Clean Water Council Meeting Agenda
Monday, September 16, 2024
9:00 a.m. to 2 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, Committee, and Council Staff update
    - Policy Committee Update
    - Budget and Outcomes Committee Update
    - Ad Hoc Outreach Group Update: **Categorizing Responses for Public Input**
    - Staff update

9:30 Budget & Outcomes Committee Report on Clean Water Fund Recommendations FY26-27

10:30 BREAK

10:45 Adoption of Initial Clean Water Fund Recommendations for FY26-27

12:00 Lunch

12:30 Valuing State Investments in Clean Water (Report funded by FY20-21 CWF)

- *An analysis of Minnesota's Clean Water Fund through the lens of ecosystem services, equity, and climate change*
- Bonnie Keeler, University of Minnesota

1:45 Public Comment

2:00 Adjourn

Steering Committee Meets Directly After Adjournment

Clean Water Council
August 19, 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, Justin Hanson, Holly Hatlewick, Rep. Josh Heintzeman, Annie Knight, Jason Moeckel, Jeff Peterson, Peter Schwagerl, Glenn Skuta, Dan Sparks, Marcie Weinandt, and Jessica Wilson.
Members absent: Kelly Gribauval-Hite, Sen. Nicole Mitchell, Ole Olmanson, Peder Kjeseth, Rep. Kristi Pursell, and Sen. Nathan Wesenberg.
Others present: Paul Gardner (CWC), Brianna Frisch (MPCA), Margaret Wagner (MDA), Joel Larson (U of M), Jeff Anderson (Voyageurs project), Barbara Heitkamp (Washington Conservation District), Frieda VanQualen (MDH), Sophie Walsh (MDH), Judy Sventek (Met Council), Joe Birkholz (Red River Watershed Management Board), Jen Kader (Met Council), Barbara Weisman (DNR), Chris O'Brien (Freshwater), James Lehner (Conservation Minnesota), Michelle Jordan (Chisago SWCD), Sheila Vanney (MASWCD), Catherine Neuschler (EQB), Beau Kennedy (Goodhue SWCD), Brian Martinson (AMC), Commissioner Fran Miron (Washington County), Anne Marcelle Lewandowski (MOSH), Joe Collins (BWSR board member and Capitol Region Watershed District), Jessica Collin-Pilarski (Washington County), Jeff Hrubes (BWSR), Carly Griffith (MCEA), Julie Westerlund (BWSR), Mae Davenport (U of M), Jan Voit (MN Watersheds), LeAnn Buck (MASWCD), Angelica Anderson (Nature Conservancy), Anne Nelson (MDH), Jamie Beyer (Bois de Sioux Watershed District), Matt Spellman (MN Realtors)

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
- Motion to approve the August 19th agenda and July 15th meeting summary by Steve Besser, seconded by Marcie Weinandt. Motion carries.
- Chair, Committee, and Council Staff update:
  - Policy Committee Update
  - Budget and Outcomes Committee Update
  - Ad Hoc Outreach Group Update
  - Chair and Staff Update
    - John Barten: The Minnesota Public Radio (MPR) has a series on shoreline alterations and may come back to the Council. They started last week and have a few good articles to read as well. It would be good to know about. John will attend the Subcommittee on Minnesota Water Policy tour tomorrow.
    - Paul Gardner: Star Tribune reporter Jennifer Bjorhus has died after a nine-month battle with glioblastoma. She was an intrepid reporter, who covered the environment and authored a series of articles about nitrates in groundwater.
      - The meeting packet includes the letter sent by the Lessard-Sams Outdoor Heritage Council (LSOHC) to the Minnesota Department of Labor and Industry (DLI) regarding the issue of prevailing wage on conservation projects due to changes to Minnesota law. The issue may impact programs that use Clean Water Funds (CWFs).
      - In the packet is a one-page fact sheet from the Minnesota Department of Agriculture (MDA) on the Climate Reduction Pollution Grant (CRPG) from U.S. EPA. It covers many different things.
      - Check out the Eco Experience by the Minnesota Pollution Control Agency (MPCA) at the state fair.
      - Paul Gardner is running for the Shoreview City Council. There are two candidates for two seats. There are CWFs that go through the City of Shoreview like water efficiency grants, so if elected he will note any conflict of interest.

Public Input & Discussion: How Socially and Culturally Diverse Minnesotans Value Water, by Dr. Mae Davenport, University of Minnesota (UMN)
- Water is valued and abundant in northern Minnesota. It is also controversial in how we protect water and what good water policy looks like. Dr. Mae Davenport is a social scientist and focuses on community

engagement in the environment. Additionally, they study water values and relationships across Minnesota (like recreation, agriculture, stormwater, groundwater, drinking water, as well as water and wild rice. In this work, models have been developed for community engagement.
    - Representing perspectives and experiences of socially marginalized groups involves representation justice. People should reasonably expect that the diversity of water relationships and values of community members are fairly deliberated and equitably represented among those in power (Davenport et al. 2023).
    - In the research, they commit to using rigorous and inclusive social science research and methodologies to gather and share different narratives of water with communities and community leaders. Their goal is to represent communities and influence water policy, programing, and investments for water justice.
    - Regarding the community engagement process, they tend to ask how we can engage science, policy, and management in community in relevant, meaningful, and just ways. They aim to have a community-centered processes guided by community members and organizations.
- Urban Waters Value Project
    - This was sponsored by the Metropolitan Council (2020-2024), with CWFs. It was aimed at having a better understanding and representing the diverse values of water in the Twin Cities.
    - They asked three questions about water: What do we know? What should we know? How do we engage in co-developed policy for water justice? They partnered with Dr. Bonnie Keeler's group at the UMN. They led the review of a decade of water-related survey research in Minneapolis. They also conducted a mail survey of 622 Minneapolis residents (onsite of 1052 residents at cultural events). Additionally, they had a water policy co-development workshop with 24 community leaders and water professionals.
    - Regarding sampling:
        - Mail survey only brought in a 6 percent results for BIPOC folks. For onsite, it was at 67 percent (compared to 30 percent in the Minneapolis population). Additionally, their onsite surveys revealed more female identifying, younger age, and smaller median household income than the mail surveys.
        - To improve their response rates while conducting the research, they used a few strategies. They had multilingual field staff along with signage in French, Mandarin Chinese, Somali, and Spanish. They provided a $2 US cash incentive. There was an interactive bead "voting" activity for all ages. They engaged at 14 different events across the region.
    - Results:
        - They asked a set of questions in the survey. For "How important to you is it to protect lakes and rivers for the following water values or uses?", their research reveals, the top three are almost always: future generations, equitable access to clean drinking water, drinking water that is safe and clean. This is found true for male or female, farmers or non-farmers, age, etc. We find more differences across groups with other water values. The graphic divides between white and BIPOC, statistically different. So, we see differences that are important, especially in where the divisions happens. People relate and value water a little different, and is that reflecting in water policies? We do not want our data to be whitewashed be not collecting from all people who are represented in Minnesota.
        - There are also differences in access to drinking water. There is a decline in other race and ethnicities. For the question "Who drinks water from the tap?", 93 percent identified as White drink water from the tap, while only 49 percent identified as Black or African American. So, there are disparities in water access. They revealed that 49 percent of BIPOC respondents trust that their tap water is safe to drink, compared to 77 percent of White respondents. They may be buying water to drink then, which is spending money. Another revealed that 46 percent of BIPOC respondents worry about the safety of their drinking water, compared to 19 percent of White respondents. These are real issues of justice, policy, and trust in the twin cities.
        - There are difficult decisions and tradeoffs around water policy, so there is a need for policy co-development workshops. These workshops work on policy co-generation, deliberation, and prioritization, as well as the goal of water justice policy.
        - There are a lot of folks behind this work, and it is a strong team. We are excited about this community centered research and engagement in water across the state, across communities, that embraces culture, and the way people engage in different relationships across Minnesota.

Public Input & Discussion *(Webex 01:04:30)*
This is an opportunity for the public to discuss what stood out to them, and what changes could be made. As appropriate, topics could be directed to committee or future full Council meeting to dive deeper into the topic.

- Jason Sjoblom, Koochiching County, and member of the Voyageurs National Park Clean Water Joint Powers Board (JPB): The JPB is a collaboration between Koochiching and St. Louis Counties to improve wastewater treatment in the area. In 2010, the JPB worked with SEH to create a Comprehensive Wastewater Plan that identified four major areas for improvement. These areas are Island View, Lake Kabetogama, Ash River, and Crane Lake. We've done a lot of work on Crane Lake, and the Ash River area is next. This is a joint effort. We welcome any and all support.
- Beau Kennedy, District Manager, Goodhue Soil and Water Conservation District (SWCD): Thank you for the watershed-based implementation funding (WBIF) in the Zumbro River Watershed, which includes Rochester. The landscape is diverse (glacial fill, karst geography, bluff land areas with the Mississippi River) and is home to many trout water streams. Their plan was created with local partners, public input, and a policy committee. The plan was adopted November 2021. It focuses on groundwater protection. They have about 85 percent of funding going towards projects and field practices (with 15 percent other). They are on their second round of WBIF (2022 and 2024). The Zumbro Plan calls for $19 million over the ten-year plan life, with leveraging an additional $15 million in partner dollars. To date, the partners have encumbered 87 projects that address a backlog. Structural projects are getting more expensive and complex. Soil health practices are becoming more prevalent.
- Fran Miron, Washington County Commissioner, Chair of the Lower Saint Croix Watershed Partnership, and with Barbara Heitkamp, Lower Saint Croix Watershed Partnership: They are here to show support for the WBIF. We are a collaboration of 15 local government agencies tasked to create and implement a comprehensive plan to guide protection and restoration of priority natural resources for the next ten years. The funding unites us and fosters collaboration.
- Trevor Russell, Friends of the Mississippi River: We draw your attention to three items. The meeting packet (page 163) has a letter from 31 organizations in support of the $6 million funding request for the University of Minnesota Forever Green Initiative. There is also a fact sheet to summarize the important water quality benefits. Also, on 173, there is a letter from the Friends of the Mississippi River on the Council's overall recommendations. Our top priority is the $6 million for the Forever Green Initiative. The bulk of pollutants to the Mississippi River are nonpoint source pollutants from agricultural croplands. Traditional farmer education best management practices are essential, but likely will not get the job done alone. We need solutions that are economically supportive for farmers. These CWFs have allowed Forever Green Initiative to leverage funds. We also support chloride reduction, Clean Water Council capacity, the Watershed Partners Legacy Grants program and protecting private drinking water wells. Everyone deserves safe drinking water. We have had concerns in a few areas. Line 21 is the Voyageurs National Park. We are aware that it is deeply loved and do want to support it, but this is not the right funding source for it. We prefer not to see earmarks in the recommendations. We acknowledge if you don't make that recommendation, the Legislature may make it for you like it has been done in the past. Thank you for the work you do and making it public and accessible.

