction strategies and the estimated amount of salt that is reduced through these actions we are confident that progress is being made. The more support there is available (this is a primary goal for the chloride reduction program) and incentives to attend training (like policies, affordability, and accessibility) and use the Smart Salting Tool the more progress can be made with faster results. Our program work provides the required foundation for all chloride reduction work to build from and move forward.
- While it may take several years to see direct improvements in surface water quality we already know from groundwater trends that reversing the increasing trend in chloride conditions is possible, it just takes decades and availability of long term chloride data. https://nawqatrends.wim.usgs.gov/Decadal/?map=CL

1998-2012 groundwater chloride monitoring



2002-2020 groundwater chloride monitoring



- **Are federal funds available other than 319 grants and have they been pursued?**
  - The 319 grants funds were no longer available for training in 2020 when changes to how the funds were distributed were made.
  - EPA Pollution Prevention grant funds were applied for in the past but were not received.
  - Most other states want to talk with the MPCA about how we are funding our program as to date there is not a good source of federal funds that support this type of work.

MPCA co-leads the National Chloride Collaborative with EPA and this topic has come up frequently as funding program work that includes training, education & outreach, and other behavior change focused work does not have a reliable source of funding and often does not compete well with other structural BMP projects, as most grant scoring criteria are focused for on/in the ground projects.

- New Hampshire charges a fee to all participants in their Green SnoPro training, which is for private contractors only. They have a limited liability law in place that requires contractors/property owners to be certified in their program in order to receive the limited liability benefits, and this is a significant driver for not only participation in their program but to also pay the necessary fees.

Clean Water Council

Pending presentation on 6/17

Voyageurs National Park Water Quality Protection Program

- **Is this program coordinating with the MPCA SSTS program if SSTS is involved.**
  - Neither the VNP Clean Water Joint Powers Board or VNP Sewer Districts coordinate with the MPCA SSTS program directly. Implementation of new SSTS is administered by the respective Counties (St. Louis and Koochiching).

- **Appropriate for CWFs to upgrade failing systems, but not to facilitate development and construction of new homes?**

New sewer pipelines are implemented in areas with existing homes were SSTS are non-conforming or non-compliant. Sometimes there are empty lots between these existing homes and the sewer pipeline is available for them to connect to it versus installing a new SSTS.

- **Are you planning to ask for CWFs until the CWFs expire in 2034?**

We appreciate the National Park program exists within the Clean Water Council. The JPB updated their Sanitary Sewer Comprehensive Plan in 2022. It is anticipated that this plan is a 10+ year development plan based on available funding. We continue to seek federal, state, and local funding.

- **Can you list the other sources of funding?**

PFA Grant, PFA Loan, State Capital Investment (Bonding), Dept of Iron Range Resources (where applicable), Federal Community Directed Spending (Earmark), U.S. Army Corps of Engineers, St. Louis County, Koochiching County.

- **What wouldn't happen without the Clean Water Fund for this project that receives funding from other sources?**

Losing CWF would definitely delay project implementation and be a set back to the progress made in cleaning up the waters of the National Park. It also serves as the required match money from the other funding sources such as Bonding Bill and IRRR.

- **Could you list the outcomes from monitoring data here?**

The JPB does not currently surface or ground water monitoring. The only relatable data would be the actual number of non-conforming or non-compliant SSTS that have been eliminated from the 4 Sewer Districts.

Minnesota Department of Natural Resources

Stream Flow Monitoring Program

Lake Index of Biological Integrity

- **Is there coordination of the IBI program with fish contamination monitoring? Great to have healthy fish population in a lake, but if public cannot eat the fish, we are not protecting water quality.**

IBI is primarily focused the composition of the fish community as an indicator of overall water quality, habitat, and biodiversity, whereas the fish contamination monitoring is really focused on the presence and relative amounts of contaminants that are harmful to humans.

Fish Contamination Assessment

- **In the long term what percentage of lakes and fish within a lake do you anticipate sampling per year?**

This is a question better suited to MPCA. MDNR is not responsible for lake selections or power analysis for lake surveys – waterbody selection is not necessarily intended to cover some percentage of lakes or fish within a lake but to get a sense of the level of contaminants in various drainage basins (especially in the case of Hg). For PFAs and PCB sampling is focused on waterbodies that may be at higher risk. Current guidance for the number of fish sampled per waterbody ranges from 5-12 fish depending on general groupings of fish important for consumption such as pan, predator and rough fish. Small samples per waterbody are generally sufficient for determining the consumption advisory.

Watershed Restoration and Protection Strategies-DNR Portion

- **Does each geomorphic assessment lead to stream restoration?**

Not necessarily.

- **Does Outdoor Heritage Fund support stream restoration implementation or does DNR seek OHF for implementation of projects?**

OHF supports a considerable amount of stream restoration, and DNR has received funding every year, between $3-5M, based on a statewide priority list. Partners also request and often receive OHF funds for stream restoration projects.

- **If informed stream restoration is so effective for sediment management and aquatic habitat, why aren't more being done?**

The number of these projects has been growing, and the capacity and capability of doing them has increased considerably over the past decade.

- **Does subsurface drainage increase the channel forming flows in most streams?**

I don't know that this is definitively answered.

Aquifer Monitoring for Water Supply Planning

- **What proportion of program is non-CWF? How will program continues post-2034? How is it determined which program is supported by CWF vs. general fund? How do you determine what is a general fund expense and what is a CWF expense?**

CWF makes up 45% of GW monitoring network budget GW General 55%. Can fluctuate year to year based on staffing. Wells drilled with CWF are funded with CWF for field/data processing work, same for GW general fund. Post 2034 is TBD, DNR is working on long term funding for programs but at this time we are unsure how any of the wok funded by CWF will be handled after 2034.

- **How do you interlink with MDA on irrigation issues?**

MDA focusses largely on the efficiency, agronomic and fertigation aspects of irrigation. DNR's role is largely about quantity and sustainable use.

- **What is the projected annual cost for program when network is completed?**

If we were not adding more wells, in today's dollars it is approximately 2 million dollars.

- **This and other programs use multiple funding sources, and it is confusing. How do you assure we are not supplanting or how do we show that CWF-funded stuff is providing additional value?**

Pre-CWF we did not have dedicated funds for drilling new wells. CWF enabled us to purchase an updated well drilling rig and begin building out this network which then has been supplemented with new GW General fund. Program was funded by general fund before CWF started. CWF allowed us to also instrument current wells with data loggers to collect higher density data that is more useful to decision makers.

- **Are federal funds available and have they been pursued?**

Yes, DNR has pursued funds from the USGS National Groundwater Monitoring Grant Program since 2017. We have received $660k in matching funds to connect MNDNR gw data to the National Monitor Water Monitoring Network and add additional wells, data loggers and telemetry to our existing network.

Non-point Source Restoration and Implementation

1. Would a financial incentive (mini easement) program help to better maintain forest stewardship in long term?

2. Can projects reimburse DNR for this technical assistance when possible?

Tool Development and Evaluation [Formerly Applied Research and Tools]

Pending presentation on 6/17.

Buffer Map Maintenance

- **How is this different than BWSR monitoring in BuffCAT**

DNR maintains the map that defines where buffers are required. BWSR is involved in supporting the enforcement.

County Geologic Atlas Part B

Freshwater Mussel Restoration

1. Could this program utilize $1-2 million/year?
2. Did DNR grow these mussels before receiving the CWFs, and the CWF provides greater scale aka additionality? Just want to understand the "supplemental" benefit here. Also how did DNR decide what part of this project should be CWF vs other funds like ENRTF, OHF, game and fish fund, etc.

Water Storage

Culvert Replacement Cost Share

Minnesota Board of Water and Soil Resources

Grants to Watersheds with Approved Comprehensive Watershed Plans (Watershed-based Implementation Funding)

Surface and Drinking Water Protection/Restoration Grants: (Projects and Practices)

Accelerated Implementation

Measures, Results and Accountability

Buffer Law Implementation

Working Lands Floodplain Easements [formerly Riparian Buffer-Permanent Conservation Easements]

Critical Shoreland Protection-Permanent Conservation Easements

Wetland Restoration Easements

Targeted Wellhead/Drinking Water Source Protection

1. Broadly stated, where are we on our journey toward protecting & restoring 100,000 acres in the Upper Mississippi by 2034? What's protected? What work remains?
2. More specifically, how many acres are protected already by the CWF's $12M investment in Critical Shorelands Protection – Permanent Conservation Easements program? If I'm reading the application correctly, only 4,000 acres are under easement or in process in the program.
3. Are we counting Wetland Restoration Easements in Upper Mississippi River headwaters basin toward the 100,000 acre target? If so, how many acres are protected by the $15M invested?
4. How many acres are protected by the Riparian and Floodplain Restoration Easements in the Upper Mississippi River headwaters basin? If I'm reading the application correctly, since FY10-11, Clean Water Fund funding of $69M invested has protected over 26,000 acres state-wide.
5. Is it a wise investment to pay $7,500 per acre for Riparian and Floodplain Restoration Easements, when the land in question would cost ~$10,000 per acre to "own?"
6. What's the overlap or duplication of effort between CWF, OHF, and ENRTF funding toward protecting 100,000 acres in the Upper Mississippi? Or, stated more positively, what are the synergies across these programs to help achieve the 100,000 acre target?
7. Because of the multiple funding sources for those easement programs, looks like CWF gets lots in the public information.
8. The people who benefit from these easements aren't likely the people who voted for the Legacy Amendment.
9. How are cost per acre of easements determined? What is the typical cost?
10. How much time/effort is spent soliciting easements on DWSMA sensitive areas vs. waiting for voluntary sign-ups?

Technical Evaluation [restoration evaluation]

Pending presentation on 6/17

One Watershed, One Plan

- **Is adequate effort given to including participation from tribal and municipal representatives?**

Since 2021, the 1W1P Operating Procedures have clarified that tribal and municipal governments must be invited to participate in the process. As each planning effort starts, partnerships reach out to tribes and municipalities inviting them to participate. A common response is that these governments have limited staff who are overextended but want to be kept informed about the planning effort. Sometimes, the invitation to participate is accepted:

- To date, Tribal Governments have participated in 12 of 57 planning boundaries via the planning advisory committee (9), or the policy committee (3 via formal agreement for planning; 2 via formal agreement for implementation).

- 16 municipalities have representation on policy committees in 11 planning boundaries. Many more planning boundaries have municipal participants on advisory committees.
- Any planning group pursuing a plan renewal amendment must invite Tribal Governments and municipalities to participate in the plan amendment process and the implementation agreement.

- **What are the tangible results from targeted implementation, not practices?**
    - So far, only one watershed has completed an assessment of their progress toward goals, so it's hard to make a strong statement.
    - Other tangible results are partnerships, enhanced capacity and learning, etc.

- **How many of the implementation strategies/actions involve local action (including policies, regulation) vs incentives using state and federal funds?**
    - We don't quantify all the strategies and actions in all plans, but each plan is required to discuss local policies and regulation. Generally, local policies exist prior to plan development. Most plans include implementation items such as:
        - continuing to enforce existing ordinances
        - regularly examining ordinances across the watershed to understand differences and similarities across jurisdictions, what is successful, and what changes may be needed to make progress on plan goals
        - notifying partners in the watershed about proposed changes to local controls

- **What's the status of the Non-Point Funding Priority Plan? How is it included in WBIF?**
    - The NPFP is currently being revised; the Clean Water Council will receive a draft to comment on this summer.
    - The high-level priorities from the NPFP are incorporated into the prioritization process for planning efforts; WBIF is available to implement those priorities.

- **Can you describe the efficiencies gained from consolidating lots of local plans into 1W1P?**
    - It's tough to compare because relative to most local (county-based) plans, the CWMPs developed via 1W1P are so much more robust. Some benefits: there is far more cross-pollination of ideas and expertise; because people are associated with more than one planning effort, they don't reinvent the wheel on any aspect of the process – plan elements, policies, tracking mechanisms and more get shared from one watershed to the next.

- **Occasionally I hear that cities feel left out of the process—how do you reach out to them?**
    - We require the partners to do that outreach at the beginning of the process. Often time that's done via the existing connections that the required partners have with municipal contacts – usually an invitation via email followed by a meeting if the municipality expresses interest.
    - The clarification in our requirements in 2021 has helped a lot; we have one planning effort that has four municipalities on the policy committee!

- **Are there certain stakeholders you'd like to see participate more in 1W1P, and can the Council help bring some to the table through their networks?**
    - Potentially interested and affected parties are identified at the local level by the policy committee with advice from their staff. If Council members have ideas about who might participate, please let us or the local government leaders in a particular area know.

Conservation Drainage Management and Assistance

Tillage, Cover Crop and Erosion Evaluation

Pending 6/17 presentation

Watershed Partners Legacy (WPL) Grants

Enhancing Soil Health and Landowner Adoption of Cover Crops for Drinking Water & Groundwater Protection

Great Lakes Restoration LAMP

Minnesota Department of Health

Drinking Water Contaminants of Emerging Concern

- **How do you determine which of the thousands of PFAS chemicals to focus on?**
    - From the laboratory testing perspective this is currently driven by the availability of certified reference materials. While we know 1,000s of PFAS compounds exist, only several dozen are available for purchase to be used for calibrations, quality controls, etc. Additionally, and more generally speaking, the determination for which compounds to test for is also driven by toxicity data and prevalence or likely prevalence of the existence of these compounds in the environment.
    - In the Health Risk Assessment (HRA) Unit, where we make guidance for CECs found in water, we receive nominations from the public, other Minnesota agencies, and other units within MDH. We screen the contaminants based on toxicity and exposure. Those with the highest screening scores are the ones we develop guidance for.
    - MNELAP is responsive to analytes (CEC or regulated) based on data user and State and Federal requirements.
- **Other than PFAS compounds, what do public water suppliers do with your health based values? Has any change in any community taken place because of the research in this program, other than PFAS?**
    - Public water suppliers treat health-based values (HBVs) as goals. They are required to meet the EPA MCL levels, but aspire to meet the HBVs, since these values are purely health-based. When public water systems need to evaluate the potential health impacts for contaminants for which there is no federal regulatory value (MCL), they use the

health-based guidance from MDH's CEC program. For example, the city of New Brighton used MDH guidance as the reference value to address 1, 4 Dioxane in their groundwater sources and was successful in securing funding for advanced oxidation treatment to remove 1,4 Dioxane. Similarly, community water systems are using MDH value to evaluate levels of manganese and develop appropriate responses to protect public health.

- **I like that MDH has developed some "rapid tests" to reduce the time required to help communities know what direction to go.**
    - HRA has developed rapid assessments (fast, conservative, health-based guidance) that both the Minnesota Department of Agriculture (MDA) and MDH's Drinking Water Protection (DWP) Unit use when they need a guidance value quickly. MDA has used them for contaminants detected in private wells or fertilizer/pesticide spills. DWP has requested rapid assessments for contaminants on EPA's Unregulated Contaminants Monitoring Rule lists (federal public water supply screening for contaminants with no federal guidance).
- **Are federal funds available and have they been pursued?**
    - There are not any federal funds specifically available for the testing of emerging contaminants that I am aware of. Our laboratory is very involved with the national Association of Public Health Laboratories (APHL). Funding is a regular topic and if federal funding were available we would hear about it.
    - The Minnesota Environmental Laboratory Accreditation Program (MNELAP) is a fee based program as per MN Statute 144.98. MNELAP is a requirement of USEPA Primacy for the Safe Drinking Water Act if all required analyses are not performed in principal State laboratories, then primacy States must have a certification program for certifying other drinking water laboratories (40 CFR 142.10(b)(3)(i)).
    - There also are no federal funds for health-based guidance development that I know of.