Report from Budget & Outcomes Committee on August 2nd Discussions *(Webex 02:25:30)*
We had two rigorous meetings. The BOC sent priorities to the Interagency Coordination Team (ICT). This was for a $307 million budget, and the ICT was only able to get the budget to $317 million. Therefore, there was $10 million further to cut. We have worked closer to a final recommendation. Steve Christenson has put together a spreadsheet reviewing our status.

- At the next Council meeting, we will have a budget proposal and ideas for use of a surplus.
- Public feedback has been appreciated. It is the most the Council has received.
- The BOC would like feedback on three strategic topics: Easements, WBIF, as well as Federal matching programs and federal funding programs.
- Six areas were selected for budget reductions to get to $307 million, especially in programs that are scalable, or those that had supplemental funds in FY2025. The ICT proposed seven programs for an increase. There are about a dozen areas to cut, to help increase those areas. For the most part, the BOC agreed with the ICT's recommendations. There were some areas to flag for additional investment. The items highlighted in yellow is where we needed further discussion, looking into the impacts of increases or decreases and leveraging funds.

        - Easements: There is a history of cutting back easements to fund the WBIF (and/or other funds). How comfortable is the Council with this?
        - John Barten: The easements are permanent. Between the Outdoor Heritage Fund and the Fish and Wildlife funds, these funds protect wellhead protection area in almost perpetuity. I really like the thought of spending these public dollars that sunset in 2034.
        - Holly Hatlewick: Easements are a great tool for conservation and water quality. The conversations we've had is that these are more scalable. Easements have been around for a long time. We can still have the program, but just scaled back.
        - Marcie Weinandt: I like easements too. They are good for the landowner and the environment. However, I don't think this is a permanent cut. We can always look at them again. I want to compliment the ICT and the Board of Water and Soil Resources (BWSR), because this is something that could be reduced to provide funding to WBIF, or other items that are prioritized.
        - Rich Biske: I am uneasy about cuts to easements because of their durability. The easements have some flexibility. The working lands easements are impactful. It is an opportunity to retire groundwater- sensitive lands and vulnerable floodplains. I would hate to slow that down.
        - Annie Knight: I strongly support continuing the program and am hesitant to decrease any. For the WBIF, if the One Watershed One Plan (1W1P) prioritizes conservation, they could use those funds for easements in that region, which would support it as well. The responsibility shifts to the local units.
    - WBIF: To make more investments in WBIF, there needs to be cuts within the budget. More watersheds are completing their comprehensive watershed plans, so more money is needed. This year there are about 60 of them. They average $1.5 million, and there is a need to increase the funding. This is up to a third of the budget! How do Council members feel about providing that much funding?
        - John Barten: To increase the WBIF by $10 million, other programs must be reduced.
        - Dick Brainerd: It is a tough question. These are the kind of projects we want to happen, that need to have funding. What happens if they don't have these additional funds?
        - Steve Besser: We have spent our entire CWC career creating the 1W1P. It is our keystone project that are boots-on-the-ground that the public will see. That does not diminish the importance of easements. Keeping pace is important. We are still better than we were three budget cycles ago.
        - Jessica Wilson: Other programs are shrinking over time as 1W1P grows. The Council has less impact on where the funding goes since local units of government manage it. It is okay to have more 1W1P funding. Over time, it may be a bigger percentage. This can really be transformative and can really change the trajectory of the water resources. There is a momentum needed. As local watersheds implement their plans over time, the less they need the Council to recommend where the funding goes.
    - Federal matching:
        - Justin Hanson, BWSR: Often, once you are in the federal funding programs, you can continue to stay in them. The hardest part is showing up with money in hand for leveraging.
        - Glenn Skuta, MPCA: The SWCD capacity funding now comes from the state's general fund, so it won't go away. Funds for local water planning have been around for a while, and the requirement will remain in place. There was not a lot before the CWFs. Minnesotans (e.g., farmers) receive money from the USDA for conservation as well, even if we don't know how the funds are going to be spent. The CWFs are incredibly important, but it is not over. We are making a lot of progress right now.
        - Marcie Weinandt: Leveraging money whenever possible is a priority. However, if you are leveraging money that may not be priority, then perhaps the focus should be a little more flexible. We do not want to be chasing money.
        - Margaret Wagner, MDA: Minnesota is competitive because we have existing dollars and can bring a match to the table. If funding decreases, we would need to go back to the federal government to let them know it has changed, and that does not reflect well. *Response from Marcie Weinandt*: I would not be supportive in having to do that with the federal government.
- This information will go back to the BOC for further discussion. For the September full Council meeting, the BOC will provide a $307 million budget, as well as a plan if the budget is higher or lower than $307 million.

Ad Hoc Outreach Group Discussion *(Webex 03:36:30)*

- We want to circle back and close the loop on how input influences the outcome. Part of it is having a public discussion on what had been heard during the meeting this morning, verbal testimonies, and written comments. We want to reflect on all the comments received. Additionally, this group wants to respond to each of these comments. Some input will have already been captured in the recommendations.

Discussion:

- Steve Christenson: Will someone reply to each input? *Answer:* Moving forward we can have a somewhat generic response, so folks know we have read and listened to their input. However, depending on what is provided, there may be some good follow up to connect to the stakeholder. For example, for the summary of public comment, the first one talks about concerns for microplastics. The Council has received the comment, but it may be a good idea to respond to this individual with a response on how the Council is approaching the microplastics issues. We don't want to just file them away. Paul Gardner notes that anyone who sent items to the Council received acknowledgement. A small group of Council member could complete some responses. There may be a need for the larger Council on some items.
- John Barten: It would be good to reveal the funding to the people too. So, they know the amounts.
- Dick Brainerd: There is a lot of support in these written comments, and that does not require a lot of response. So, we should thank them for their feedback.
- Brad Gausman: There are few not related to specific programs, is there a time to assess input on non-programmatic items? Those comments may be important to include as well.
- Rich Biske: It might be good to review which programs did not get called out by stakeholders, to learn more. If there is an awareness of the program, or just support across the program in general. It would be interesting to understand.
- The group can convene and follow up again at the September meeting.

Adjournment *(Webex 03:59:10)*

Federal Matching Interactions with the Clean Water Fund

Clean Water Council

Budget and Outcomes Committee

6 September 2024

The following includes some general points informed by discussion with agency staff.

- Federal matching funds to support activities also supported by the CWF have different requirements based on the program and funding source. Generally the federal government wants their money to ***supplement*** and not ***supplant*** state funding, similar to the requirement in the Legacy Amendment.

- Minnesota is not receiving any ***current*** federal funds that are contingent on receiving as yet unappropriated ***future*** CWFs in FY26-27, but future funds under a multi-year grant agreement may be threatened if a state match is not maintained.

For example, Minnesota's Conservation Reserve Enhancement Program (CREP) agreement and federal funding is 100% contingent on our ability to leverage state funding. We can't access funding unless this match is appropriated.

EPA's Climate Pollution Reduction Grant (CPRG) requires maintaining the program baseline committed in the application for the five-year award. The federal funds are exclusively for emission reductions above that baseline (supplementing and not supplanting). Future state budget cycles will determine if we maintain/forgo the remaining federal funds. There has been no indication that federal authorities would claw-back funds or enact financial penalties if the state reduces or eliminates a match in future years.

Our success in landing future federal matching funds usually hinges on the state's reliability in maintaining a constant effort in existing programs.

- Each federal grant award has its own conditions for a minimum match.

Some federal matching funds come to us in some ratio and some do not. For example, federal CREP funds come to us at $2 for every $1 in appropriated state funds. The federal Regional Conservation Partnership Program (RCPP) program requires a match but doesn't require a specific ratio; our CWFs make a strong case for federal support in our proposal. The U.S. EPA's CPRG requires a minimum baseline of state support.

- Sometimes we just need CWFs for the capacity to seek out and manage federal funds.

The issue isn't always the match, it's just the needed capacity that no one else will pay for. The Great Lakes Restoration Initiative (GLRI) is an example. By supporting the St. Louis River Area of Concern with staff funding at the MPCA, the project had people who could seek out state capital investment funding, Outdoor Heritage Funds, and EPA GLRI funds. Similarly, the CWFs for Lake Superior Basin SWCDs in FY24-25 are supporting capacity for local governments to manage projects beyond their usual workload.

Clean Water Council

September 16, 2024

Executive Summary for Response to Public Input

This executive summary is intended to:

1) Describe how public input is acknowledged, answered, sorted, and routed to committees or agencies for further clarification or discussion.
2) Summarize key takeaways to aid Council discussion so it may determine if further action is needed.
3) Give people a 'line of sight' for how the Council used or didn't use the input that was provided.

This executive summary is informed by the summary of public comment table and the original letters/testimony offered by commenters.

Input can generally be sorted into the following categories:

- **Acknowledge**. This is common for input that doesn't require an answer or further discussion.
- **Answer**. This is common for input that has a discrete response. For example, describing how past, present, or planned future work might address a concern or comment.
- **Route to Budget and Outcomes Committee for consideration**. This is for input that BOC may consider taking up at a future meeting.
- **Route to Policy Committee for consideration**. For input that Policy committee may consider taking up at a future meeting.
- **Route to Agencies**. Questions or comments that are best answered by an agency – the proper agency is noted.

Key takeaways overall

- A lot of input was received from a wide range of entities; however, they tended to be the usual suspects.
- The calls for support and funding increases exceed the budget.
- People are concerned about conventional water quality pollutants and noted specifically chloride, microplastics, PFAS, and pesticides.
- People are concerned about flooding, drainage, and hydrologic changes and how they impact water quality.
- People are concerned about nitrate. They want more protection, monitoring, and incentives for landowners. They want protection for source water broadly, as well as for private well owners.
- People support planning, monitoring, protection (easements), implementation, and research and technology transfer.
- People are concerned about safe and sustainable drinking water supply. People value water supply planning, water efficiency implementation, and support water reuse funding and implementation.
- People value and support investing in landowners and adoption of a wide range of agricultural best practices and tools (equipment, technical assistance, certification, monitoring and data tools, perennial vegetative cover and soil health).

- People value efficiency, transparency, communication, and cooperation.
- There is some disagreement on appropriateness of using CWF for specific projects and programs, preferring either other funding mechanisms or regulation.

Key takeaways for BOC

- Paul to help draft the 2-5 core ideas that emerged for the BOC to consider taking up or leave this to Council discussion.

Key takeaways for Policy Committee

- Paul to help draft the 2-5 core ideas that emerged for the policy committee to consider taking up or leave this to Council discussion.

Summary of Public Comment to Clean Water Council Proposals for the Clean Water Fund FY26-27

of 11 September 2024

Entity	Agency	Program Name	Comments	Response
Tom Lynch			Concerned about microplastics in water	FY2019 CWF appropriation (at legislative direction) supports ongoing study of microplastics and their presence in MN surface water, groundwater, and drinking water. Expect results in 2025.
Friends of the Mississippi River		Chloride application liability protection for snow removal businesses with Smart Salting certification	Support	Council already supports
Dakota County		Funding needed for water reuse, esp. capital improvement funds, statewide policy and guidelines, incentivizing better irrigation		• MDH received CWFs for looking at water reuse challenges; remaining funding expired. • Met Council does receive funding for residential irrigation efficiency but not necessarily harvesting for irrigation reuse. • We have probably funded some reuse projects for irrigation. • CWF does fund some stormwater capital projects but not many for reuse; usually left to bonding. • Describe incentives? Fees? Penalties? Tougher conservation rate structure?
Nature Conservancy		General	Find more efficiencies to reduce duplication	Suggestions welcome
Minnesota River Watershed Drainage Collaborative		General comments on Nonpoint Priority Funding Plan	Minimize/eliminate hydrologic changes in MN River watershed; BMPs not keeping up with growth in TSS problem due to land use	Route to Policy Committee for consideration.

			changes, more drainage, and more precipitation.	• Commenter is most concerned about regulating tile drainage in MN River basin. • CWF does fund some multi-purpose drainage management, a few water storage projects, and hundreds of WASCOBs but not much on reducing tile drainage. • Policy Committee has discussed how to map all tile drainage but not much past that
Conservation Minnesota		Lack of transparent tracking and communicating progress towards this goal with the broader public; it is unclear the influence the Interagency Coordination Team (ICT) may have over Clean Water Fund recommendations each biennium		• CWC has a new communications plan. A contractor is working on a story map and fact sheets on CWF spending strategy and outcomes. • ICT proposes programs and funding amounts based on input from Council; Council thoroughly vets all programs, makes recommendations that are not always in agreement with ICT
MN Environmental Partnership		Pesticide Testing Private Wells	Increase fees, where feasible, rather than relying on CWF for activities that previously relied on other funding sources	Route to Budget and Outcomes Committee for consideration. It would be good to model what the cost would be to carry these programs out and what it would cost per unit of product.
Freshwater	BWSR	Accelerated Implementation	Support	Thanks and noted
Friends of the Mississippi River	BWSR	Buffer Implementation	Oppose using all CWF; prefer $2M from General Fund	• $2M/year goes to SWCDs to help landowners get back to compliance.

			Riparian Aid funding and fines from APO authority	• CWFs considered cheaper and quicker than enforcement. • Not sure what ratio is of people who made honest mistakes (e.g., accidently plowing up buffer) vs. recalcitrant landowners
MN Environmental Partnership	BWSR	Buffer Law Implementation	Use administrative penalty orders instead	• 2M/year goes t*o SWCDs to help landowners get back to compliance. • CWFs considered cheaper and quicker than enforcement. • Not sure what ratio is of people who made honest mistakes (e.g., accidently plowing up buffer) vs. recalcitrant landowners
Minnesota Corn Growers Association	BWSR	Conservation Drainage and Management	Support	Thanks and noted
Nature Conservancy	BWSR	Critical Shoreland Protection Easements	Support	Thanks and noted
Scott County Water Management Organization (WMO)	BWSR	One Watershed One Plan Watershed Based Implementation Funding	Don't spend 1W1P funding in the metro; it is redundant and wasteful; give it to Greater Minnesota	• Would be interested to know if this is just one county or if other metro counties feel the same. • Metro is a hodgepodge of WDs, conservation districts, and WMOs that have had a variety of plans over the years and have a head start on monitoring and planning
WinLAC Partnership (Winona-La Crescent 1W1P)	BWSR	RIM Easements	Support	Thanks and noted
Bassett Creek Watershed Management Commission	BWSR	Surface and Drinking Water Protection/Restoration Grants: (Projects and Practices)	Support	Thanks and noted
Friends of the Mississippi River	BWSR	Targeted Wellhead/Drinking Water Source Protection	Support higher cost easements within high risk DWSMAs	Route to Budget and Outcomes Committee for consideration.

				Council has brought up the topic, especially at BOC, no conclusion reached yet
Anoka Conservation District	BWSR	Watershed Based Implementation Funding	Support and prioritize	Rate of growth is in debate
Bassett Creek Watershed Management Commission	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Bois de Sioux & Mustinka River Watershed Districts	BWSR	Watershed Based Implementation Funding	Support and prioritize	Rate of growth is in debate
Bois de Sioux Watershed District	BWSR	Watershed Based Implementation Funding	Make CWFs available for flood control since they impact water quality; drainage management can reduce TSS and P at lower cost than cover crops; evaluate grant portfolio by problem scale	• Projects that support flood control as well as wastewater treatment, climate resilience, carbon sequestration, and habitat also have water quality benefits. This could set a precedent. • Projects that have flood control as the main objective may not be constitutional under the Legacy Amendment.
Chippewa River Watershed Association	BWSR	Watershed Based Implementation Funding	Support, fully fund, ensure long-term support	Rate of growth is in debate
Coon Creek Watershed District	BWSR	Watershed Based Implementation Funding	Support and fully fund	Rate of growth is in debate
James Raymond, farmer	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Lower St. Croix Watershed Partnership	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Middle-Snake-Tamarac Rivers Watershed District	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Mississippi River St. Cloud Watershed Partnership	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
MN Environmental Partnership	BWSR	Watershed Based Implementation Funding	"Simply ramping up voluntary cost-share BMP adoption funding is not likely to produce the needed results."	Noted; we have a balance between BMPs, protection, and other prevention activities including landowner engagement

Summary of Public Comment to Clean Water Council Proposals for the Clean Water Fund FY26-27

North Fork River Watershed Collaborative	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Roseau River Watershed District	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Rum River Watershed Partnership	BWSR	Watershed Based Implementation Funding	Support and fully fund	Rate of growth is in debate
Sauk River Watershed Collaborative	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
West Otter Tail SWCD	BWSR	Watershed Based Implementation Funding	Support	Rate of growth is in debate
Friends of the Mississippi River	BWSR	Watershed Partners Legacy Grant Program	Support	Thanks and noted
MN Environmental Partnership	BWSR	Watershed Partners Legacy Grant Program	Support	Thanks and noted
Nature Conservancy	BWSR	Watershed Partners Legacy Grant Program	Support significant increase and appreciate greater outreach esp. tribes	This program started at $1M per biennium to $3M in FY25 due to a large one-time surplus. The current FY26-27 is $1M.
Nature Conservancy	BWSR	Working Lands Floodplain Easements	Support	Thanks and noted
Freshwater	DNR	Aquifer Monitoring for Water Supply Planning	Support	Thanks and noted
MN Environmental Partnership	DNR	Aquifer Monitoring for Water Supply Planning	Support	Thanks and noted
Bois de Sioux Watershed District	DNR	Culvert Replacement	Recognize conflict between connectivity and flood control	Route to DNR. Ask DNR if targeted locations have an issue with flood control
Nature Conservancy	DNR	Culvert Replacement	Support additional investment	Budget constraints for FY26-27
Nature Conservancy	DNR	Mussel Restoration	Support additional investment	Budget constraints for FY26-27
Bois de Sioux Watershed District	DNR MDA	Nonpoint Source Implementation Technical Assistance	Permit delays in Red River; encourage state agencies to standardize and streamline process	Route to MDA, DNR, and Watershed Districts. Let's ask MDA, DNR, and watershed districts to understand the issue.
MN Environmental Partnership	DNR	Nonpoint Source Implementation	Support	Thanks and noted
Nature Conservancy	DNR	Nonpoint Source Implementation	Support additional investment	

Bois de Sioux Watershed District	DNR	Water Storage (could also include any water storage like wetland easements)	Red River not getting CWFs for this--going to less organized parts of MN; make it statewide	• The Red River basin is ahead of the MN River basin on planning, use of geospatial data, and basin-wide collaboration. • However, the DNR water storage line item in FY24-25 was only for two projects on state owned land in SW MN. DNR is not asking for funding in FY26-27. • Water storage funding on a larger scale is being done via other funding sources than CWF.
City of Bayport	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Chanhassen	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Eden Prairie	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Lake Elmo	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Minnetonka	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of New Brighton	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of North St. Paul	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Prior Lake	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Robbinsdale	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Shoreview	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of St. Louis Park	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted

City of Woodbury	MC	Metropolitan Area Water Supply Sustainability Support	Support	Thanks and noted
City of Bayport	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Chanhassen	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Eden Prairie	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Lake Elmo	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Minnetonka	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of New Brighton	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of North St. Paul	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Prior Lake	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Robbinsdale	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Shoreview	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of St. Louis Park	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
City of Woodbury	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
Freshwater	MC	Water Demand Reduction Efficiency Grant Program	Support	Thanks and noted
AgCountry Bank	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Carver County	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Cook County	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast

First Farmers and Merchants Bank Cannon Falls	MDA	Agricultural Best Management Practices Loan Program	Support; re-allocating unspent funds from counties to areas with higher need; big backlog	Route to MDA. • Budget is tighter in FY26-27; may consider after 11/24 forecast • Let's ask MDA if there are any counties that have unspent funds to see if there is an issue. • MDA has usually indicated that these funds get committed pretty quickly statewide?
Goodhue County	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
John Rud	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Lyon County	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Minnesota Corn Growers Association	MDA	Agricultural Best Management Practices Loan Program	Support increase	Budget is tighter in FY26-27; may consider after 11/24 forecast
Mower County	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Oakwood Bank	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Rock County	MDA	Agricultural Best Management Practices Loan Program	Support; waiting list	Budget is tighter in FY26-27; may consider after 11/24 forecast
Freshwater	MDA	Conservation Equipment Assistance	Support	Thanks and noted
Minnesota Corn Growers Association	MDA	Conservation Equipment Assistance	Support at $7M; support for ownership of equipment not rental and for custom work	• The BOC has discussed this a little bit. There was some discomfort about free equipment that someone could use to set up a business. • Advocates say we should want a producer to use the equipment on as many acres as possible no matter who owns it for maximum water quality benefits.