Private Well Initiative

- **Was all this work from CWFs?**
    - Most all of the voluntary aspects related to private well work in Minnesota is funded through the Clean Water Fund.
    - In addition to CWF dollars, MDH received a 5-year grant from the Centers for Disease Control and Prevention to increase our capacity on data informatics. With this, we are building data visualizations about private well water quality data and sociodemographic characteristics, developed the online training for real estate professionals, and developing model ordinances to require well testing at rental properties. This is the final year of that grant.
    - We consistently keep an eye out for additional grant opportunities.
- **In many instances, information and education do not change behavior. How does your program address high arsenic in wells where homeowners are not likely to voluntarily take action?**
    - Our goal is to provide the information and resources so that private well households feel empowered and confident in ensuring their water is safe for everyone in their home.

  - We create and share a lot of educational messages through various platforms and messengers, but at the end of the day, it is up to that homeowner if they want to take action or not.
  - The goal to change behavior and empower really drives the need for a follow-up statewide assessment to really understand private well users' knowledge, attitudes, and behaviors around well testing, mitigation, and private well stewardship. That assessment, similar to the 2016 survey conducted with CWF dollars, informs what approaches are most effective at removing actual and perceived barriers to addressing water quality issues.
- **What do you need from the Council to advocate for this effort including non-CWFs?**
  - Continued support from the CWF is key to identify where all private wells are and offer well testing to all private well households.
  - Continued support in promoting policies that would better protect private well households. E.g., local ordinances to require well testing in rental properties.
  - Support for prioritizing some type of state mitigation funding for private well households with a water quality issue and a demonstrated financial need.
- **What do you need to update the Well Index in a timely fashion? Funds? Staff? Student workers? Better hardware/software?**
  - We need a combination of staff time and new software. Existing software is 27 years old and is not able to meet the needs partners and we have related to well data.
  - Staff time is necessary to assess the current system, limitations, and needs and determine what other platform(s) may work.
- **Are federal funds available and have they been pursued?**
  - We always keep an eye out for grant opportunities; some of which are federally funded grants. We currently have one federal grant that will finish in early FY2026.
  - More recently, EPA has broadened eligible costs for some funding programs that have traditionally been limited to public water systems so that private well work could also be eligible. However, for existing funds MN has received, the dollars are already earmarked for other projects. This could be a potential avenue for some funding in the future.

Source Water Protection

- **There was discussion of a dashboard showing progress towards protecting 400,000 acres in DWSMAs or at least what percentage of tasks in each plan are completed. Any progress on that?**
  - Some of the data that will be included in the future dashboard are in the 2024 Clean Water Fund Performance Report, under the measure *Land use in Drinking Water Supply Management Areas*. We are still identifying and assembling data from partners and also intend to hire a position to support data requests, analysis, and management for this initiative.
  - The dashboard will show summary data on acres with beneficial land use practices within vulnerable DWSMAs. It will not have tasks, as much of the land within vulnerable DWSMAs is not owned by the municipality and land use decisions are made locally by landowners. Planning and implementing land use changes with decision-makers is a locally led process that takes time.

- **How many municipalities own portions of their DWSMAs with land in agriculture and corn?**
    - Virtually all municipalities own or control a small portion of the land in their DWSMAs because they are required to own the land within 50 feet of the well itself. Many own more as it is common to place wells on parcels used for other purposes, like recreational complexes, schools, etc.
    - We don't track the proportion of municipally owned or controlled lands that are used for row crow agriculture. Across vulnerable DWSMAs statewide, 41% of the land is in cultivated row crops, as described in the Clean Water Fund Performance Report. We don't have data available to provide an answer on municipal ownership of agricultural DWSMA lands at this time.
- **Why don't municipalities pay more or use land use authority to have compatible uses for clean water within DWSMAs?**
    - This is a good question, and there is no easy answer. We would like to address this at the BOC meeting if time allows.
- **Is there anything the CWF/CWC can do to accelerate protection of DWSMAs in sensitive areas?**
    - One of the things that helps us to promote protection activities within DWSMAs is to have programs that are flexible. Many of the lands within DWSMAs are in private hands. Additionally, we have no authority to compel or mandate land use changes towards more protective activities. In order to change the use of these lands we have to be able to nudge landowners towards these decisions. Landowners are a diverse group, with an array of different interests and needs. Accordingly, we need tools that offer a range of different options – for example, an easement with attractive rates, terms, and conditions – that can be tailored to meet individual circumstances. BWSRs wellhead RIM and the associated Partner Protection Grant program are examples of such tools that we are able to use to good effect.
- **Are federal funds available and have they been pursued?**
    - Federal funds from EPA are available and have supported source water protection work at a baseline level since 1997. Additional support from CWF has allowed the program to expand and accelerate its work. Some federal legislation like the federal Farm Bill designates some of their funding to be used for source water protection implementation work. The programmatic work of the state program allows these federal dollars to be targeted for effective use in the state.

Groundwater Restoration and Protection Strategies

- **Private well inventories were mentioned during Private Well Initiative. Will the proposed accelerated implementation grants include a private well inventory and will efforts be coordinated with Private Well Initiative?**
    - The Accelerated Implementation Grant currently awards projects that conduct private well inventories. To date, two different grant awards for private well inventories have been funded. The first awarded to Itasca SWCD to conduct a private well inventory to support the development of the Itasca County Geologic Atlas. The second to Wabasha SWCD to conduct a private well inventory in response to the EPA petition for the SE.

There will be further coordination with the Water Policy Center to ensure there is no duplication of efforts and resources with the Private Well Initiative.
  - GRAPS and the Private Well Initiative have complimentary goals and objectives that align our work resulting in ongoing collaboration. The Accelerated Implementation Grant will continue to be a tool to address private well concerns in the SE.
  - County Well Index (CWI) is necessary for recording the data entry and well locations of these two different initiatives from the Private Well Initiative and Accelerated Implementation Grant.

Future of Drinking Water (formerly Drinking Water Protection)

- **How does this align with the proposed Morrison 50-year water plan?**
  - The in-progress Minnesota Drinking Water Action Plan focuses specifically on what is needed over the next 10 years to ensure safe and sufficient drinking water for everyone in Minnesota, including things such as supporting and expanding the drinking water workforce. The Future of Drinking Water initiative will continue to build on that plan and focus on implementation of key aspects outlined in the plan.
  - The Morrison 50-year water plan has a longer timeframe and broader scope than just drinking water. The 50-year water plan looks at water quality and quantity of all waters and what needs to happen to protect, remediate, and conserve clean water for human use and biodiversity.
  - In developing the Drinking Water Action Plan, MDH has reviewed, included content from, and built off many existing water plans, including: the 2020 State Water Plan, Clean Water Council Strategic Plan, Minnesota's Climate Action Framework, Metro Area Water Supply Plan, Nutrient Reduction Strategies, and the State Soil Health Plan. We would be intentional about finding ways to cross-pollinate with and help inform the 50-year water plan.

Recreational Water Portal

Pending presentation on 6/17

Metropolitan Council

Metropolitan Area Water Supply Sustainability Support Program

- **Are federal funds available and have they been pursued?**

We have recently investigated federal programs to help support our sustainability work. The main current program has $12M for the entire United States. It is unlikely that we could get enough federal funds to from this program to meet our needs or warrant dedicating staff time to continually search the federal grant system to find enough grant money to support our work.

Water Demand Reduction- Efficiency- Grant Program

- **Is there a way to use funds to eliminate lawn irrigation during rain events?**

Yes. Our Water Demand/Reduction Grant program already factors this in. By funding installation of WaterSense labeled smart irrigation controllers, we prevent the systems from turning on during rain

events. This can save up to 15,000 gallons of water over the course of a year as compared to a time-based controller. More information is available on the WaterSense website.

- **State statutes say that irrigation systems installed after 2002 or something like that have to use a moisture sensor. Cities (or maybe the state) require households to not send sump pump water into the home drain, and my city came to everyone's house to check. We ought to move toward requiring the pre-2002 systems to do the moisture sensor in the same way and not subsidize big suburban homes.**

Cities have a key role managing irrigation efficiency. The Met Council Water Demand/Reduction Grant program supports city inspections by funding irrigation system audits conducted by a certified Irrigation Professional (US EPA WaterSense program). Program funding also helps communities incentivize and support replacement of older irrigation systems with newer WaterSense labeled smart irrigation controllers and spray sprinkler bodies. Each community designs their own program and many do encourage and fund the replacement of older irrigation controllers with smart controllers and spray sprinkler bodies.

- **Establish criteria so that funding for this program is targeted to people for which the cost of implementing new appliances is a barrier. We should not be cost sharing irrigation controllers for people wealthy enough to sprinkle their lawn. Locals could give information on selecting a Water Sense certified product but not pay for it with Clean Water Funds. We should fund projects like the St. Paul toilet conversion project**.

We had a pilot project with St. Paul Regional Water Services in FY23/24 where Clean Water Funds supported a project to conduct no-cost-to-resident toilet replacements for renters in apartment buildings in areas of concentrated poverty who pay their own water use expenses. We are now working on a new equity-based program for part of the funding we received in FY 24/25. This new program will continue to evolve based on input from our partners based on their needs. Based on input so far, we will continue to use a portion of our funding received for this program to target areas and people in need of more support to replace toilets and other high water use appliances to help reduce their water use and water bills.

- **How much of the community grants are for irrigation sensors? Should CWF be paying for wealthy property owners to do something they could do via municipal ordinance?**

Each community has designed their program to the needs of that community. Some use the funds to support the purchase of smart irrigation controllers and improved lawn irrigation systems which has been shown to be an effective way to reduce water use during peak summer use. Others focus more on spray sprinkler bodies, audit programs, and toilet and washing machine replacements. Most support of a mix of these eligible reimbursed activities and products. The grant program currently funds 80% of the product replacement while the homeowner or community pays the other 20%.

For the 2022-2024 grant program cycle:

- 31 of the 37 participating communities chose to include **smart irrigation controllers** in their program
- 10 of the 37 participating communities chose to include **spray sprinkler bodies** in their program

- 5 of the 37 participating communities chose to include **irrigation system audits** in their program

With the 2024-2026 grant program, we have set aside $400,000 out of the $1,500.000 available to dedicate toward an equity-based program that will be developed with community input and awarded later this year.

- **Would be nice to have a comparison of water use per capita in urban vs. suburban; changes over time and how much increased use is lawn irrigation.**

This is something we could investigate further. Water use per capita can be estimated from the permitted user data reported to the DNR in their MPARS and Conservation Database reporting systems. We have that data through 2022. We are still waiting for the DNR to release the 2023 numbers to us. We have some comparisons of how water is used in our subregional water atlases.

Another measure to look at would be outdoor water use estimates or outdoor water use alongside of per capita estimates. We know that much of "outdoor water" is treated drinkable water that's used to irrigate lawns and landscaping.

University of Minnesota

County Geologic Atlas Part A

- **This and other programs use multiple funding sources, and it is confusing. How do you assure we are not supplanting or how do we show that CWF-funded stuff is providing additional value? How do you determine what is a ENRTF, DNR, or USGS fund expense and what is a CWF expense?**

I agree, it can be very confusing. Not only do we have multiple funding sources, but each has its own timeline and some have restrictions on how the funds can be used. Add to that, the fact that each county takes 4-5 years to complete means that we can rarely start and finish a county on the same award. I try to keep counties with the same sponsor, but it doesn't always work out that way.

Luckily, the University has an excellent accounting system whereby we can set up sub-accounts to track expenses for each county. I can track those expenses in detail down to the individual salary, field excursion, or laboratory analysis. USGS funds and MGS matching funds are tracked separately.

Having multiple, concurrent awards is helpful because it allows us to work uninterrupted. When one award is spent, I can relatively easily shift the accounting to another award so we can continue working.

Clean Water Funding is ideal because it has a long period of performance and it is unencumbered. I don't have to follow a prescribed budget. Instead, I can use the money most effectively how and when I need it to maximize MGS resources and opportunities. I currently have 6 "child" accounts on the CWF account funding all or parts of 8 counties. Counties that are small enough and close in proximity may be more efficiently mapped together under the same budget account.

- **Could you describe how you work with the tribes and how that has changed your work?**

Over the past couple of years and with an emphasis on social justice, equity, and inclusion, MGS has revisited our interactions with citizens as well as state, county and tribal representatives. While we have

had many positive interactions with tribal nations throughout the state, recent events have opened our eyes to the fact that our efforts to map and interpret the geologic framework of the state may not welcome everywhere. We are currently working to better communicate who we are and what we do in case there is some misunderstanding of our intent or actions.

MGS now operates under a policy whereby tribal land will not be mapped at any scale, even remotely, without permission from the tribe. Currently, 4 of the 11 tribal nations in Minnesota have declined to participate in MGS CGA mapping. Therefore the land of these tribes is entirely blank on maps created since this policy was enacted.

Stormwater Research and Technology Transfer Program

Pending presentation on 6/17.

Legislative Coordinating Committee

Legislative Coordinating Commission Website

Pending presentation on 6/17.

Public Facilities Authority

Point Source Implementation Grant (PSIG) Program (PFA)

- **How are federal funds leveraged? Does it come from the Drinking Water and Wastewater Revolving Loan funds?**

Yes, federal funds are leveraged though the Drinking Water and Clean Water (wastewater) Revolving Funds. PSIG grants are limited to 80% of eligible project costs up to $7M. PSIG recipients often use CWRF loans for the remaining project costs. The DW and CW Revolving Funds also provide loans to replace aging infrastructure and principal forgiveness grants based on affordability, for green infrastructure, and for lead service line replacement and emerging contaminant projects.

- **Council members often ask if we can move this to the bonding bill but I guess the failure of the Legislature to pass a bonding bill may explain why!**

The Clean Water Fund has funded the PSIG program (and predecessors TMDL and Phosphorus grant programs) from the beginning. In 2016 Governor Dayton decided that the state should do more to help cities with PSIG eligible water treatment upgrades and for the first-time recommended bonding to supplement the CWF. Bonding appropriations for PSIG have been as follows:

2017	$33.7M
2019	$38.3M
2020	$44.6M
2023	$80.0M
	$196.6M

Small Community Wastewater Treatment Program (PFA)

- **Are there federal rural development funds available? More leverage opportunities?**

USDA Rural Development has funded many unsewered community projects for regionalization and construction of new collection/treatment systems, often with PFA co-funding through WIF grants and sometimes PSIG grants, but there are currently no opportunity for funding facilitators. The Small

Community Wastewater Treatment Program was created as a more streamlined path specifically for smaller community systems that need additional support in evaluating their options for wastewater treatment and those that use soil-based treatment (community mounds and cluster drainfields).