Summary of Public Comment to Clean Water Council Proposals for the Clean Water Fund FY26-27

Minnesota Corn Growers Association	MDA	Expand MN Weather Station Network	Support	Thanks and noted
Forever Green advocates	MDA	Forever Green Initiative	Support @$6M	An increase is in debate
Freshwater	MDA	Forever Green Initiative	Support @$6M	An increase is in debate
Friends of the Mississippi River	MDA	Forever Green Initiative	Support @ $6M, support at $10M if possible; market opportunity for sustainable aviation fuel (SAF)	Route to Budget and Outcomes Committee for consideration. • An increase is in debate • The Policy Committee heard a presentation on SAF on 8/23. • Happy to follow up on this in whatever form the committee prefers.
MN Environmental Partnership	MDA	Forever Green Initiative	Support @$6M; make first priority for any additional funds	An increase is in debate
MN Environmental Partnership	MDA	Irrigation Water Quality Protection	Increase fees, where feasible, rather than relying on CWF for activities that previously relied on other funding sources	• DNR charges groundwater fees but MDA runs the irrigation WQ protection program—would an additional fee be charged on the water and sent to MDA?
Minnesota Corn Growers Association	MDA	MN Agricultural Water Quality Certification Program	Support; use as conduit for more soil health BMPs	Route to Budget and Outcomes Committee for more information about how larger matching funds are leveraged by MAWQCP. • MAWQCP does provide up to $5,000 grants to producers to support BMPs. • A discussion is warranted about synchronizing multiple CWF programs that support soil health to make sure we are maximizing acreage and not leaving funds on the table in any one program.
Friends of the Mississippi River	MDA	MN Agricultural Water Quality Certification Program	Support policy change: 1) Certified farms inside DWSMA are not exempted from Level 3 & 4 GPR mitigation requirements; 2) reduce	• MAWQCP requires nitrogen application to be at or below what is required by GPR

			certification period for farms inside DWSMAs with elevated nitrate levels from 10 years to 5 years	• Certified farms must meet many other standards besides N so certification is harder to get than being GPR compliant
MN Environmental Partnership	MDA	MN Agricultural Water Quality Certification Program	Support policy change: 1) Certified farms inside DWSMA are not exempted from Level 3 & 4 GPR mitigation requirements; 2) reduce certification period for farms inside DWSMAs with elevated nitrate levels from 10 years to 5 years	• MAWQCP requires nitrogen application to be at or below what is required by GPR • Certified farms must meet many other standards besides N so certification is harder to get than being GPR compliant
Simple Harvest Farm Organics	MDA	MN Agricultural Water Quality Certification Program	Support investment in more monitoring for outcomes	Idea is on our list for potential funding after 11/24 forecast
MN Environmental Partnership	MDA	Monitoring for Pesticides in Surface Water and Groundwater	Increase fees, where feasible, rather than relying on CWF for activities that previously relied on other funding sources	Route to Budget and Outcomes Committee for consideration It would be good to model what the cost would be to carry these programs out and what it would cost per unit of product.
Minnesota Corn Growers Association	MDA	Nitrate in Groundwater	Support	Thanks and noted
MN Environmental Partnership	MDA	Nitrate in Groundwater	Increase fees, where feasible, rather than relying on CWF for activities that previously relied on other funding sources	Route to Budget and Outcomes Committee for consideration • A modest fertilizer fee increase was proposed ($0.99 per ton and then $0.40 per ton) in the Legislature in 2024 but failed. It would have funded a limited amount of mitigation ($5M?). • It would be good to model what the cost would be to carry these programs out and what it would cost per unit of product.

Summary of Public Comment to Clean Water Council Proposals for the Clean Water Fund FY26-27

MN Center for Environmental Advocacy, MN Well Owners Assn; Winona County Coalition for Clean Water	MDA	Pesticide Testing in Private Wells	Support	Thanks and noted
Minnesota Crop Production Retailers	MDA	Suggests new a targeted financial incentive program that would incentivize crop advisors to promote conservation instead of promoting more fertilizer	Thanks for supporting comprehensive SE MN response	• Budget constraints keep CWC from considering a new program • Would be interesting to look at costs and benefits
Minnesota Corn Growers Association	MDA	Technical Assistance	Support	Thanks and noted
Nature Conservancy	MDA	Technical Assistance	Support	Thanks and noted
Freshwater	MDH	Future of Drinking Water Initiative	Support	Thanks and noted
Friends of the Mississippi River	MDH	Groundwater Restoration and Protection Strategies	Support @ $3.5M	Thanks and noted
Mille Lacs SWCD	MDH	Groundwater Restoration and Protection Strategies	Support	Thanks and noted
MN Center for Environmental Advocacy, MN Well Owners Assn; Winona County Coalition for Clean Water	MDH	Groundwater Restoration and Protection Strategies	Support	Thanks and noted
Pope County SWCD	MDH	Groundwater Restoration and Protection Strategies	Support	Thanks and noted
Bruce M. Olson	MDH	Private Well Initiative	Support SE MN work	Thanks and noted
Freshwater	MDH	Private Well Initiative	Support	Thanks and noted
Friends of the Mississippi River	MDH	Private Well Initiative	Support @ $6M	Thanks and noted
Jeffrey Stoner, retired hydrologist	MDH	Private Well Initiative	Support	Thanks and noted
Minnesota Water Well Association	MDH	Private Well Initiative	Support	Thanks and noted
MN Center for Environmental Advocacy, MN Well Owners Assn; Winona County Coalition for Clean Water	MDH	Private Well Initiative	Support; please report progress	Route to Budget and Outcomes Committee for consideration • A modest fertilizer fee increase was proposed ($0.99 per ton and then $0.40 per ton) in the Legislature in 2024 but failed. It

				would have funded a limited amount of mitigation ($5M?). • It would be good to model what the cost would be to carry these programs out and what it would cost per unit of product.
MN Environmental Partnership	MDH	Private Well Initiative	Support	Thanks and noted
Olmsted County	MDH	Private Well Initiative	Support	Thanks and noted
City of Avon	MDH	Source Water Protection	Support	Thanks and noted
City of Cold Spring	MDH	Source Water Protection	Support	Thanks and noted
City of Darwin	MDH	Source Water Protection	Support	Thanks and noted
City of Gibbon	MDH	Source Water Protection	Support	Thanks and noted
City of Glenwood	MDH	Source Water Protection	Support	Thanks and noted
City of Goodhue	MDH	Source Water Protection	Support	Thanks and noted
City of Grey Eagle	MDH	Source Water Protection	Support	Thanks and noted
City of Le Center	MDH	Source Water Protection	Support	Thanks and noted
City of Little Falls	MDH	Source Water Protection	Support	Thanks and noted
City of Luverne	MDH	Source Water Protection	Support	Thanks and noted
City of Mankato	MDH	Source Water Protection	Support	Thanks and noted
City of Milaca	MDH	Source Water Protection	Support	Thanks and noted
City of Moorhead	MDH	Source Water Protection	Support	Thanks and noted
City of Mora	MDH	Source Water Protection	Support	Thanks and noted
City of Ogilvie	MDH	Source Water Protection	Support	Thanks and noted
City of Onamia	MDH	Source Water Protection	Support	Thanks and noted
City of Pipestone	MDH	Source Water Protection	Support	Thanks and noted
City of Randall	MDH	Source Water Protection	Support	Thanks and noted
City of St. Hilaire	MDH	Source Water Protection	Support	Thanks and noted
City of Waconia	MDH	Source Water Protection	Support	Thanks and noted
Dakota County	MDH	Source Water Protection	Support; PFAS a major issue in drinking water	Thanks and noted
Friends of the Mississippi River	MDH	Source Water Protection	Support	Thanks and noted
MN Center for Environmental Advocacy, MN Well Owners Assn; Winona County Coalition for Clean Water	MDH	Source Water Protection	Support	Thanks and noted

Summary of Public Comment to Clean Water Council Proposals for the Clean Water Fund FY26-27

MN Environmental Partnership	MDH	Source Water Protection	Support	Thanks and noted
Moose Track Adventures, Ely	MDH	Source Water Protection	Support	Thanks and noted
Coalition of Greater MN Cities	MPCA	Chloride Reduction	Support	Thanks and noted
Freshwater	MPCA	Chloride Reduction	Support	Thanks and noted
Friends of the Mississippi River	MPCA	Chloride Reduction	Support	Thanks and noted
MN Environmental Partnership	MPCA	Chloride Reduction	Support	Thanks and noted
Nature Conservancy	MPCA	Chloride Reduction	Support	Thanks and noted
Friends of the Mississippi River	MPCA	Clean Water Council	Support	Thanks and noted
Nature Conservancy	MPCA	Clean Water Council	Support additional staffing	Slightly larger proposed budget will allow additional communications
MN Environmental Partnership	MPCA	Enhanced County Inspections/ SSTS Corrective Actions	Support	Thanks and noted
Ash River Sewer District	MPCA	National Park Water Quality Protection Program	Support @ $4 million	In debate
Crane Lake Water & Sanitary District	MPCA	National Park Water Quality Protection Program	Support @ $4 million	In debate
Friends of the Mississippi River	MPCA	National Park Water Quality Protection Program	Oppose using CWF; avoid earmarks; oppose supporting more development	In debate
Kabetogama Township	MPCA	National Park Water Quality Protection Program	Support @ $4 million	In debate
Koochiching County	MPCA	National Park Water Quality Protection Program	Support @ $4 million	In debate
MN Environmental Partnership	MPCA	National Park Water Quality Protection Program	CWF not right source	In debate
Sen. Jen McEwen	MPCA	National Park Water Quality Protection Program	Support @ $4 million	In debate
Senator Grant Hauschild	MPCA	National Park Water Quality Protection Program	Support @ $4 million	In debate
David Craig	MPCA	River and Lake Monitoring and Assessment	Monitor all lakes and streams; fine polluters	CWF allows for comprehensive monitoring; permits and fines are outside CWC's purview
Coalition of Greater MN Cities	MPCA	Wastewater/Stormwater TMDL Implementation	Support	Thanks and noted
Coalition of Greater MN Cities	PFA	Point Source Implementation Grants	Support	Thanks and noted

Minnesota Department of Transportation, Erosion and Stormwater Management Unit	UMN	Stormwater Research and Technology Transfer Program	Support	Thanks and noted
Mississippi WMO	UMN	Stormwater Research and Technology Transfer Program	Support	Thanks and noted
South Washington Watershed District	UMN	Stormwater Research and Technology Transfer Program	Support current level or increase	Thanks and noted
SRF Consulting Group	UMN	Stormwater Research and Technology Transfer Program	Support	Thanks and noted