- **What is the projected cost to address the 800 under-sewered communities?**

Unknown. The total cost depends on the method used for solution. These communities may decide that it's best to undertake individual upgrades, regionalize with a nearby community, or construct a community wastewater treatment system. If all these communities upgraded individual SSTS systems, it could cost $846 million on the low end. Regionalizing or constructing community systems would cost drastically more. The solution is the decision of each community and could be any of these.

- **Who does the technical assistance?**

The local decision makers (cities, townships, counties) select the TA provider, as long as they meet the statutory criteria. The communities can use TA grants to contract with licensed SSTS businesses, county staff, the U of M On-Site Sewage Treatment Program, or other qualified nonprofit organizations. The decision is dependent on the level of technical assistance needed and the need of the community.

- **Is it accurate to say that these communities have more affordable water and sewer bills in addition to functionality of their infrastructure?**

These communities typically do not have any water or sewer infrastructure, are primarily unincorporated, and likely have no water or sewer bills beyond pumping/maintenance of their own system. Having a functioning system costs more than having no system or a non-functioning system. The program intent is to help unsewered communities evaluate wastewater alternatives and construct systems that they deem the most cost-effective. Since property owners in these communities are used to having no sewer bill, the per household cost of a community system can be daunting (typically $70+/month). The TA grants help to show residents that all possible alternatives have been explored and lets them choose the solution that meets their needs.

- **Could we have a dashboard in the performance report on the 800 under-sewered communities to compare with the past?**

We do not have an externally available dashboard at this time. In the future it may be possible, separate from the Small Community Wastewater Treatment Program, depending on the level of detail. We have tracked the number of communities on the list, who has been assessed, and who is working on solutions.

- **Does this project interact with the Voyageurs project?**

Generally, no, with the exception of one Small Community project in 2017 for Kabetogama Township which is on the edge of Voyageurs.

- **Will PCA's proposal for an SSTS facilitator help put more communities in the queue for this program? Will demand for help on SCWT go up?**

We hope so. The goal of the facilitators would be to help these communities understand what their wastewater needs are, what options are available, and then seek funding for those fixes.

Comment Sheet

for Clean Water Fund Requests

June 17, 2024

Please share any comments you have on the programs presented today.

Any comments you have on these programs will be passed along to the Budget and Outcomes Committee on July 12th.

Agricultural Research and Evaluation (MDA)

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Recreational Water Quality Online Portal (MDH)

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Stormwater BMP Performance Evaluation and Technology Transfer (UMN)

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Tillage, Cover Crop and Erosion Evaluation (BWSR)

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Technical Evaluation [formerly restoration evaluation] (BWSR/DNR)

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Tool Development and Evaluation [formerly Applied Research and Tools] (DNR)

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Clean Water Council budget (MPCA)

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Legislative Citizen Commission Website Maintenance (LCC)

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Source Water Protection (MDH)

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Tillage and Erosion Survey Project

Prepared by Udai B. Singh, PhD. | BWSR Modeling and Outcomes Coordinator

Presented by Annie Felix-Gerth | BWSR Clean Water Coordinator

Tillage and Erosion Project: CWC Strategic Plan

Drinking Water	Surface Water	Value Water
1 strategy	2 strategies	1 strategy

Purpose: Tillage and Erosion Survey Project

- **Develop** a long-term program to systematically collect tillage data and soil erosion
- **Track** tillage trends, cover crop adoption, and land cover
- **Quantify and track** trends in average annual and daily soil loss due to wind and water erosion
- **Provide data** to support targeting of conservation programs

University of Minnesota Driven to Discover®

Iowa State University

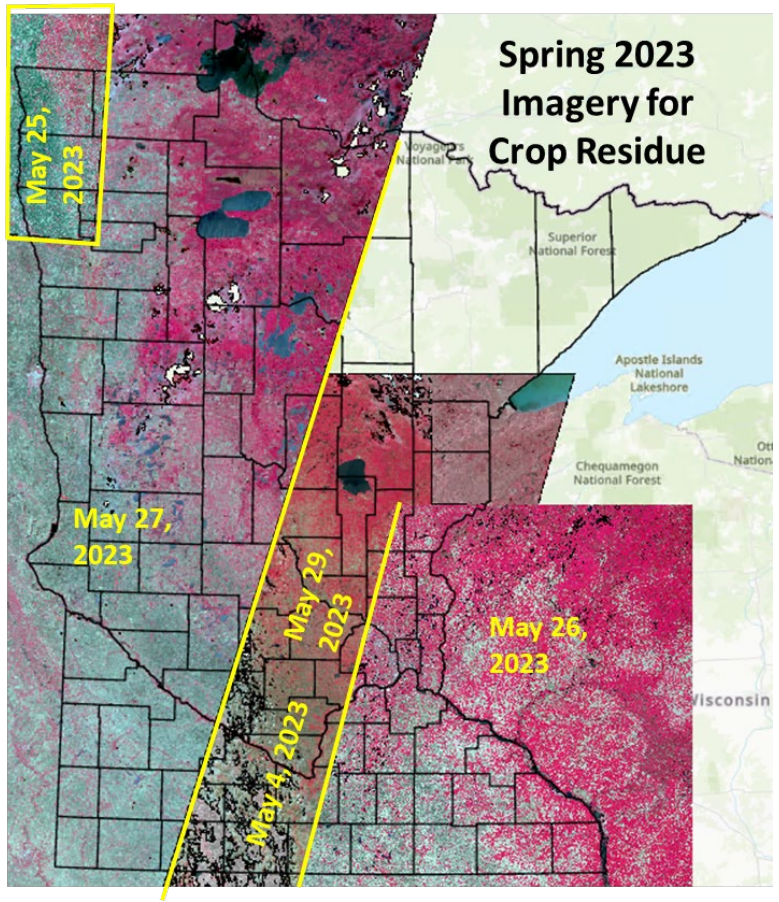
Clean Water Land & Legacy Amendment

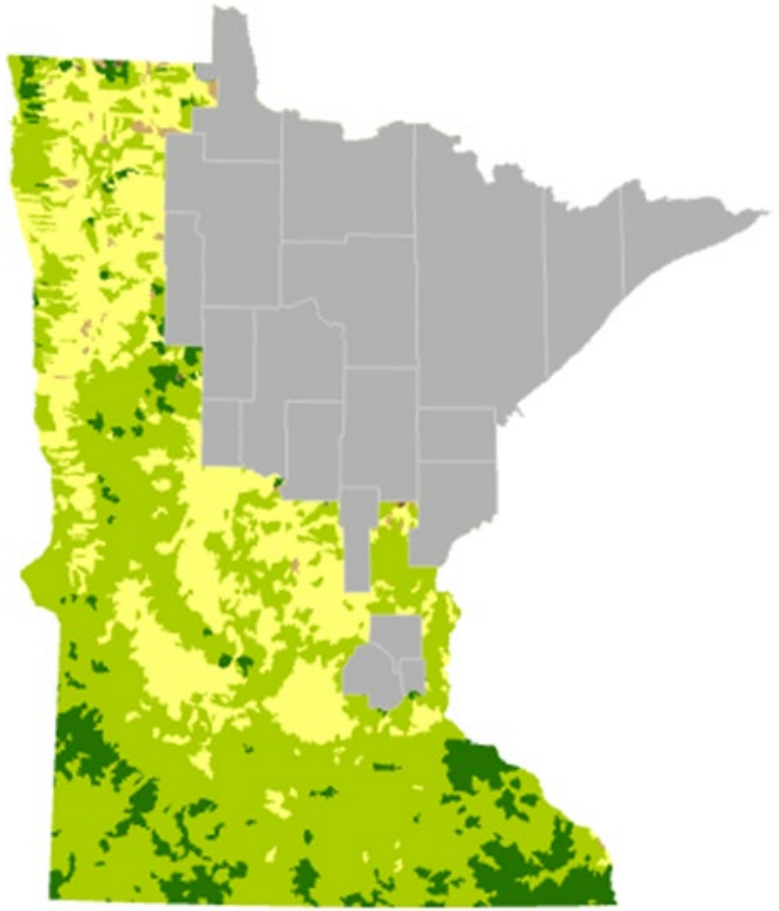
Board of Water and Soil Resources

Project Status

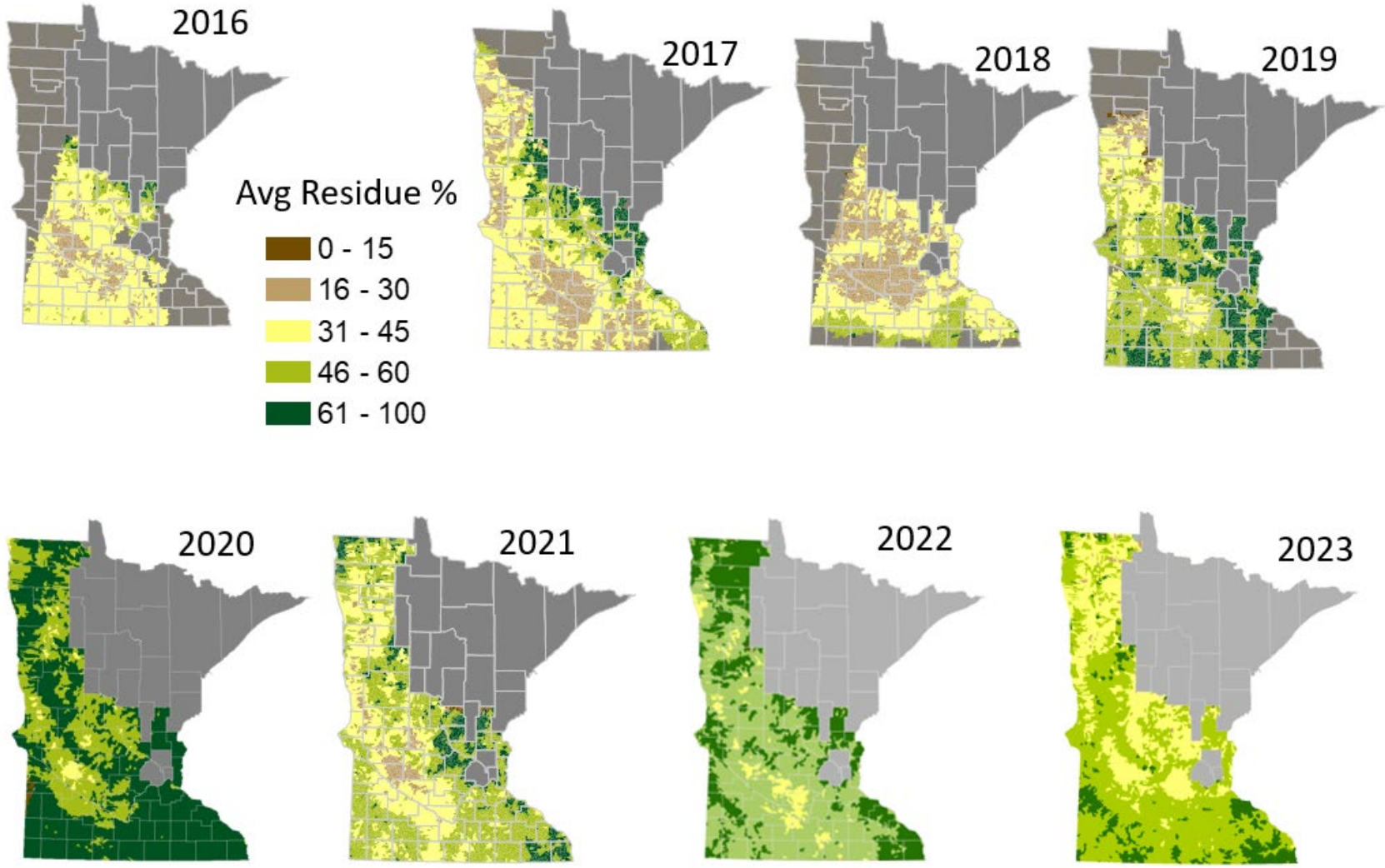
- Analysis of Spring Crop Residue Levels and Fall Cover Crop Adoption
- Daily Erosion Project (DEP) Web Application
- Education and Outreach

Imagery and Residue Cover Spring 2023

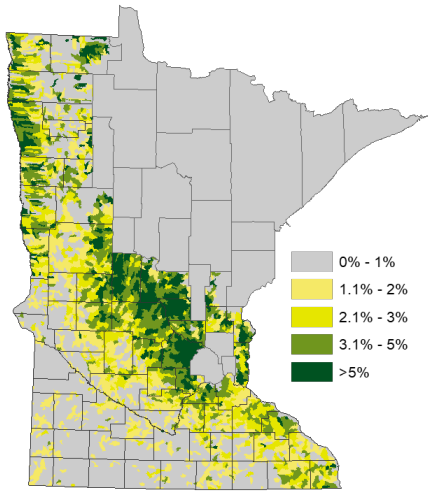




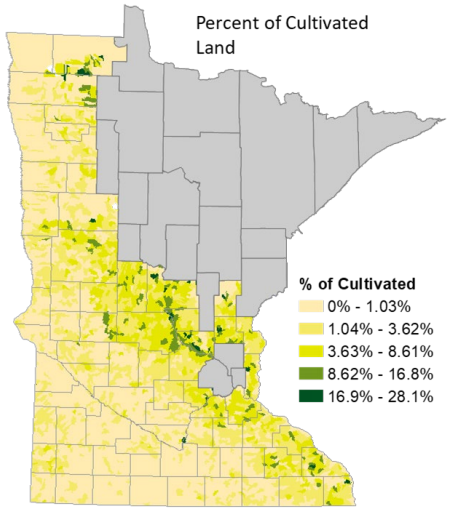
Average Residue Cover Percentage (2016-2023) Minor Watershed



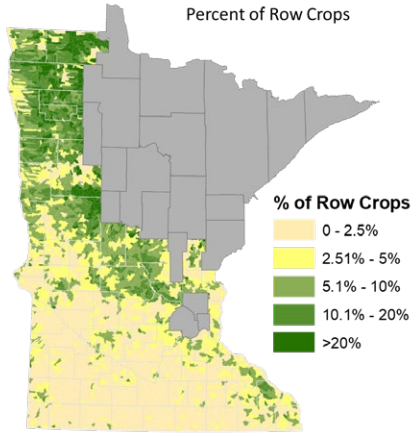
Cover Crop Emergence
Percent of Row Crop Land at Minor Watershed Scale



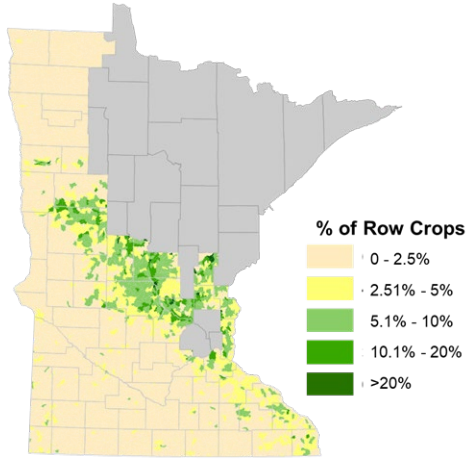
Year 2019: 299,584 ac



Year 2020: 248,000 ac

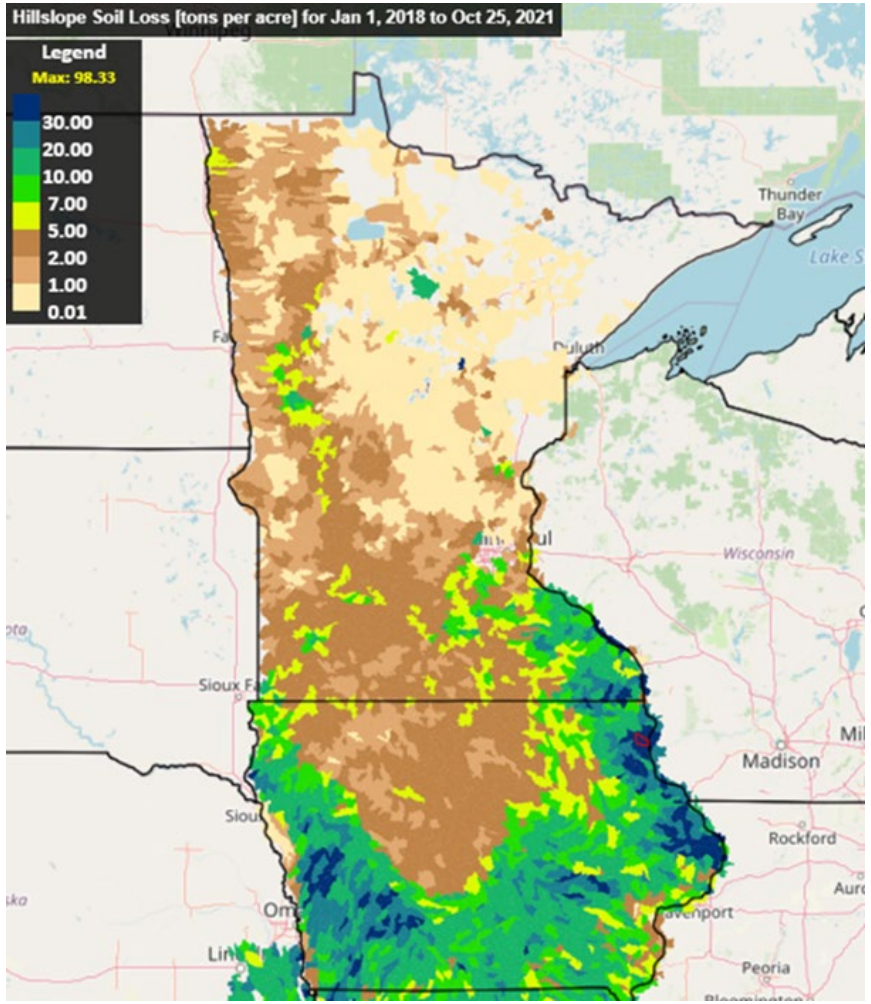


Year 2021: 935,000 ac



Year 2022: 258,000 ac

Daily Erosion Project (DEP)



Hillslope Soil Loss January 2018 to October 2021

- BWSR working with University of Minnesota and Iowa State University on development and maintenance since 2016. Wind erosion to be added this year.
- Data Inputs needed for DEP to work
  - Remote sensing analysis of crop residue cover
  - ACPF database development and upkeep
  - Automated hDEM developed for State

https://www.dailyerosion.org/

Fall 2023 Cover Crop Surveys

- Fall cover crop survey ground truth data were collected in the Cannon River watershed
- Partnership with Becker, East Otter Tail, and Faribault counties
- These counties supplied photos of emerged cover crop biomass for ground truthing of Fall 2023 satellite imagery
- Data published on MnGEO Commons June 2024 for Crop Residue and Cover Crops layer
- Scales: HUC 12, Agroecoregion, County, and 1W1P Boundaries

Cover Crop Observations: Cannon River Watershed

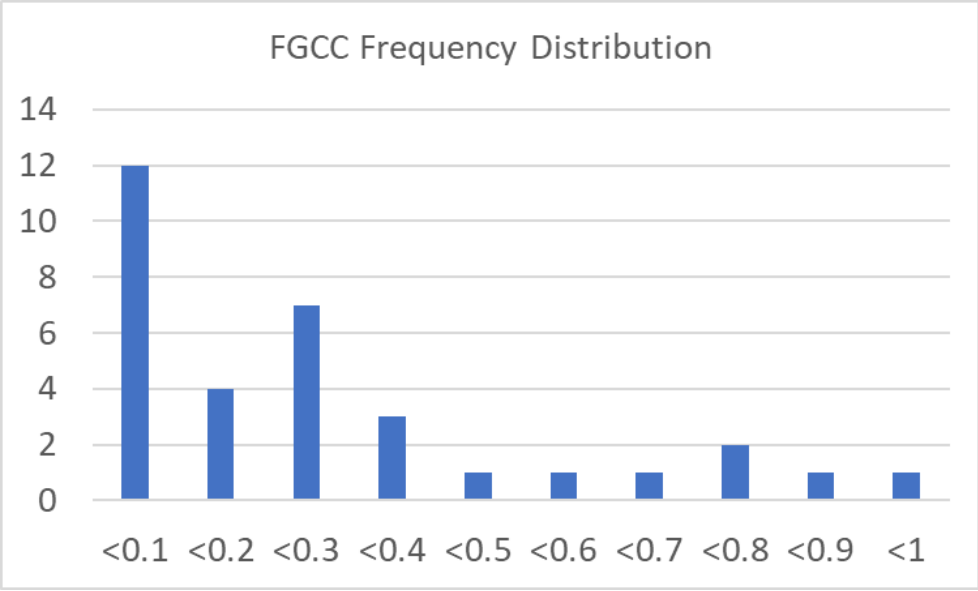
- On December 6, 36 locations were visited
- Most locations had previously been identified using remote sensing as having green vegetation
- 27 locations had cover crops, 8 had forage crops, and 1 was in a conservation easement

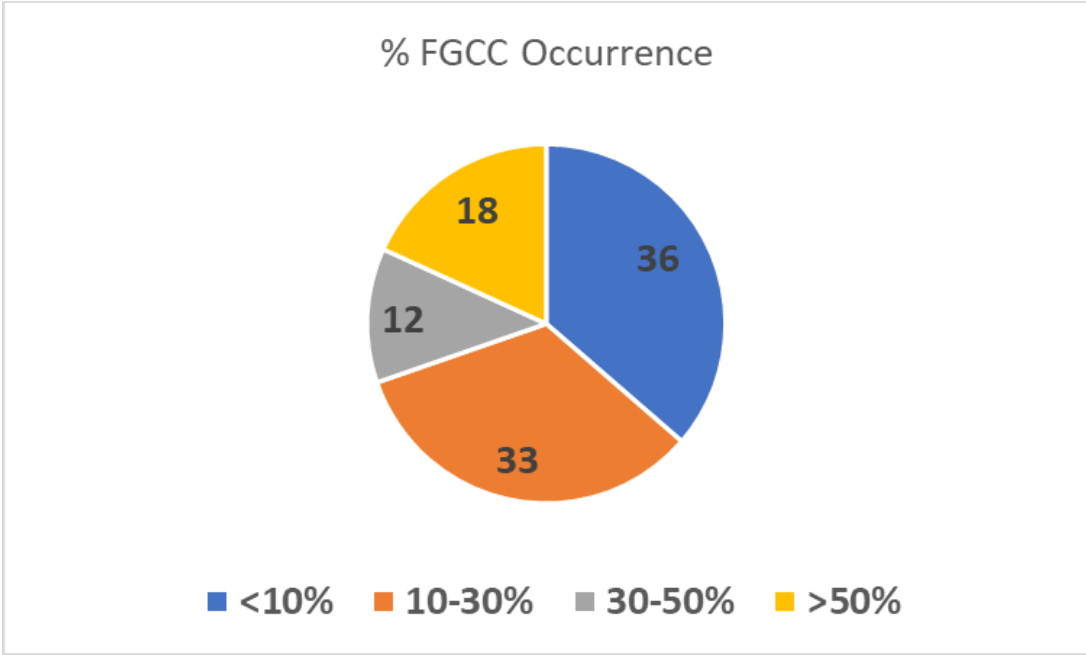
Cover Crop Observations: Cannon River Watershed

- Fall of 2023 was very dry and warm (with no snow cover) through early December
- While the warm weather was conducive to cover crop planting post-harvest, the lack of moisture in the upper soil profile limited germination and emergence of fall cover crops
- Photos at right show winter rye cover crop emergence in two fields, one with good cover crop emergence, the other with low emergence

Fall 2023 Farmer Cover Crop Photos

- Anna Cates mobilized 33 farmers in Becker, E. Ottertail and Faribault counties to provide photos of their cover crops
- Cover crops were planted primarily into land previously in canning crops, corn silage or soybean crops
- All photos were evaluated for FGCC - fractional green crop cover (0-1 value)
- One-third had little cover (<10%), two-thirds had from 10-100% cover





Upcoming Work for the next Year

Daily Erosion Project: Forestry Component

Continue Field Data Collection and Validation

Post Pandemic Educational Campaign

Digital Elevation Model Evaluation

BWSR Website Update

Tillage and Erosion Survey

	FY 10-15	FY 16-17	FY 18-19	FY 20-21	FY 22-23	FY 24-25	FY 26-27	Total
Clean Water Funds	-	$1M	$845K	$845K	$724K	$850K	Same	$4.26M
FTEs (state agency staff funded by CWF)	-	.5	.5	.5	.5	0.5	NA	NA
Dollars Passed Through	-	$860K	$700K	$700K	$600K	$382K	NA	$3.24M

Technical Evaluation Program

Annie Felix-Gerth | Clean Water Coordinator

Board of Water and Soil Resources

Technical Evaluation Program

- Legislative requirement
- Annual report
- Supports project managers to maximize outcomes
- Presented findings to the Clean Water Council in the past
- Lead by Wade Johnson, MN DNR

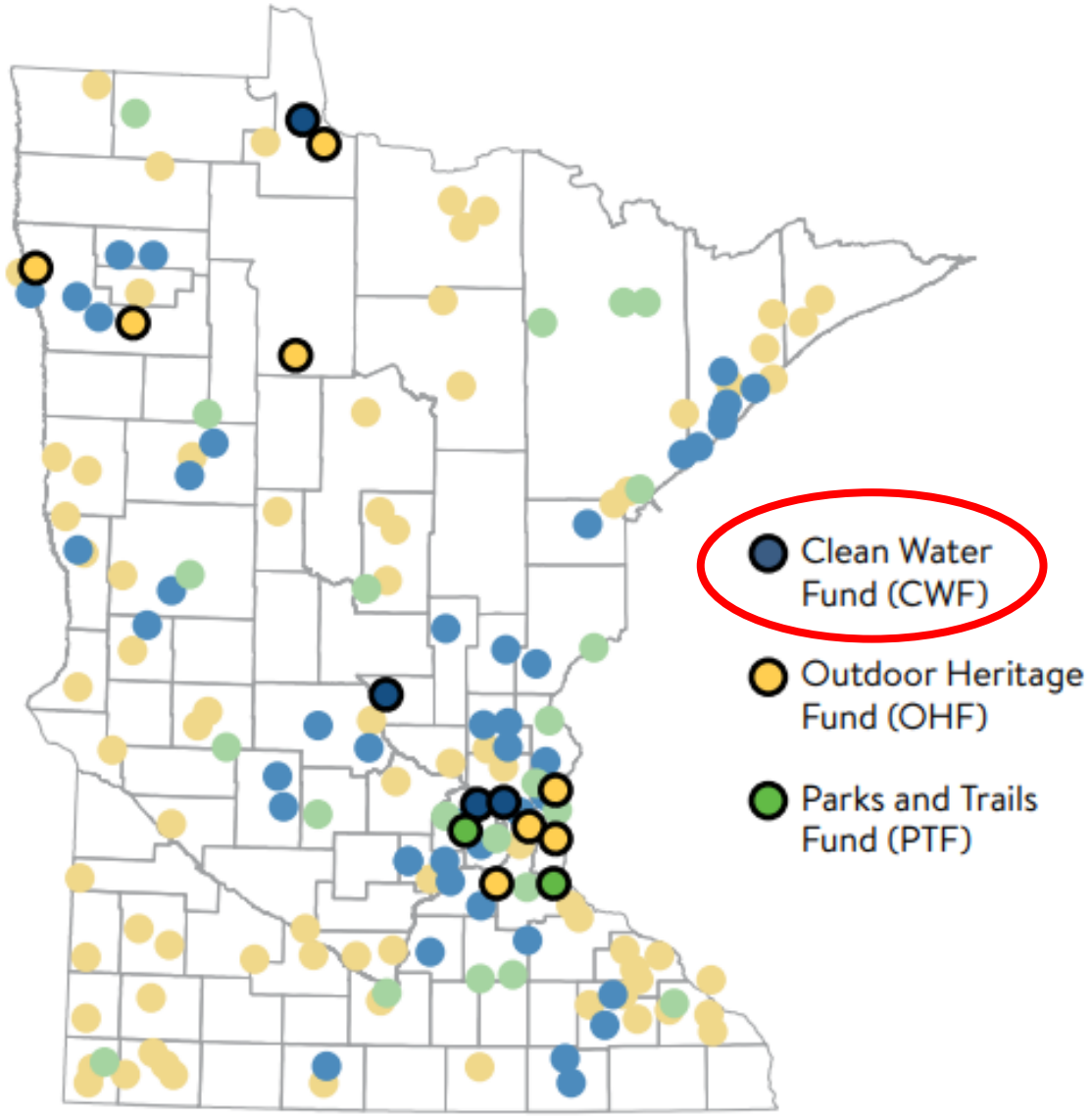
https://files.dnr.state.mn.us/aboutdnr/legacy/legacy-funds/legacy-restoration-evaluation-report.pdf

Technical Evaluation Program: CWC Strategic Plan

Drinking Water	Surface Water	Value Water
3 strategies	2 strategies	1 strategy

PROJECTS EVALUATED IN 2022

Dots may represent more than one project site. Circled dots represent projects evaluated in 2022; plain dots represent projects evaluated in previous years. Project evaluations from 2022 are available in Appendix A Program Process and Project Evaluations.



	CWF	OHF	PTF	All Funds
Project sites in evaluation program pool	390	5,342	1,413	7,145
Project sites evaluated in 2022	7	10	4	21
Project sites evaluated to date	92	121	34	247

Recommendations to Improve Future Restorations

https://www.dnr.state.mn.us/legacy/restoration-evaluation.html

Program Activities

ENGAGING EXPERTS

A goal of the Legacy Fund Restoration Evaluation Program is to facilitate the technical exchange between restoratio experts and practitioners. This begins in the field with state or contracted sit assessors and project managers discuss implemented restoration practices and shared experience on the ground. Prog staff and site assessors then draft site evaluation reports. These reports are presented to the panel annually by site assessors and program staff to discuss challenges and successes across Legac Funded restoration projects. This tech exchange forms the recommendations for the Annual Report and future communications to stakeholders.