Clean Water Fund Appropriations

as of 9/11/2024

leg order	Agency	Program Title	BOC recs 9/6/24	Change from ICT recs	Change vs FY24-25	10% surplus contingency	ICT FY26-27 recs	FY24-25 supple-mental 5/24	FY24-25 appropriation 5/23
1	MDA	Monitoring for Pesticides in Surface Water and Groundwater	740	-	40		740	-	700
2	MDA	Nitrate in Groundwater	6,200	-	(800)		6,200	1,000	6,000
3	MDA	AgBMP Loan Program	4,000	-	(9,000)	5,500	4,000	3,402	9,598
4	MDA	Technical Assistance	3,200	-	200		3,200		3,000
5	MDA	MN Water Research Digital Library [aka Research Inventory Database]	100	-	20		100		80
6	MDA	MN Agricultural Water Quality Certification Program	7,000	-	-		7,000		7,000
7	MDA	Irrigation Water Quality Protection	310	-	10		310		300
8	MDA	Forever Green Agricultural Initiative (U of MN)	6,000	2,000	-		4,000		6,000
9	MDA	Pesticide Testing in Private Wells	1,000	-	-		1,000		1,000
10	MDA	Conservation Equipment Assistance	3,500	-	-		3,500		3,500
11	MDA	Expand MN Ag Weather Station Network	2,500	-	(500)		2,500		3,000
12	MDA	Agricultural Research/Evaluation	-	-	(1,500)		-		1,500
13	MPCA	River and Lake Monitoring and Assessment	18,900	-	474		18,900	326	18,100
14	MPCA	Watershed Restoration & Protection Strategies (includes TMDL development)	14,500	-	1,800		14,500		12,700
15	MPCA	Groundwater Monitoring and Assessment	2,000	-	-		2,000		2,000
16	MPCA	St. Louis River AOC	-	-	(1,500)		-		1,500
17	MPCA	NPDES wastewater/stormwater point-source implementation (combined from 2 previous programs)	3,200	-	200		3,200		3,000
18	MPCA	Enhanced County inspections/SSTS corrective actions	7,081	-	(1,969)	1,019	7,081	1,950	7,100
19	MPCA	Chloride Reduction	1,300	-	(1,000)	1,000	1,300	1,000	1,300
20	MPCA	Clean Water Council	922	-	247		922		675
21	MPCA	National Park Water Quality Protection Program	1,500	1,500	(500)		-		2,000
22	MPCA	Nitrate Sensors	-	-	(2,000)		-	2,000	-
23	MPCA	River Watch for Friends of the MN Valley	-	-	(50)		-	50	-
24	DNR	Stream Flow Monitoring Program	5,650	-	550		5,650		5,100
25	DNR	Lake Index of Biological Integrity	3,050	-	150		3,050		2,900
26	DNR	Fish Contamination Assessment	1,100	-	100		1,100	90	910
27	DNR	Watershed Restoration and Protection Strategies-DNR Portion	5,000	-	700		5,000		4,300

28	DNR	Aquifer Monitoring for Water Supply Planning	4,700	-	700		**4,700**		4,000
29	DNR	Non-point Source Restoration and Implementation	4,500	-	1,300		**4,500**		3,200
30	DNR	Tool Development and Evaluation [Formerly Applied Research and Tools]	1,400	-	100		**1,400**		1,300
31	DNR	Buffer Map Maintenance	-	-	(50)		**-**		50
32	DNR	County Geologic Atlas Part B	200	-	-		**200**		200
33	DNR	Freshwater Mussel Restoration	700	-	100		**700**		600
34	DNR	Water Storage	-	-	(1,000)		**-**		1,000
35	DNR	Culvert Replacement Cost Share	3,000	-	1,000		**3,000**		2,000
36	BWSR	Grants to Watersheds with Approved Comprehensive Watershed Plans (Watershed-based Implementation Funding)	88,100	(1,900)	9,100	9,900	**90,000**		79,000
37	BWSR	Surface and Drinking Water Protection/Restoration Grants: (Projects and Practices)	6,000	-	(11,000)		**6,000**		17,000
38	BWSR	Accelerated Implementation	8,700	-	(2,300)	400	**8,700**		11,000
39	BWSR	Measures, Results and Accountability	2,500	-	-		**2,500**		2,500
40	BWSR	Buffer Law Implementation	4,000	-	-		**4,000**		4,000
41	BWSR	Working Lands Floodplain Easements [formerly Riparian Buffer-Permanent Conservation Easements]	2,000	-	(6,434)	3,000	**2,000**	3,434	5,000
42	BWSR	Targeted Wellhead/Drinking Water Source Protection	5,000	-	(1,000)		**5,000**	1,000	5,000
43	BWSR	Technical Evaluation [restoration evaluation]	200	-	-		**200**		200
44	BWSR	Watershed Management Transition (One Watershed, One Plan)	1,000	-	(2,500)		**1,000**		3,500
45	BWSR	Conservation Drainage Management and Assistance	2,000	-	-		**2,000**		2,000
46	BWSR	Critical Shoreland Protection-Permanent Conservation Easements	1,000	-	(6,000)	4,000	**1,000**	4,000	3,000
47	BWSR	Tillage, Cover Crop and Erosion Evaluation	850	-	-		**850**		850
48	BWSR	Watershed Partners Legacy (WPL) Grants	1,000	-	(2,000)	1,000	**1,000**	2,000	1,000
49	BWSR	Wetland Restoration Easements	5,000	-	(5,000)	5,000	**5,000**		10,000
50	BWSR	Enhancing Soil Health and Landowner Adoption of Cover Crops for Drinking Water & Groundwater Protection	10,000	(2,000)	(2,077)	2,077	**12,000**		12,077
51	BWSR	Great Lakes Restoration LAMP	1,000	-	-	750	**1,000**	1,000	-
52	BWSR	MN & IA Conservation Corps	1,500	-	1,500	200	**1,500**		
53	MDH	Contaminants of Emerging Concern	11,850	-	1,366		**11,850**	384	10,100
54	MDH	Private Well Initiative	6,000	-	3,000		**6,000**		3,000
55	MDH	Source Water Protection	7,790	-	290		**7,790**		7,500

56	MDH	Groundwater Restoration and Protection Strategies	3,500	-	2,000		**3,500**		1,500
57	MDH	Future of Drinking Water (formerly Drinking Water Protection)	500	-	-		**500**		500
58	MDH	Recreational Water Portal	600	-	-		**600**		600
59	MDH	Nitrate response in SE Minnesota**	-	-	(2,790)		**-**	2,790	-
60	MC	Metropolitan Area Water Sustainability Support Program	2,750	-	500		**2,750**		2,250
61	MC	Water Demand Reduction- Efficiency - Grant Program	1,500	-	-		**1,500**		1,500
62	UMN	County Geologic Atlas Part A	800	-	(200)		**800**		1,000
63	UMN	Stormwater Research and Technology Transfer Program	2,000	400	(1,000)	600	**1,600**	1,000	2,000
64	LCC	Legislative Coordinating Commission Website	7	-	1		**7**		6
65	PFA	Point Source Implementation Grant (PSIG) Program	16,500	-	-		**16,500**		16,500
66	PFA	Small Community Wastewater Treatment Program	100	-	(100)		**100**		200
			$ 307,000			**$ 34,446**	**$ 307,000**	**$ 25,426**	**$318,396**
					total	**$ 341,446**			

BWSR would like to have these unused grants for new competitive grants (line 37) but it requires **legislation**				$ 1,324,003
BWSR can return these unused funds to the CWF but only with the Legacy bill **legislation**				$ 406,725
MDH water reuse funds expired and will show up in Nov forecast				$ 22,107

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

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

BOARD OF WATER AND SOIL RESOURCES

FY 26/27 Clean Water Program Budget

Date: September 12th, 2024

To: Paul Gardner

From: BWSR Program Managers via Justin Hanson, Assistant Director for Regional Operations

RE: Implications for budget reductions to local implementation programs

This memo was prepared to supplement discussions at the August 19 Clean Water Council Meeting, and to address questions Council members asked about some key BWSR programs. We appreciate the opportunity to further clarify and explain our needs for effective delivery of clean water projects through our local implementing partners. This memo provides more information on BWSR's soil health, easement, and Watershed Based Implementation Funding (WBIF) programs.

Enhanced Soil Health Cover

Program Need: $12M
ICT Recs: $12M

Program Description: The Clean Water Fund leverages federal dollars and local skills and relationships to achieve the water quality benefits that come from increased adoption of soil health practices. The specific budget activities are as follows:

- Minnesota Office of Soil Health (MOSH): Ongoing social science work, research, and outreach. ($600K)
- Grants for targeted incentives to areas identified with vulnerable ground water, public water supplies, or other locally prioritized areas. ($10M)
- Additional programing to expand partnerships associated with soil health related activities. ($1.4M)

Current Situation: The state launched an increase in soil health programming with a one-time General Fund appropriation in FY24/25. That appropriation, coupled with the Clean Water Fund allocation, allowed Minnesota to secure a matching federal (USDA-NRCS RCPP) grant for soil health practices. BWSR is currently processing soil health staffing grants; local governments are hiring specialized staff for soil health work and the agreement with USDA-NRCS is being finalized to put practices in place. This is a five-year agreement that will require continued state funding beyond the FY24/25 biennial amounts .

Need: We need $12M from the Clean Water Fund to achieve our long-term vision of supporting soil health implementation as an essential part of a comprehensive package of initiatives, including research and technical assistance. Timing is critical to keeping momentum with soil health efforts and to sustain the federal grant agreement needed.

Budget Implications: Reduced funding will compromise our ability to match federal dollars with a 1:1 return on the state's investment. SWCDs are relying on state dollars and the federal dollars they leverage to effectively implement systems change and get outcomes. The current program structure relies on:

1. Local staffing and expertise for soil health delivery (state funded)
2. Implementation incentives for landowners (primarily federally funded)
3. Technical assistance and research (state funded)

Without sustained state funding,

A. SWCDs will have limited ability to:
    - Provide incentives to landowners in priority areas
    - Support landowners systematically and predictably in their adoption of soil health practices
B. Leveraging capacity for supporting infrastructure will be restricted, affecting:
    - Training and events
    - Outreach materials
C. The University of Minnesota Office of Soil Health will be unable to:
    - Continue developing Minnesota-specific social science information
    - Inform future programming and delivery
D. Expansion of Soil Health programming will be limited:
    - Restricted ability to go beyond traditional models
    - Reduced opportunities for new partnerships beyond SWCDs

Easement Programs

Current Situation:

- The Clean Water Council's current recommendation is a consequential decrease from FY24/25 for the 4 programs listed below.
- Since 2020, average farmland values have increased on average 40%, meaning we need more money to fund easement programs in agricultural areas.
- The Council is interested in increasing funding for protection-focused easements; however, increased funding does not match the program needs and likely will not translate to more participation in these programs, resulting in a mismatch between funding and need.
- Immediate program needs can vary based on the current appropriation balance, average land costs and market rates.

It's important that Clean Water Council support the funding needs listed below, for each of the following programs. Easement programs are implementation and protection. The Council has proposed significant reductions to easement programs that have demonstrated the outcomes that Council has prioritized. BWSR supports the ICT recommendations. Its important that those needs are not offset by other implementation programs. If ICT recommendations are not being followed, then its unclear why Council would only consider reductions to the local government programs that implement and protect resources on the ground.

Wetland Restoration Easements

Program Need: $10 M
ICT Recs: $5 M

Program description: These easements restore and permanently protect wetlands. Wetland restoration easements are the long-standing "center" of the Re-Invest in Minnesota (RIM) easement program and the most popular easement type.

Current Situation: Less than $1M remains from the FY24/25 $10M appropriation for landowner easement payments.

This program is also supported by Outdoor Heritage Fund dollars because of the Clean Water Fund allocation -- and vice versa. Leveraging both funds to support the many public benefits of wetland restorations is an important part of the decision-making process with Lessard-Sams Outdoor Heritage Council.

Need: $10M will allow us to take advantage of leveraged funding, acquire easements consistent with the current demand, and restore wetland to protect drinking water sources, reduce flooding, recharge aquifers, and protect surface waters for recreation and wildlife habitat.