263
EXPERTS ENGAGED

CLEAN WATER LAND & LEGACY AMENDMENT

COMMUNICATING WITH STAKEHOLDERS

For panel recommendations to make a difference, they need to be communicated to the stakeholders engaged in planning, funding, and implementing restorations in the state.

One way our program meets this goal is by helping coordinate training opportunities for practitioners to engage with experts. In 2022 program staff conducted a training session at the BWSR Academy focusing on lakeshore restoration projects. Restoration experts shared the process of planning and implementing high quality shoreline projects.

MORE THAN
5,000
STAKEHOLDERS REACHED

Technical Evaluation Program

	FY 10-23	FY 24-25	FY 26-27	Historical Total
Clean Water Funds	$924K	$200K	Steady	$1.1M
FTEs (state agency staff funded by CWF)*	.5	NA	NA	0.5

*BWSR/DNR Partnership

Stormwater BMP Performance Evaluation and Technology Transfer Program

John Bilotta – Senior Research and Extension Coordinator

Jeff Peterson - Director

Water Resources Center, University of Minnesota

Stormwater BMP Performance Evaluation and Technology Transfer Program

- ✓ Research leads to the improvement of existing practices
- ✓ Discovery of new innovative techniques
- ✓ Increases in the efficiency and effectiveness of frequently used practices and management approaches
- ✓ Technology transfer - Effective outreach, training, and resources are provided to public and private practitioners, professionals, and policy leaders

Minnesota specific information to ensure the 'best' is achieved in the best management practice (BMP) paradigm.

Stormwater BMP Performance Evaluation and Technology Transfer Program

maintain surface water and groundwater resources and minimize and mitigate the impacts of runoff and pollutants from the built urban environment.

Stormwater BMP Performance Evaluation and Technology Transfer Program

Aligns to multiple goals of the Clean Water Council Strategic Plan

- Develop and carry out strategies that will protect and restore **groundwater** statewide.
  - *Action: Reduce risk of stormwater contaminants entering groundwater.*

- Protect and restore **surface waters**
  - *Action: Reduce risk of stormwater contaminants entering surface water.*

- Vision - **Build capacity** of local communities to protect and sustain water resources.
  - *Action: Engage water managers statewide*
  - *Action: Engage chloride users*
  - *Action: Support innovative efforts that accelerate progress toward clean water goals*

Stormwater BMP Performance Evaluation and Technology Transfer Program

Accomplishments

36 Project investments

6 Active investigations + **5** Pond studies

25 Completed

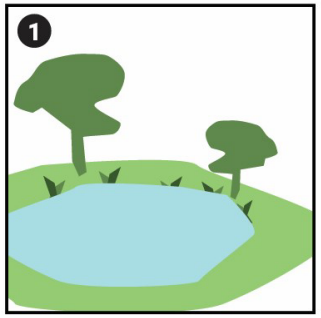
“The research is high-quality and at the forefront of the industry. It also addresses research needs and other industry challenges we are facing in our region.”

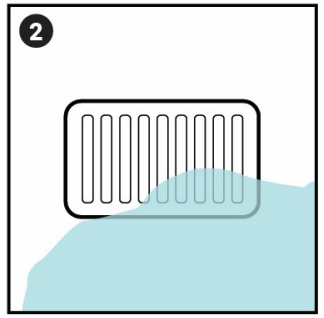
Stormwater BMP Performance Evaluation and Technology Transfer Program

Future Plans

Part I. Strategic, well-informed research investments

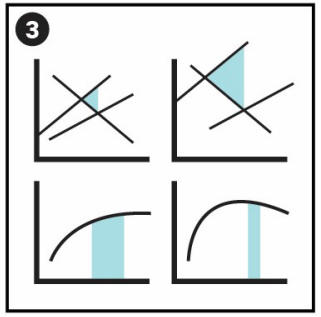
Structural practices





Pollution prevention and source reduction

Effectiveness (efficacy) of practices



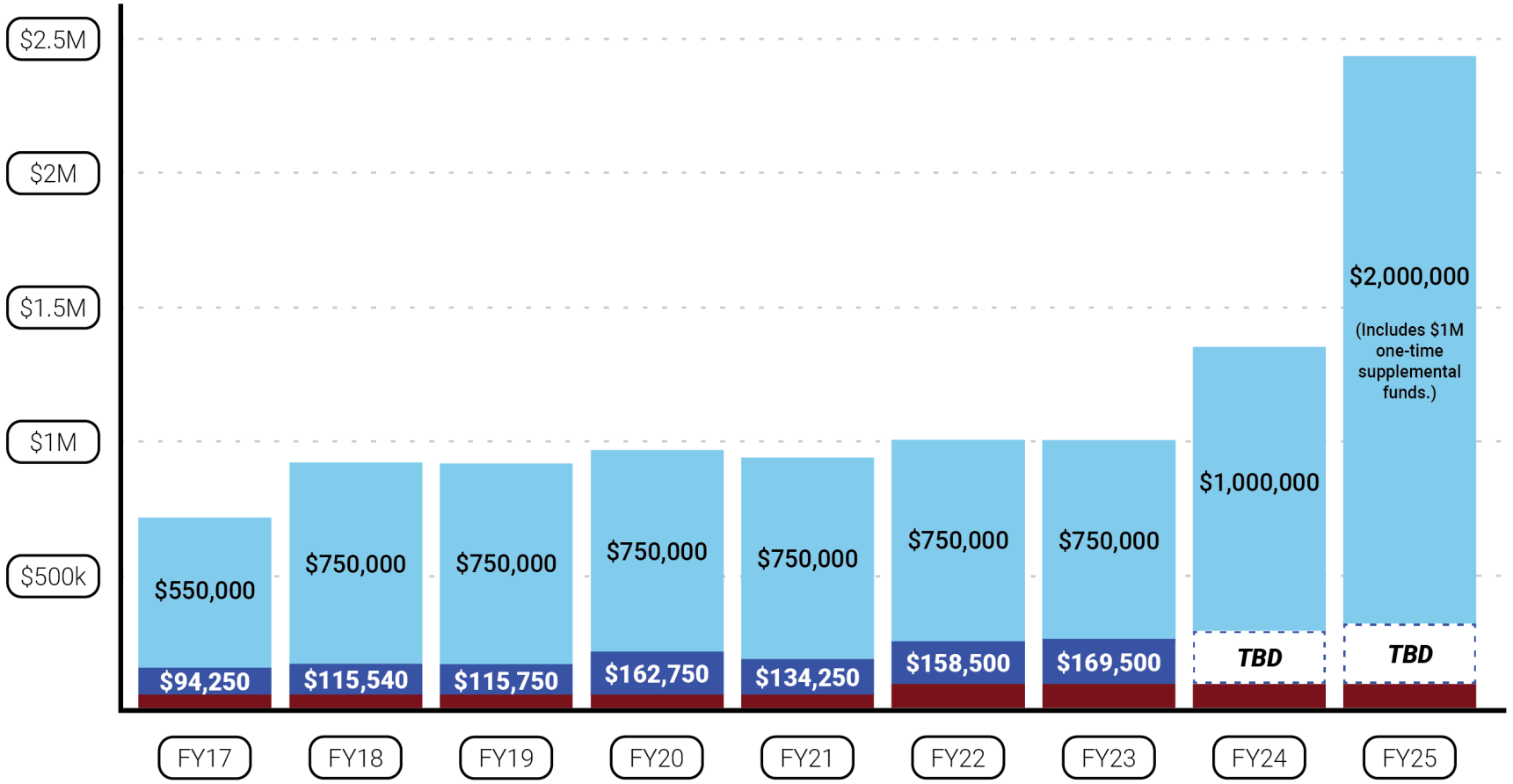
Continued characterization of stormwater runoff

Part II. Expand technology transfer

CLEAN SWEEP
EDUCATION & TRAINING PROGRAM

Stormwater BMP Performance Evaluation and Technology Transfer Program

Financial



Program Financiers

Clean Water Fund from the Minnesota Clean Water, Land and Legacy Amendment

Watersheds, Cities, and Private Industry

2023 Contributors

- Barr Engineering Company
- Capitol Region Watershed District
- City of Edina
- Emmons & Olivier Resources, Inc.
- Mississippi Watershed Management Organization
- Nine Mile Creek Watershed District
- Ramsey-Washington Metro Watershed District
- Rice Creek Watershed District
- South Washington Watershed District
- Stantec
- Upper Mississippi River Source Water Protection Project
- Valley Branch Watershed District
- WSB Engineering

Water Resources Center, College of Food, Agricultural and Natural Sciences, and Minnesota Sea Grant at the University of Minnesota

More than a 1:1 match to CWF resources

FY26-27 outlook
STEADY

Applied Research and Tool Development

Jason Moeckel - DNR Ecological and Water Resources

DNR Applied Research and Tool Category

- Forestry BMP Monitoring and Modeling
- LiDAR data support and resources
  - Hydro Conditioning
  - Mn Topo
- ~~Watershed Modeling~~

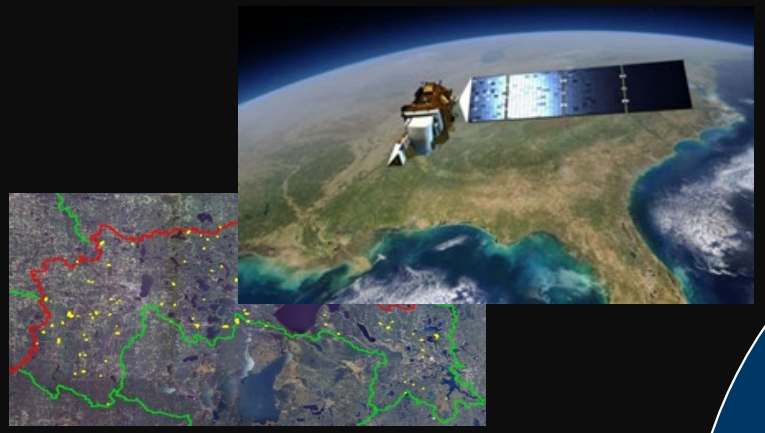
Forestry Monitoring Program (GMP)

- Sites identified using satellite imagery and data layers; 2-3 watersheds surveyed per year
- Data collection handled by 3rd party contractors with DNR supervision and training
- Typically 30-40 sites/watershed
- Data reported biannually
- Training through MLEP, MFRC, and logger conferences focused on improving guideline adherence

Watershed	County	Federal	Forest Industry	NIPF	State	Total
CWR	6	0	0	5	10	21
LRRR	5	0	1	6	14	26
MRBS	12	0	0	9	7	28
SCKS	10	0	0	7	14	31
SCN	7	1	5	9	6	28
SEMN	0	0	0	3	7	10
Total	40	1	6	39	58	144

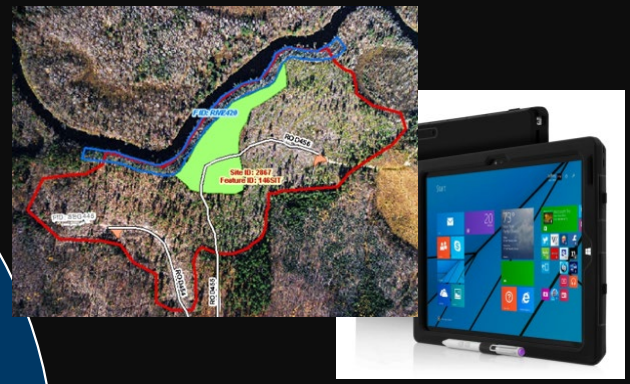
Sites visited during 2022-2023 sampling period by ownership

Forestry Monitoring Program



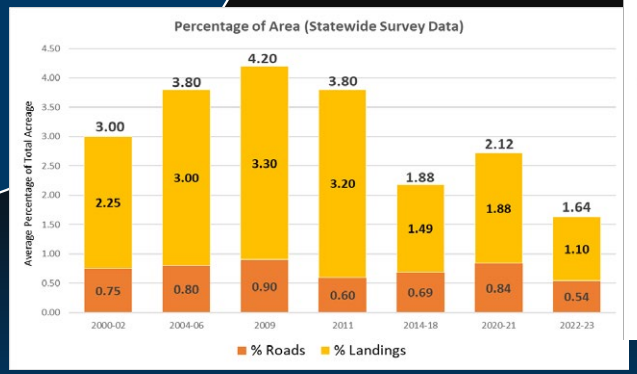
Forest Disturbance Analysis

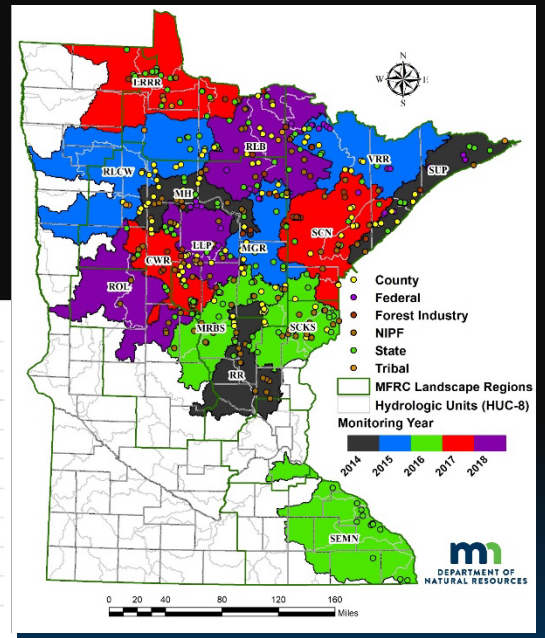
Guideline Implementation Field Monitoring



Outreach and Education

Watershed Assessment



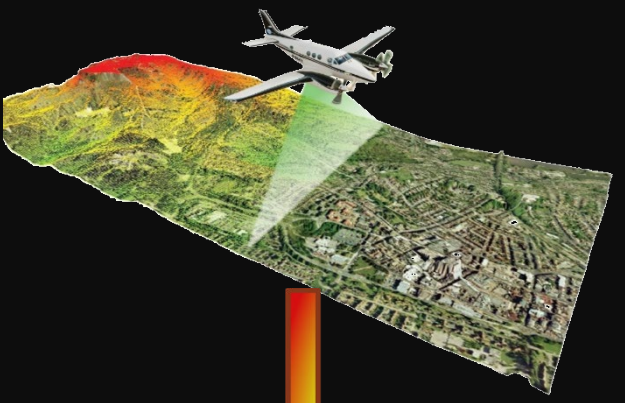


Minnesota’s Second Generation (2ndGEN) of Lidar (2021 – 2024)

A New Era for Mapping the Hydrology of Minnesota’s Landscape

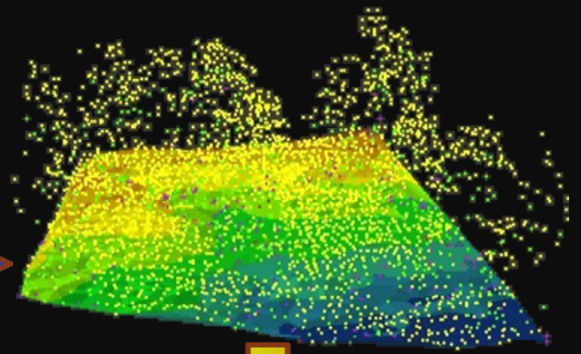
What is Lidar

1. Lidar Acquisition



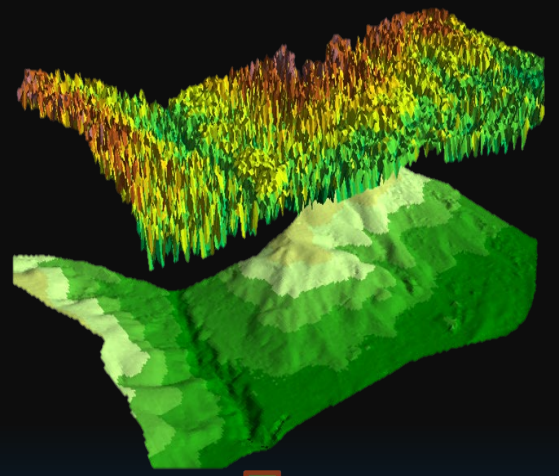
2. Lidar Point Cloud

3D Rendition of Natural and Built Environments



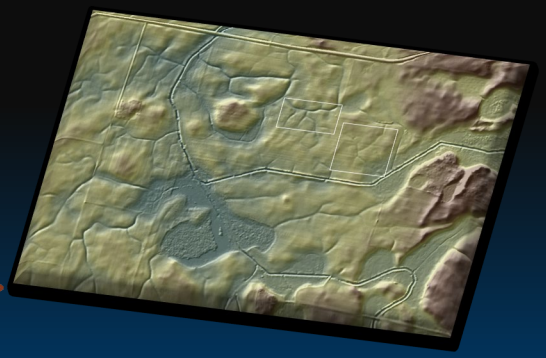
3. Point Cloud Classification

Feature Identification and Separation of Data for Sector Application



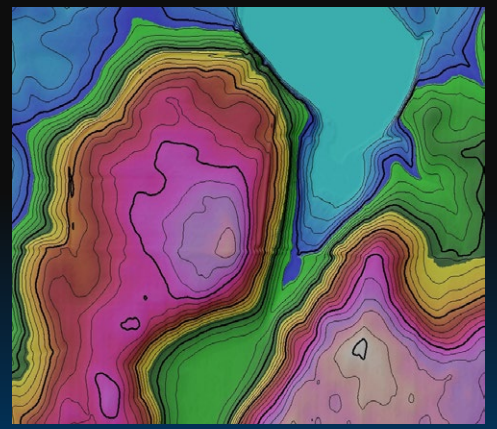
4. DEM

Lidar-derived Digital Elevation Model

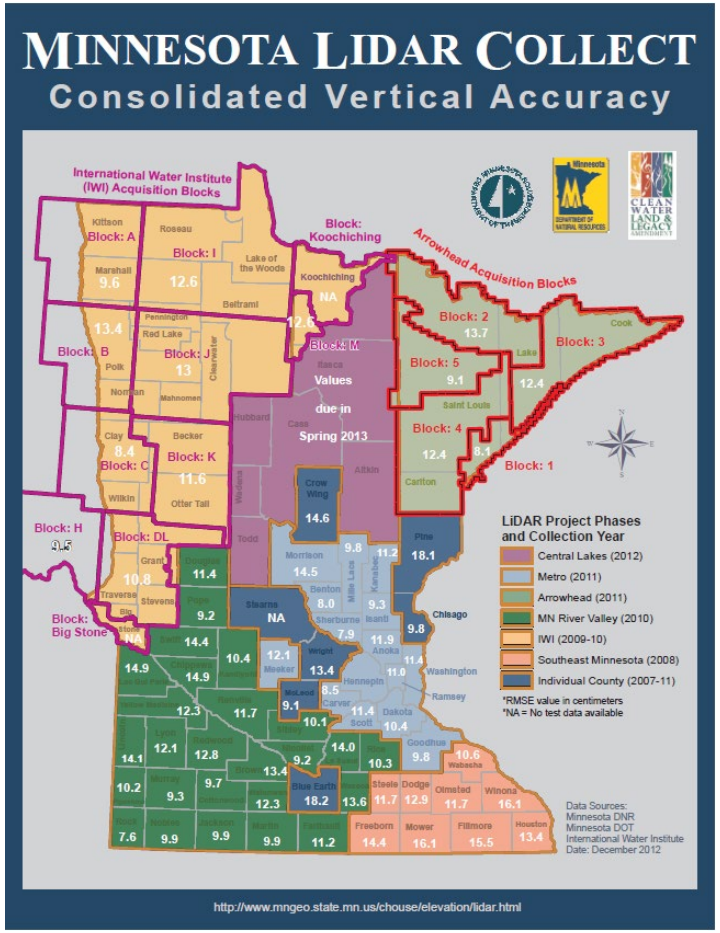


5. Contours

Lidar-derived Digital Contours



Minnesota Elevation Mapping Project: 2008 - 2012



1st Generation Lidar Initiative Led By the **Digital Elevation Committee**

- Goal - Develop and a **seamless high-accuracy digital elevation map** of the State of Minnesota, based on data collected using LiDAR technology.
- July 2009, the Minnesota Legislature appropriated **$8.3 million** from the Clean Water Fund of the Clean Water, Land and Legacy Amendment to DNR.
- **2013 MnTOPO** was published: An **a**pplication is our vehicle for visualizing and serving the data to customers
- Our 1st Generation lidar is now outdated and no longer meets USGS Specification but it will continue to serve Minnesota as a **temporal dataset** of Minnesota's landscape.

CLEAN WATER LAND & LEGACY AMENDMENT

3D Geomatics: Funding, Agreements, and Acquisition

Contributions to Minnesota Lidar

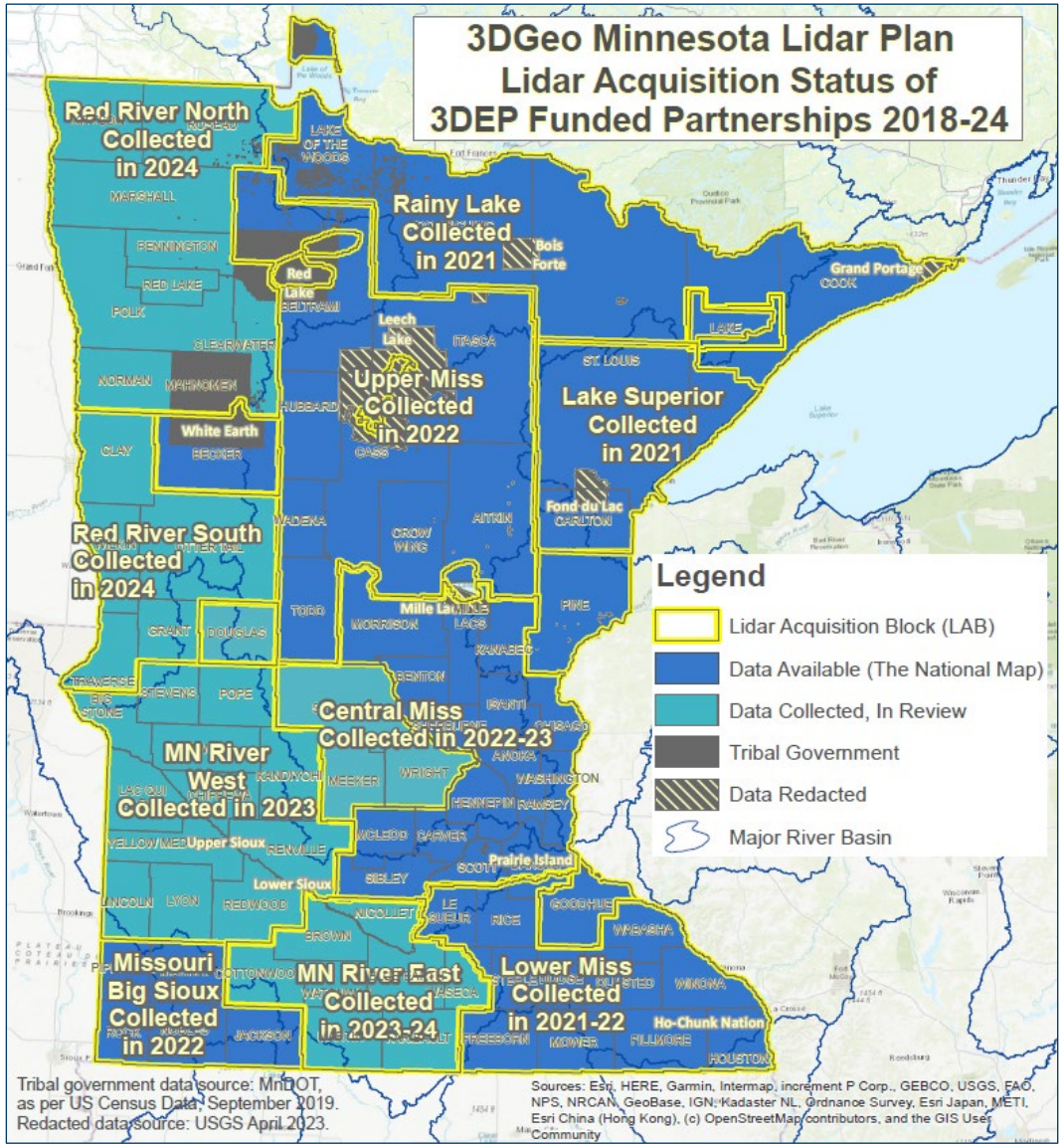
($millions)

- Minnesota Partners: $ 7.55
- USGS 3DEP: $19.08
- Other Federal $ 0.45

Total: ~$**27.08**M

Minnesota Funding Partners

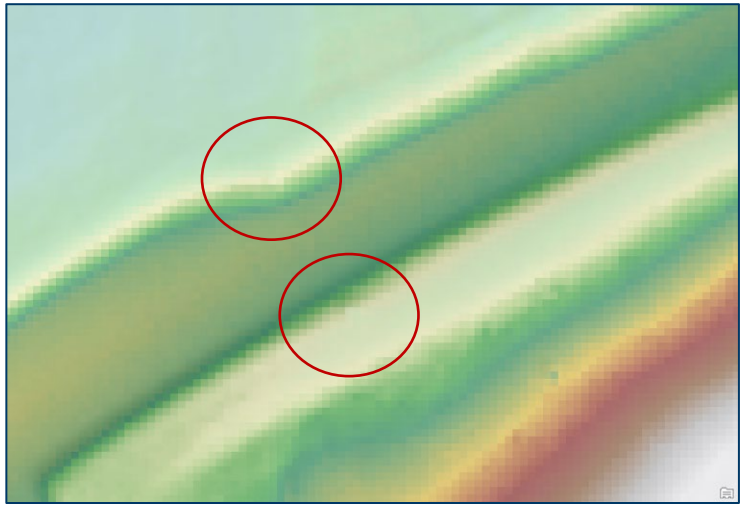
- **59** Funding Partners
- **81,500** Square Miles of New Lidar
- **$92.59*** Cost/mi² For MN Partners



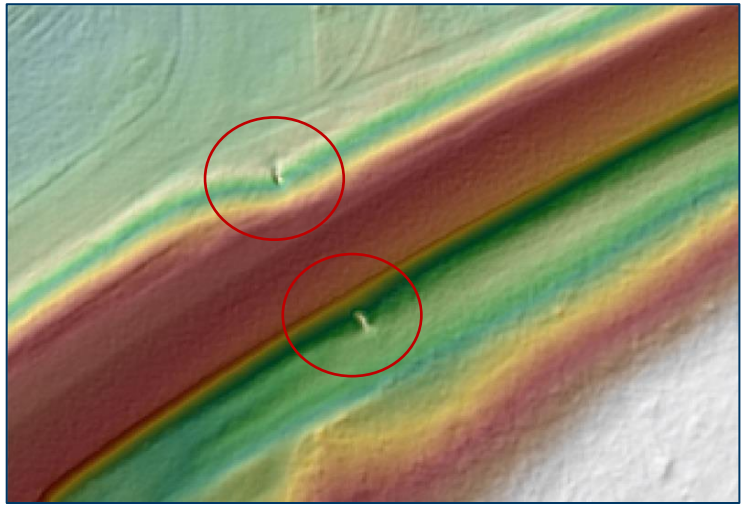
* Estimated per mi² of lidar. 59 unique funding partners and local tax dollars working collaboratively for consistent data acquisition. $92.59 value: 1) not specific to a LAB, 2) total partner contributions of $7,545,761.44 (10/04/2023), 3) doesn't include federal contributions