Budget Implications: Many restoration projects are "once in a lifetime" opportunities to restore resources that have been degraded – and could be permanently lost if funding is not available when landowners make decisions regarding their future goals for the land. Restoring wetlands, particularly in the prairie pothole region where so many wetlands have been lost, is the best tool for multi-benefit gains including improved water quality and improved habitat.

Critical Shoreland Protection-Permanent Conservation Easements

Program Need: $1M
ICT Recs: $1M

Program description: This program funds permanent conservation easements to protect lands adjacent to public waters with good water quality but threatened with degradation.

Current Situation: In FY24/25, the legislature appropriated $7M (including $4M in supplemental funding).

Need: $1M is sufficient for FY26/27 because of the supplemental appropriation earlier this year. There's currently not enough interest in the program, nor are land costs high enough in protection areas, to justify more than $1M additional in FY26/27 for this program. Rather than increase funding, it would be helpful for the Clean Water Council to support the needs described below.

Budget implications/Policy need: This program targets sub-watersheds in the upper Mississippi River basin at high risk of land use conversion. While not explicitly required in the appropriation language, this approach also

protects drinking water sources for St. Cloud, the Twin Cities, and downstream communities. We would like to engage a discussion with the CWC's Policy Committee around these points:

- We appreciate the CWC's support for Upper Mississippi protection efforts.
- The program's focus has been narrower than the broad appropriation language suggests.
- BWSR seeks to confirm program goals with the CWC Policy Committee.
- We may need to adjust appropriation language or eligibility criteria to align with the Council's vision.

Floodplain Easements

Program Need: $4 M
ICT Recs: $2M

Program description: This program funds conservation easements sets aside sensitive land in riverine and riparian corridors to address water quality concerns

Need: Need is higher than ICT recommendations. The program could support a higher allocation of funding if the forecast projections increase.

Targeted Wellhead Protection Easements

Program Need: $2.5 M
ICT Recs: $5 M

Program description: This program funds conservation easements on wellhead protection areas or for grants to local units of government to ensure long-term protection of groundwater supply sources in wellhead protection areas.

Need: There is not a current backlog of projects and this program received supplemental funding this legislative year. If funding is limited, this program could be funded at a lower level in order to implement programs that are currently more marketable.

Watershed Based Implementation Funding (WBIF)

Minimum Program Need to Maintain: $90M
ICT Recs: $90M

Program description: WBIF is used to implement actions in watershed plans to make measurable progress toward Minnesota's water quality goals of protecting and restoring surface water and groundwater, including drinking water.

Current Situation: Partnerships with approved plans are eligible for/have received between 1 and 4 WBIF grants, depending on when their watershed plans were approved. Currently, 48 partnerships have approved plans; we anticipate 54 approved plans by March 2025; 6 more plans are in development with anticipated approval in FY26/27.

Need: Watershed partnerships need a minimum of $90 million for scheduled implementation actions for each watershed**,** including an anticipated increase in the number of completed plans. To continue to make progress on measurable goals in local plans, which align with the CWC's Strategic Plan goals for drinking water, groundwater, and surface water, the state must continue to provide consistent, reliable funding for plan implementation.

Budget Implications: Reduced funding will result in less implementation and fewer water quality benefits. More critically, it may shake local governments' confidence in the state's commitment to supporting our collective investment in watershed plans and partnerships.

Local partnerships regularly emphasize that reliable, consistent funding creates a positive feedback loop, allowing them to grow their capacity and accomplish more. We've invested significant state and local money and time to build a new system for planning and implementation. Even a temporary reduction in funding could disrupt this momentum. This puts at risk the trusting relationships that have taken considerable time and effort to establish.

FY26-27 Clean Water Fund Budget Recommendations – September 6, 2024 BOC Meeting Report
Prepared by Steve Christenson & aligned with staff accounting tabulations

At the Clean Water Council's Budget & Outcomes Committee (BOC) meeting on September 6, 2024, the BOC developed Clean Water Fund budget recommendations for FY26-27 that address two scenarios:

- **Low** – a potential **$307M** budget in line with current revenue forecasts provided by MMB (i.e., approximately **$15M** below the $318.396M of appropriations for the FY24-25 biennium).
- **High** - a potential **$341M** budget if revenues exceed current forecasts by ~10% (i.e., **$34M** over current revenue forecasts)

After incorporating 200+ pages of public comments and feedback, both budget recommendations build from the **$307M** budget framework summarized in the Interagency Coordinating Team's (ICT) memorandum dated July 24, 2024. In summary, the recommendations align with the CWC's Strat Plan, increase investments in 7 key programs, and balance **~$10M** in increases in Watershed-Based Implementation Funding with offsets via **~$10M** in reductions from conservation easement programs. Notable investments empower watershed-based water quality programs and the Forever Green initiative to transform Minnesota's agricultural economy toward crops that protect soil and water as Minnesota leads the transition to Sustainable Aviation Fuel. The following chart summarizes BOC's recommended adjustments to ICT''s July 24 draft framework:

Table #1 – Recommended Adjustments to ICT's July 24 draft framework:

Item #	Title	FY24-25 Appropriation (+ FY24-25 Supplemental)	July 24 ICT Proposed Cut or Increase	ICT FY26-27 Recom-mendation	Sept 6 BOC Recommendation
8	Forever Green	$6M	-$2M from $6M base	$4M	**Increase** $2M for $6M net recommendation
21	Voyageurs National Park Water Quality Protection Program	$2M	-$2M from $2M base	0	**Increase** $1.5M for a $1.5M net recommendation

36	Grants to Watersheds with Approved Comprehensive Watershed Plans (Watershed based Implementation Funding)	$79M	+$11M from $79M base	$90M	**Reduce** $1.9M for an $88.1M net recommendation
50	Enhancing Soil Health & Landowner Adoption of Cover Crops for Drinking Water & Groundwater Protection	$12.077M	-$0.077 from $12.077M base	$12M	**Reduce** $2M for a $10M net recommendation
63	Stormwater Research & Technology Transfer Program	$2M (+$1M supplemental appropriation)	-$1.4M from $3M total base	$1.6M	**Increase** $0.4M for a $2M net recommendation
Summary: Increase 3 programs by **$3.9M** and reduce 2 programs by **$3.9M** for a net result of **$307M** in recommendations					

Table #2 – Recommended Priorities for Increases if Revenue Forecasts Exceed $307M: Group A (Highest Priority)

Item #	Title	FY24-25 Appropriation (+ FY24-25 Supplemental)	ICT FY26-27 Recom-mendation	Sept 6 BOC Recommendation	Potential Increase If Additional Funds Become Available
36	Grants to Watersheds with Approved Comprehensive Watershed Plans (Watershed based Implementation Funding)	$79M	$90M	Reduce $1.9M for an $88.1M net recommendation	**$1.9M**
50	Enhancing Soil Health & Landowner Adoption of Cover Crops for Drinking Water & Groundwater Protection	$12.077M	$12M	Reduce $2M for a $10M net recommendation	**$2.077M**
Summary: Restore **$3.977M** to 2 programs reduced to achieve $307M budget, if **$310.977M** becomes available					

Table #3: Recommended Priorities for Increases if Revenue Forecasts Exceed $310.977M: Group B (High Priority):

Item #	Title	FY24-25 Appropriation (+ FY24-25 Supplemental)	BOC & ICT FY26-27 Recom-mendation	Potential Increase If Additional Funds Become Available
3	AgBMP Loan Program	$9.598M (+$3.402M supplemental appropriation)	$4M	+$5.5M
18	Enhanced county Inspections/SSTS Corrective Actions	$7.1M (+$1.950M supplemental appropriation)	$7.081M	+$1.019M
19	Chloride Reduction	$1.3M (+$1M supplemental appropriation)	$1.3M	+$1M
36	Grants to Watersheds with Approved Comprehensive Watershed Plans (Watershed based Implementation Funding)	$79M	$88.1: BOC $90M: ICT	+$8M (for a total appropriation of $99.9M including the $1.9M in Group A above)
37	Surface & Drinking Water Protection/Restoration Grants (Projects & Practices)	$17M	$6M (Note: $1.5M shifted to line item 52)	TBD
38	Accelerated Implementation	$11M	$8.7M	+$0.4M
41	Working Lands Floodplain **Easements** (formerly Riparian Buffer-Permanent Conservation Easements)	$5M (+$3.434 supplemental appropriation)	$2M	+$3M
46	Critical Shoreland Protection-Permanent Conservation **Easements**	$3M (+$4M supplemental appropriation)	$1M	+$4M

48	Watershed Partners Legacy (WPL) Grants	$1M (+$2M supplemental appropriation)	$1M	+$1M
49	Wetland Restoration **Easements**	$10M	$5M	+$5M
51	Great Lakes Restoration LAMP	$0 ($1M supplemental appropriation)	$1M	$0.75M
52	MN Conservation Corps	Funding previously woven into line 37 (reduced by $1.5M accordingly)	$1.5M	$0.2M
63	Stormwater Research & Tech Transfer Program	$2M (+$1M supplemental appropriation)	$1.6M (plus $0.4M recommended by BOC)	+$0.6M
Summary: Restore **$30.469M** to programs reduced to achieve budget targets Note: $307M base budget + $3.977M in Group A + $30.469 in Group B = $341.446M Please refer to excel spreadsheet for more precise accounting, as this summary rounds up numbers for simplification.				

Valuing state investments in clean water

An analysis of Minnesota's Clean Water Fund through the lens of ecosystem services, equity, and climate change

June 2024

Authors: Bonnie Keeler, Olena Boiko, Taylor Hohensee, Rachel Nichols, Erin Niehoff

Affiliations: Center for Science, Technology, and Environmental Policy, Humphrey School of Public Affairs, University of Minnesota

CENTER FOR SCIENCE, TECHNOLOGY, AND ENVIRONMENTAL POLICY
UNIVERSITY OF MINNESOTA

Legislative Request: (MN Laws 2021, 1st Special Session, Chapter 1):
(c) $95,000 the first year and $95,000 the second year are for a report that quantifies the multiple benefits of clean water investments, for a review of equity considerations in clean water fund spending, and for proposing climate considerations in comprehensive watershed management plans. The Board of Regents must submit the report to the Clean Water Council and the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over environment and natural resources and the clean water fund no later than June 30, 2024.

Per the requirements set forth in Minn. Stat. §3.197, the cost to prepare this report was $190,000.

Table of Contents

Introduction and Report Summary

Dedicated funding for clean water: Minnesota's Clean Water Land and Legacy Amendment

Voters in the state of Minnesota passed a constitutional amendment in 2008 that created a dedicated fund for the protection and restoration of water quality. In 2009, the Clean Water Council was assigned the task of recommending how to spend the Clean Water Fund, which comprises one-third of the dedicated sales tax revenue generated from the amendment. Decisions are made biennially on the appropriate investment strategies for the fund with final approval for expenditures made by the Minnesota legislature and signed by the Governor.