Culvert Mapping : Hydrography & Infrastructure

Arial Image – Culverts are captured



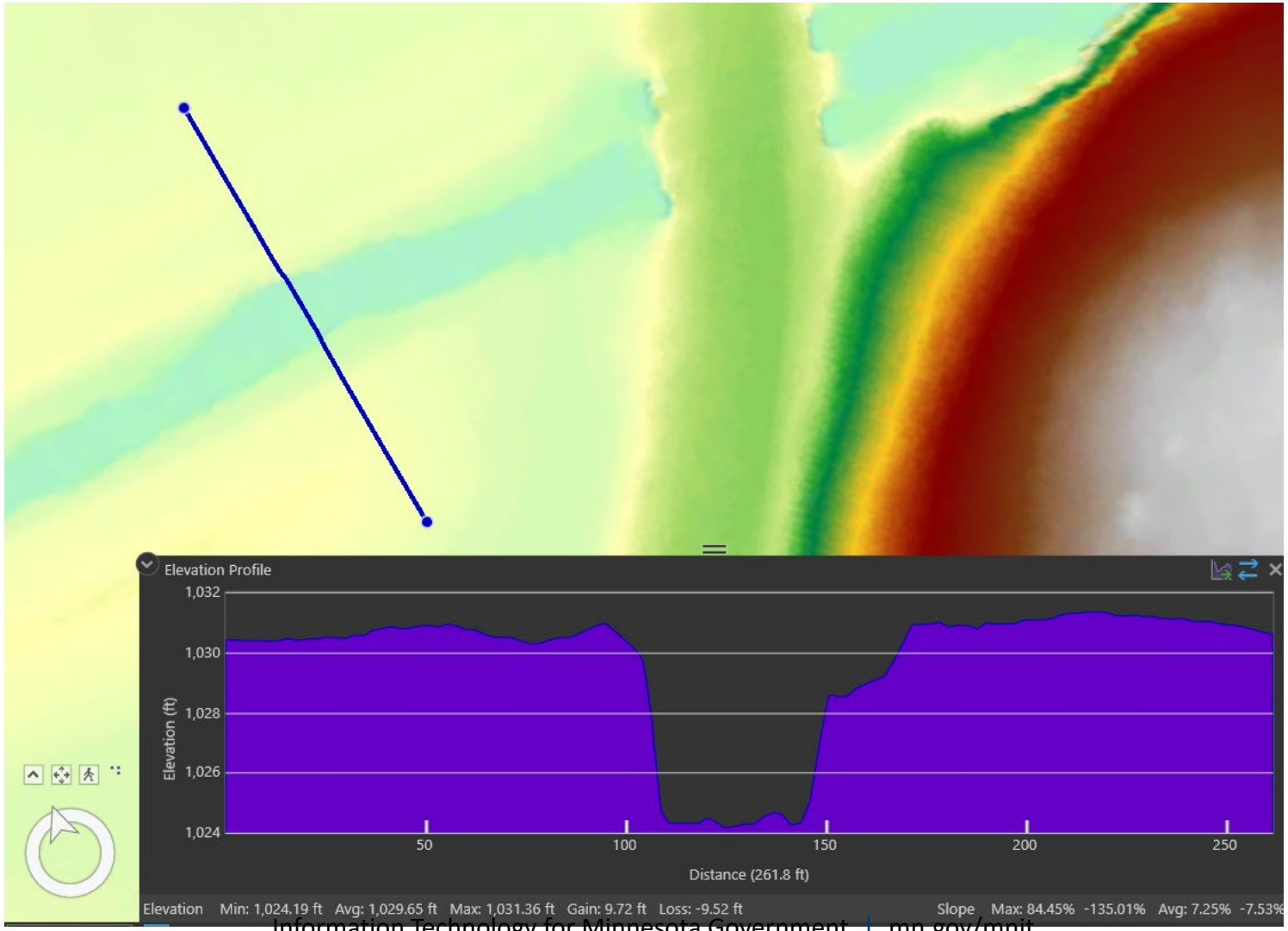
1st Generation Lidar 1-meter DEM



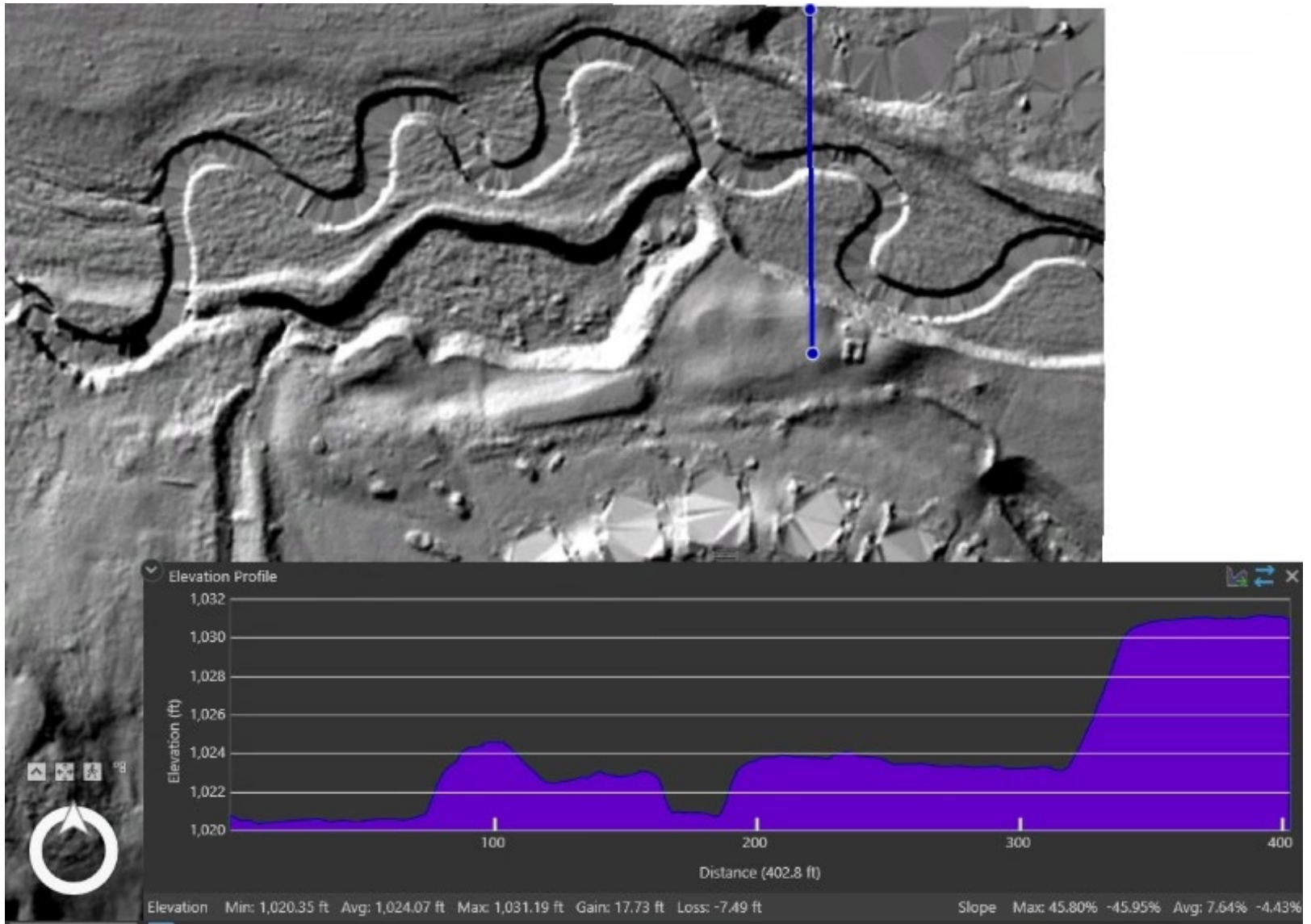
2nd Generation Lidar 0.5-meter DEM

Cascade Creek – Aerial Image

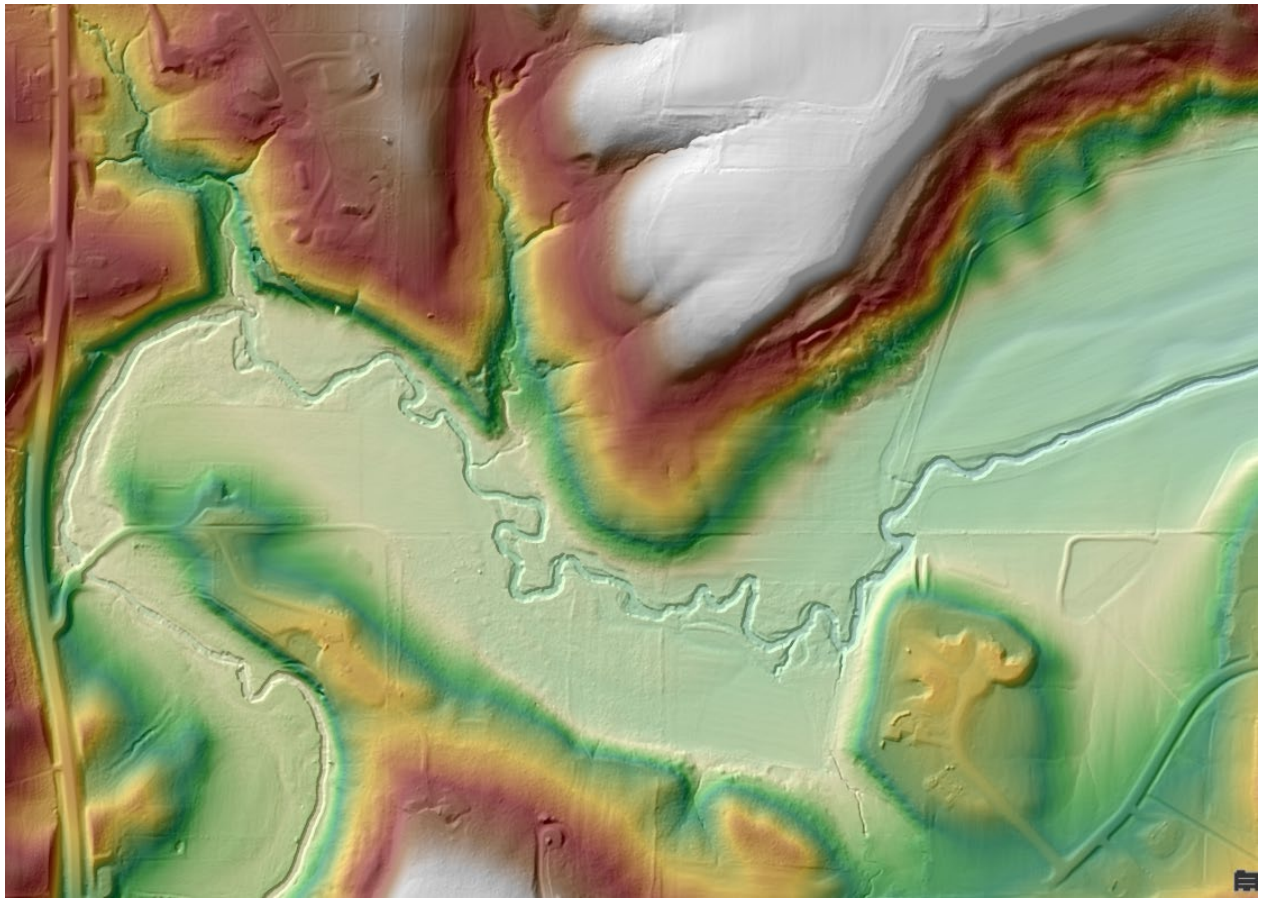
Cascade Creek –2nd Gen Lidar-derived Profile



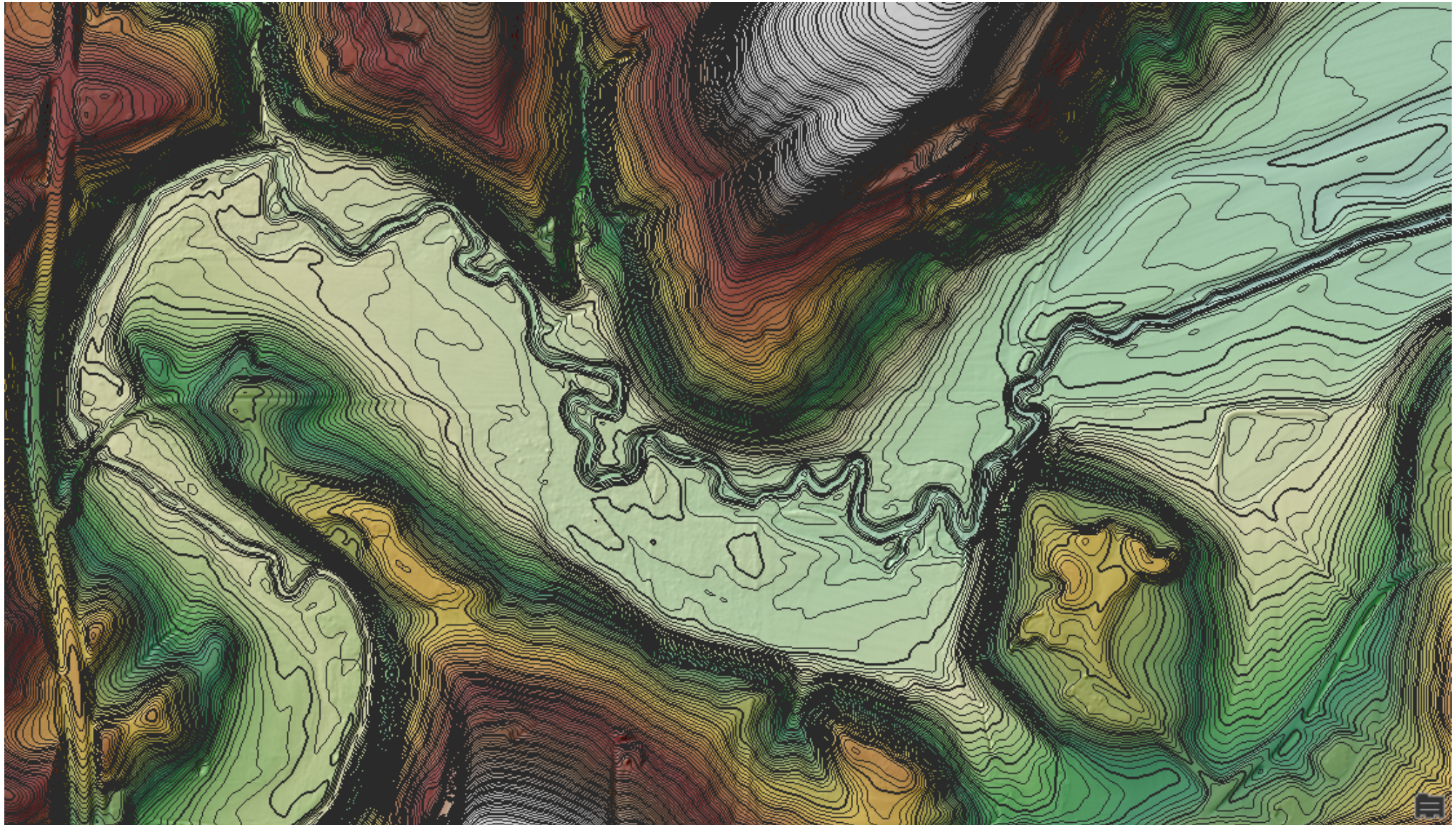
Cascade Creek – 2nd Gen Lidar-derived Profile



Cascade Creek Aerial Image - Details of Creek Disappear



Cascade Creek DEM – Contours Show Detail of the Terrain



Minnesota’s Second Generation (2ndGEN) of Lidar (2021 – 2024)

A New Era for Mapping the Hydrology of Minnesota’s Landscape

Applied Research and Tools

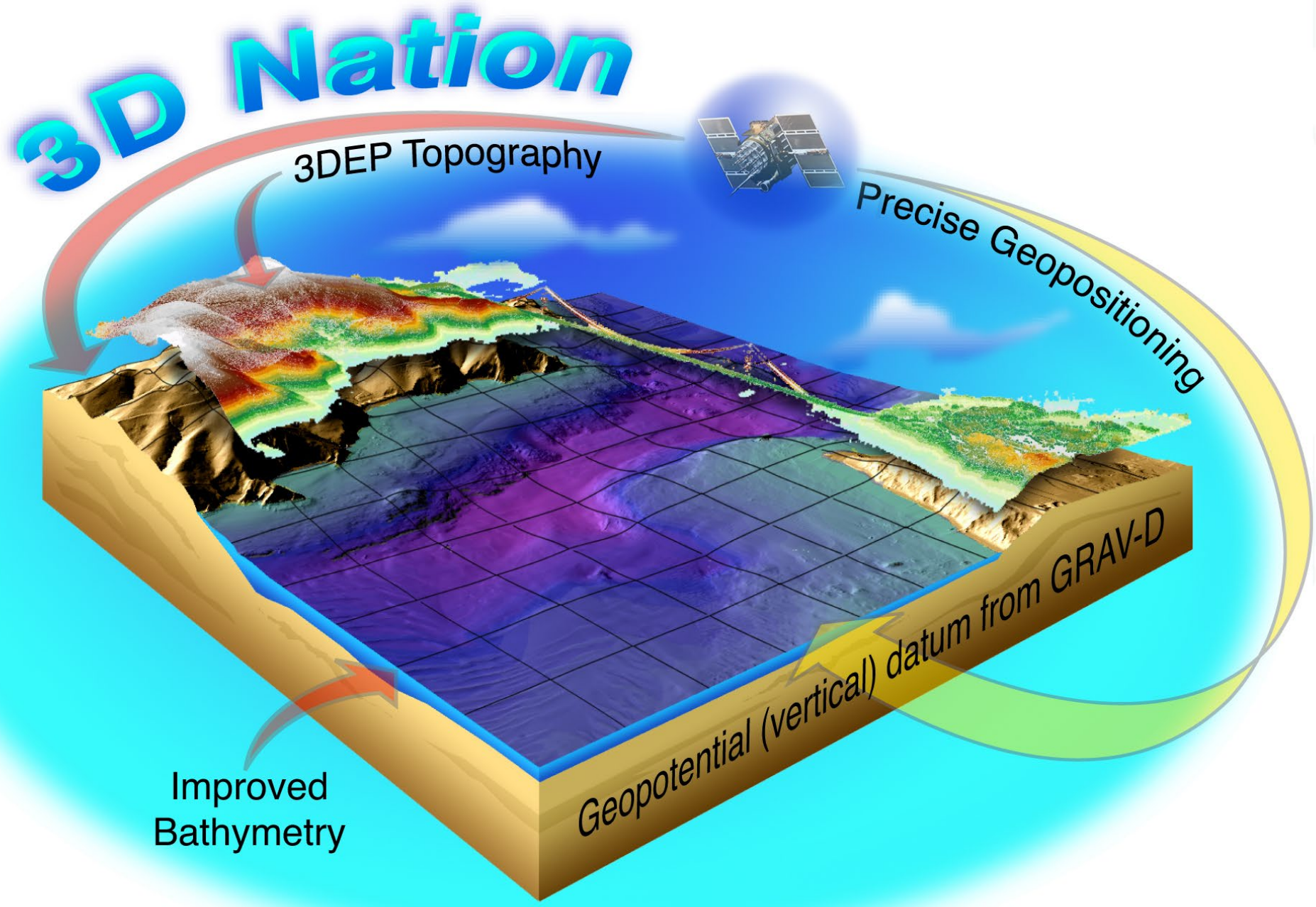
	FY10-11	FY12-13	FY14-15	FY16-17	FY18-19	FY20-21	FY22-23	FY24-25	Total
Clean Water Funds	$550K	$790K	$1.35M	$1.35M	$1.35M	$1.4M	$1.06M	$1.3M	$9.15M
FTEs (DNR)	2	2	2	2.3	2.3	2.0	1.2	0	
MNIT FTE	2	2	2	2	2	2	2	2	

Key Points

- Legacy lidar collations (2008 – 2012) are defined as Minnesota's first-generation low density lidar data.
- MN 3DGeo and the USGS 3DEP partnership is bringing industry recognized 3DEP certified lidar to Minnesota ($27M).
- Current lidar collations (2021 – 2025) are defined as Minnesota's **second-generation high density lidar** data.
- This data is not just an update to our legacy data
- Minnesota will have temporal lidar products. 1st Gen lidar (2008 – 2012) will continue to be publicly available with the 2nd Gen lidar (2020 – 2024).

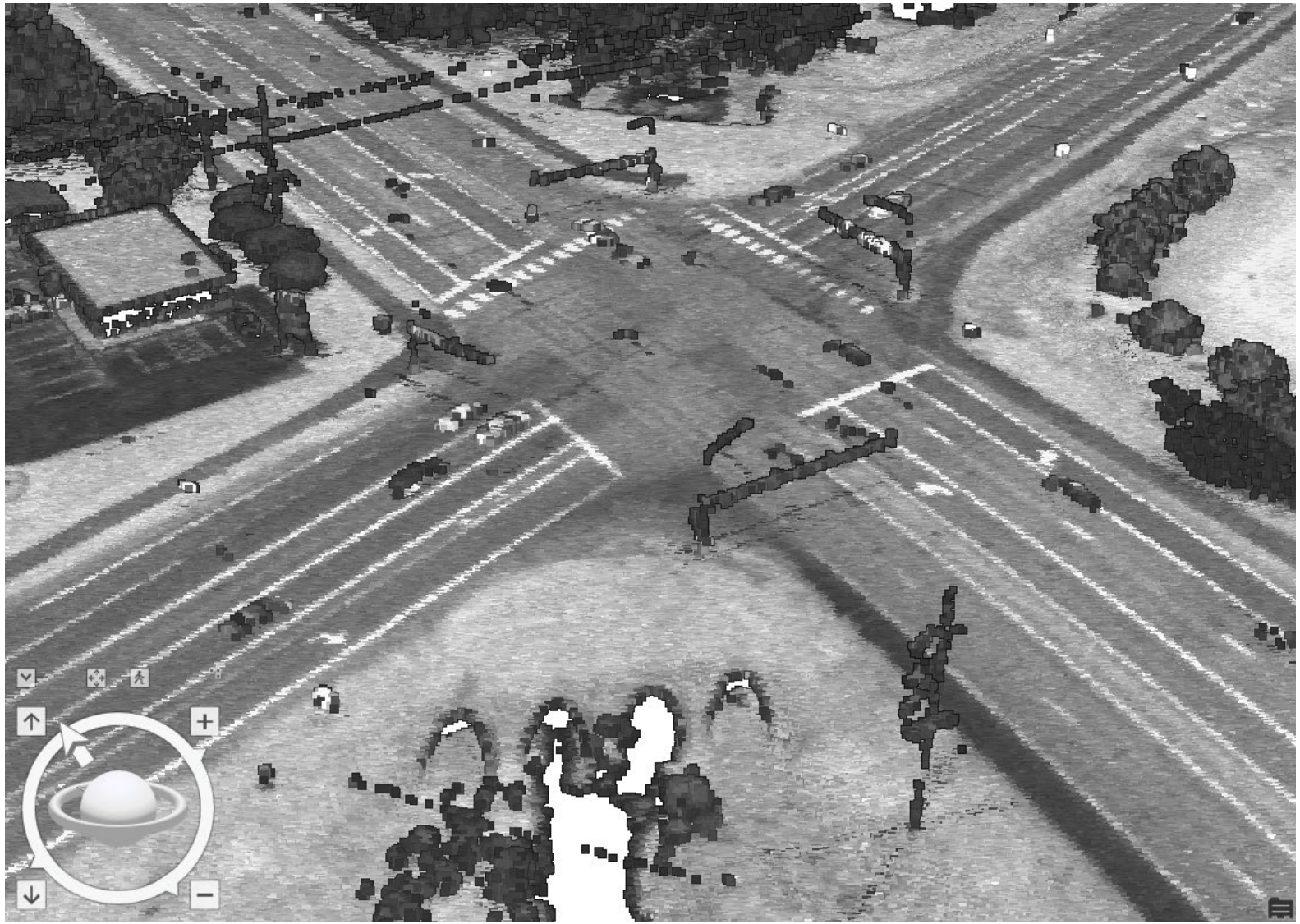
Data Availability: What about Minnesota-specific access?

- **MnTOPO-2**
  - **MnGeo** plans a new version of the MnTOPO to include:
    - ✓ First generation, **legacy** (2008 – 2012) lidar data and derivatives
    - ✓ Second generation, **current** (2021 – 2025) lidar data and new derivatives
    - ✓ MnGeo plans to offer **map services** of derivative products, such as DEMs, that could be loaded directly into tools, such as ArcPro
  - New MnTOPO functionality to include:
    - ✓ Data browsing, data download, onscreen analysis (profile tool)
  - Timeline for release of this tool is not defined

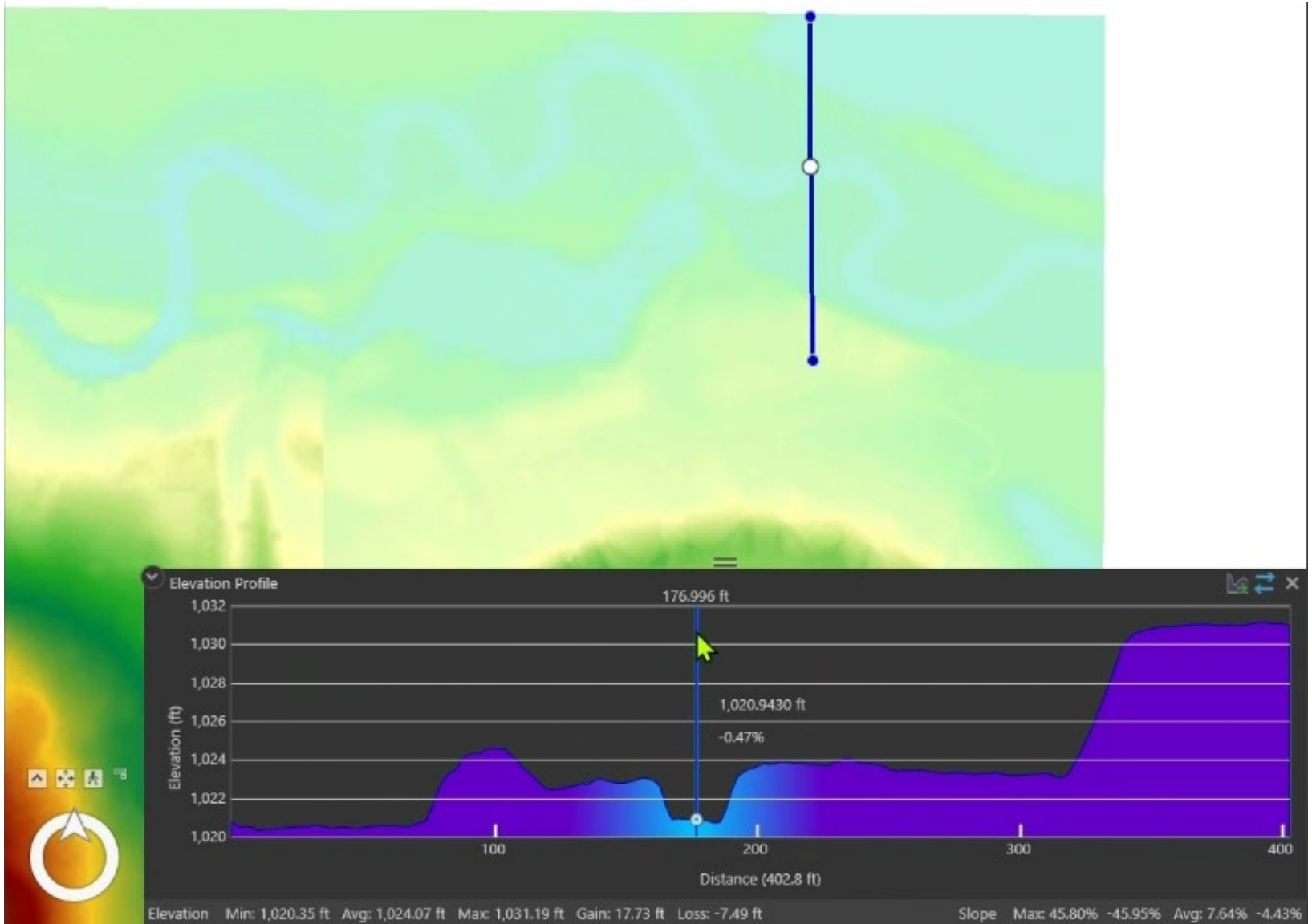

3D Nation
3DEP Topography
Precise Geopositioning
Geopotential (vertical) datum from GRAV-D
Improved
Bathymetry

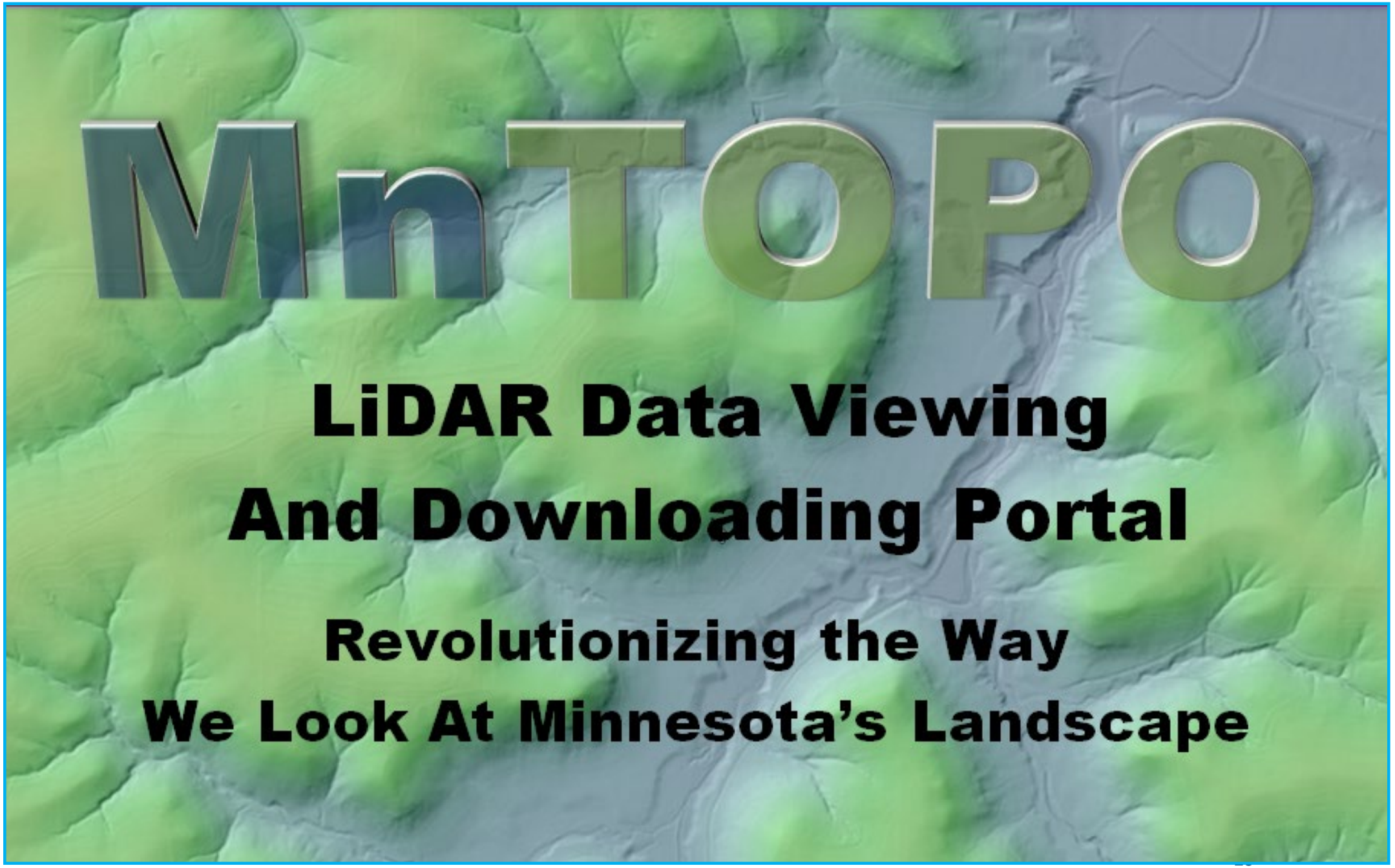
3D Model

Lidar Point Cloud – Mapping Intersection and 4 Box Culverts



Cascade Creek – 2nd Gen Lidar-derived Profile




MnTOPO
LiDAR Data Viewing
And Downloading Portal
Revolutionizing the Way
We Look At Minnesota's Landscape