Projects approved to receive fund investments must comply with statutory guidance *"to protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater and drinking water from degradation."* Projects are given priority if they meet more than one of these stated objectives. The authorizing legislation also requires that investments are expended to balance the distribution of benefits across the state.

Since 2010, over $1.8 billion in funding from the Clean Water, Land and Legacy Amendment has been appropriated to water quality projects and planning in Minnesota (Figure 1). Assuming a linear extrapolation of funds into the future, there is an estimated $1-1.6 billion in funding available through the expiration of the amendment in 2034 (Figure 1).

In 2023, legislators modified the statutory guidance to require projects financed by the Clean Water fund to include *"an assessment of whether the funding celebrates cultural diversity or reaches diverse communities in Minnesota, including reaching low-and moderate-income households."* In accordance with this guidance, the Clean Water Council began requesting agencies and applicants to incorporate principles for diversity, equity, inclusion, and/or environmental justice into Clean Water Fund-supported programs. The Council also requests that applications articulate how programs align with the state's Climate Action Framework.

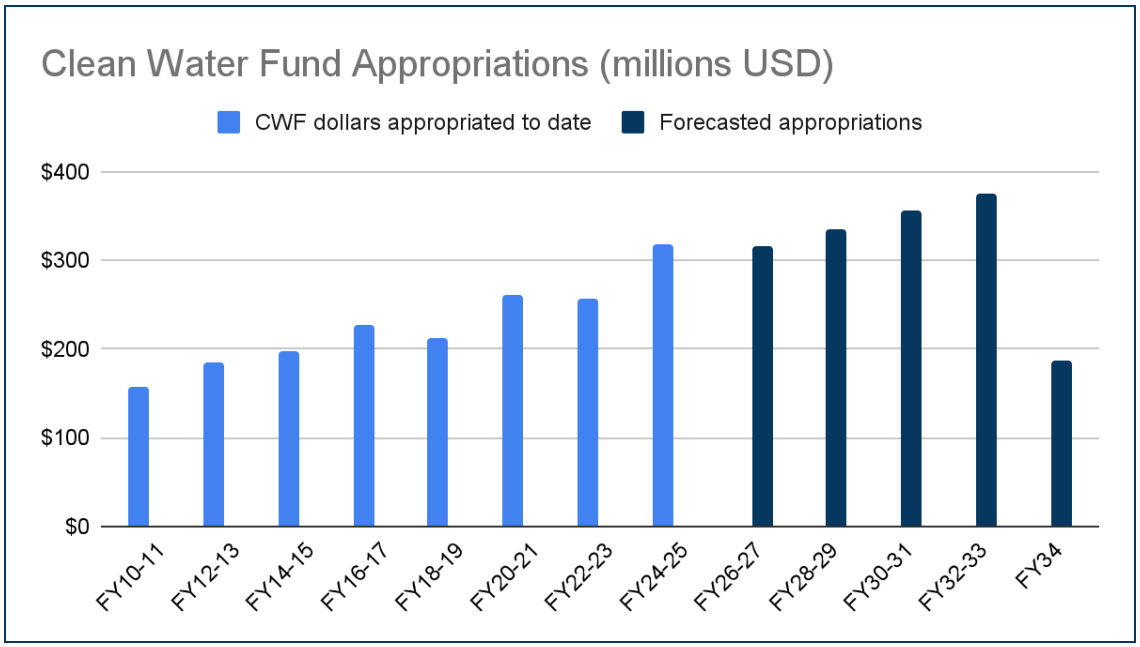

Figure 1: Funding appropriated in each biennium from the Clean Water Fund and forecasted appropriations assuming a linear extrapolation of historical data.

Communicating the value of clean water investments

The establishment of a long-term dedicated fund for clean water allows the state to make significant investments in water quality planning, monitoring, restoration, and protection. Dollars available through the fund are required to supplement, not substitute, other investments in clean water and can be used to leverage additional state and federal resources. The Clean Water Council (Council) produces biennial reports on progress made towards multiple water quality goals and strategic targets that align with the 2014 Clean Water Roadmap.

Communicating the impacts of the Clean Water Fund to the public is necessary to maintain transparency about the expenditures of public dollars. State-mandated performance reports and agency documentation contribute to this goal. However, it is both expensive and challenging to conduct systematic monitoring and evaluation of water quality programs and expenditures. Further challenges arise when attempting to connect changes in water quality outcomes to social and economic metrics.

Beyond the quantification and communication of water quality impacts, emerging issues such as climate change and environmental justice have raised additional considerations in how water quality funds are distributed and prioritized. Climate change will affect both the quality and quantity of Minnesota waters and affect the implementation and efficacy of best management practices. Attention to the equitable distribution of water resources at both state and federal levels requires additional data on how state investments may differentially benefit or burden particular communities. These are important considerations in watershed planning and management, but place additional burdens on Council and agency staff in estimating and

reporting on the impacts of funds across multiple social, economic, and environmental objectives.

Report aim and scope

This report aims to support strategic planning through the duration of the Clean Water Land and Legacy amendment. Our goal is to provide insights to the Council and legislature to help inform remaining years of the fund, prioritize future allocations, and suggest recommendations for more efficient and equitable management. To address these gaps, we aligned our research with the following three objectives:

1. Estimating ecosystem service benefits of clean water investments,
2. Reviewing integration of climate and equity consideration in watershed planning, and
3. Evaluating potential costs of achieving multiple water quality goals through the expiration of the Clean Water Fund.

Work under each objective included review of primary and secondary literatures, spatial data analysis and modeling, review and analysis of watershed plans, and assessment and synthesis of agency and academic data and reports to distill key insights and recommendations relevant for clean water planning and management.

Findings and recommendations

We present the main insights and recommendations from our research as contributing insight to the following four questions:

1. Have Clean Water Fund investments led to multiple benefits?

Our research, along with agency investments in modeling and reporting, suggests that clean water funding leads to a flow of benefits valued by Minnesota residents. Using ecosystem service models, we illustrate how investments in water quality in different regions of the state are associated with seven potential benefits: drinking water quality, lake recreation, nutrient export, trout angling, lakeshore property value, wild rice production, and wetland bird conservation. For each water-related ecosystem service, maps identify watersheds where past Clean Water Fund investments have targeted watersheds that scored highly for the provision of particular services. For some services, such as drinking water quality and nutrient export, we observed a high degree of alignment between past Clean Water Fund investments and potential returns. There are also areas where Clean Water Fund investments have not prioritized watersheds with the greatest potential to provide particular benefits, most notably for wetland bird conservation and wild rice production.

Investment decisions that consider the demand for water quality-related benefits, in addition to biophysical factors, are more likely to target areas with greater potential to deliver valued ecosystem services. Existing spatial datasets, such as those we present in this report, can assist decision makers in prioritization of implementation activities and in the evaluation of multiple benefits.

2. Are Clean Water Fund projects being implemented equitably?

To evaluate the distribution of Clean Water Fund investments we compared county-level data on investments from 2010 to 2022 with federal data on the location of designated disadvantaged communities. The greatest cumulative investments tend to have been allocated to central and southern Minnesota counties, whereas counties with the greatest area designated as disadvantaged tend to be in the northern parts of the state, especially where Tribal lands make up a significant proportion of county area. Federal data on the location of disadvantaged communities provides an opportunity for agencies to evaluate the distribution of funds and consider differential impacts of alternative funding models.

Our review of watershed planning documents also suggested a lack of consideration of equity and environmental justice considerations in implementation planning. Very few watershed plans considered distributional or environmental justice impacts in assessment of threats or prioritization of goals and actions. We observed notable gaps in the consideration of Tribal nations in some watersheds where Tribal lands and ceded territories make up a significant proportion of the watershed. Non-indigenous minority populations in Minnesota were not considered in any plans. Prioritizing engagement with Tribes and other federally-recognized disadvantaged communities will continue to be an important implementation strategy to ensure that clean water programming is attentive to multiple equity goals, including capacity building, meaningful participation, and equitable distribution of clean water investments.

3. Is watershed planning adequately considering potential impacts of climate change?

We reviewed all approved watershed plans submitted for agency review for their consideration of climate change and extreme weather. All reviewed plans included some mention of climate change or climate trends and most plans integrated climate impacts into specified goals and actions. Our review suggests an increase in the consideration of climate impacts in watershed planning over time. However, there were notable gaps in the level of specificity and rigor in consideration of climate change in watershed planning. For example, only a few plans took advantage of publicly available high resolution downscaled climate projections and no reviewed plans integrated climate projections developed specifically for Minnesota. Most plans considered climate change in very general terms, without connecting plan implementation goals or actions to specific anticipated climatic changes.

We also reviewed the literature to identify potential climate impacts on agricultural best management practices. We noted how climate change is likely to change the effectiveness of many common practices. For example, increased temperatures and shifting precipitation regimes may reduce the effectiveness of conservation tillage, filter strips, and other water management practices. Given the potential direct and indirect impacts of climate change on Minnesota watersheds, our review points to multiple areas where the consequences of climate change for planning and implementation warrant greater consideration in watershed management.

4. Does the Clean Water Fund have sufficient resources to accomplish multiple water quality related goals?

We compared remaining funding available through the expiration of the Clean Water Land and Legacy Amendment through 2034 with the anticipated costs of achieving multiple stated water quality goals. For a subset of goals that could be estimated with existing data, we calculated potential costs of achieving these goals at over $6 billion, representing 375% of available funding. Clearly, the funding remaining through the expiration of the Legacy amendment is insufficient to meet all stated goals. Agencies and watershed planners will have to continue to leverage additional funding, while also prioritizing investments given limited resources and many competing objectives.

Cost projections are meant to be illustrations of potential expenditures and subject to uncertainties and simplifying assumptions. Our work suggests that consideration of ecosystem services, more intentional integration of climate change impacts, and an attention to equity and distribution considerations remain important focal areas as the Council prioritizes future planning and implementation decisions.

Report outline

The remaining sections of the report provide additional context and background for how we arrived at our findings and associated recommendations. The report is organized into the following sections. Section I applies an ecosystem services approach to estimate the multiple benefits of water quality investments. This section presents data on the past and current distribution of clean water investments and evaluates how the spatial pattern of investments aligns with priority watersheds for multiple ecosystem services and equity considerations. Section II addresses climate change and equity as emerging issues in watershed planning. This section presents a review of watershed planning documents supported by the Clean Water Fund. Plans are evaluated for their consideration of climate change and equity. We also consider how climate change will affect best management practices recommended in watershed plans. Section III addresses the funding remaining in the Clean Water Fund and evaluates potential cost scenarios associated with achieving multiple stated goals.

Section I: Multiple benefits of clean water investments

Minnesota's Clean Water Fund supports investments in programs and practices designed to improve water quality. Adoption of best management practices or converting lands from row-crop agriculture to perennial cover can result in a stream of public benefits including reduced treatment costs for community water suppliers and reduced risk of diseases associated with exposure to contaminated drinking water. Water quality investments can also lead to benefits beyond drinking water quality such as improved recreation or habitat for fish and wildlife.

Annual reporting by the Clean Water Council and agency partners provides useful insights into how Clean Water Fund dollars are allocated among water quality monitoring, planning, and implementation. Data are also provided on the spatial distribution of investments by county or watershed. To estimate the water quality benefits of these investments, agencies rely on models such as BWSR's Pollution Reduction Estimator Tool (Minnesota Board of Water, and Soil Resources [BWSR], 2021).

Estimated benefits from these tools represent generalized relationships between adoption of land management practices and estimates of reduced sediment or nutrients. These simplified models provide useful illustrations of potential benefits. However, modeled estimates should not be confused for actual measured changes in water quality. Quantifying the realized benefits of implemented management practices requires investments in monitoring equipment, time-consuming data collection, and detailed studies that account for variations in soil conditions, climate, and other variables. As such, a persistent challenge in the oversight of water quality expenditure programs is the difficulty in demonstrating clear relationships between investments in management practices and robust and measurable outcomes in improved water quality.

From water quality metrics to ecosystem services

Connecting expected changes in water quality to ecosystem services or metrics of human wellbeing requires a completely different set of integrated models and assumptions. Changes in water quality can be translated into changes in ecosystem services based on presumed relationships between water quality attributes and designated uses. Further conversion of ecosystem service values into monetary values requires economic models that estimate the values households place on changes in the supply of goods or services.

Ecosystem service models can help inform the prioritization of water quality investments, developing spatial maps of locations where investments in restoration or protection are likely to yield higher returns across a suite of objectives. Ecosystem service models can also be used in the assessment of tradeoffs, investigating how alternative portfolios of investments affect multiple benefits and where additional investments may lead to diminishing returns. Valuation

research is an important input into policy analysis and can be used to inform benefit-cost assessments or regulatory impact analyses. As agencies and managers are challenged to conserve resources, demonstrate the value of environmental protection, and provide the greatest return on investment in limited public funding, approaches that translate environmental outcomes into ecosystem services or values can better target investments across multiple objectives, aid in prioritization decisions, and build support for future restoration and protection activities.

In recent years, a proliferation of web-based spatial data repositories and dashboards at the state level (see the Minnesota Natural Resources Atlas) or federal level (EPA EnviroAtlas) allow users to access social and environmental data that can be integrated into spatially explicit models or facilitate spatial prioritization or mapping exercises. As with all modeling efforts, ecosystem service models rely on simplifying assumptions and are constrained by data availability and underlying science. Selection of the most appropriate model for a given application requires consideration of time, data availability, and the intended decision context (Figure 2). Reviews of ecosystem service models and tools as they are applied to water quality benefits are summarized in Brauman et al. 2007, Keeler et al. 2012, and Guswa et al. 2014.

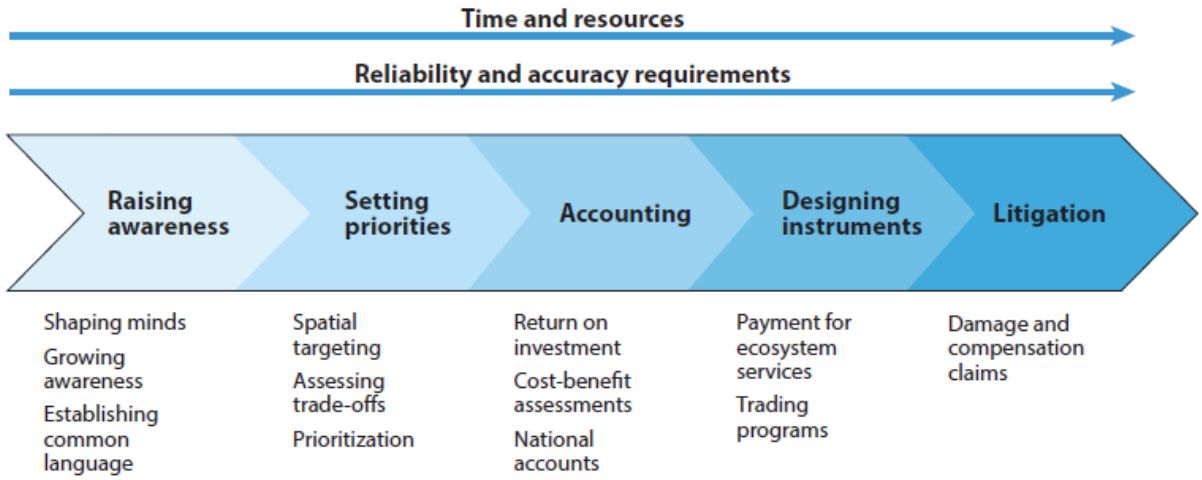

Figure 2. Selection of the most appropriate ecosystem services model depends on the intended use case or decision context. Simple overlays or benefits calculators may be sufficient if the goal is to raise awareness of potential water quality benefits. For policy design or formal evaluation, models of greater complexity and accuracy are required, increasing the time and resources required to conduct the analysis. Figure adapted from Keeler, 2020.

Using an ecosystem services approach to prioritize investments

As noted above, applying an ecosystem services approach allows decision makers to consider how water quality investments affect a variety of potential benefits and designed uses. The distribution and value of ecosystem services will vary spatially depending on the factors that affect both the supply and demand for that particular service. For example, investments in

improving the quality of drinking water will yield greater potential benefits in locations where geologic conditions facilitate the transport of pollutants from surface to groundwater and where a large number of households drink untreated groundwater.

We applied an ecosystem services approach to illustrate how investments in water quality in different regions of the state may lead to varied outcomes across a range of water-related benefits. We focused on seven potential benefits of water quality improvements: drinking water quality, lake recreation, nutrient export, trout angling, lakeshore property value, wild rice production, and wetland bird conservation. For each benefit we combined data on the provision of the ecosystem service, including biophysical data that determine how a given water quality improvement may affect endpoints of interest (trout streams, groundwater aquifers, recreational lakes) and social data on the demand for each service (population data and information on the location and preferences of users). Metrics on ecosystem service supply and demand were combined to form indicators and normalized to rank watersheds based on low to high potential to provide each service (Figure 3). We then compared these prioritization maps with spatial data on investments in water quality under the Clean Water Fund. Details on data and methods used to estimate each ecosystem services metric are described in Appendix A.

For each water-related ecosystem service, maps identify watersheds where past Clean Water Fund investments have targeted watersheds that scored highly for the provision of particular services. Similarly, the maps also identify watersheds that score highly for ecosystem service provision, but have received relatively lower levels of Clean Water Fund investments. As the supply and demand for water-related services varies spatially, there will be tradeoffs in the allocation of funds across multiple objectives. These maps indicate that for some services, such as drinking water quality and nutrient export, there is good alignment between past investments and potential returns to these two ecosystem services. There are also areas where investments have not prioritized watersheds with the greatest potential to provide particular benefits, most notably for wetland bird conservation and wild rice protection.

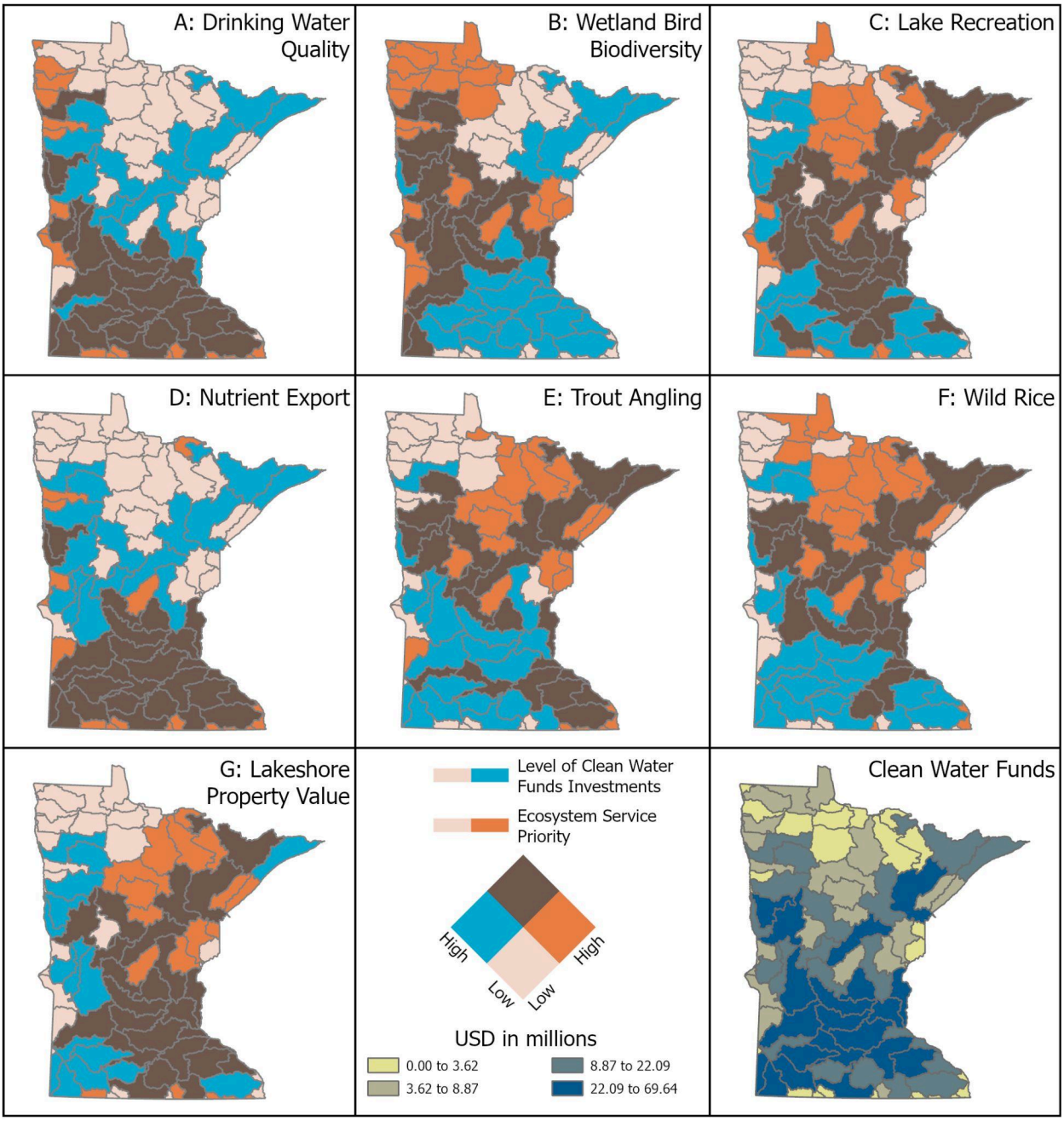

Figure 3. Lower right map visualizes total state spending on implementation projects by watershed from 2010 to 2022 for the programs managed by the Minnesota Board of Water & Soil Resources, Minnesota Department of Agriculture, and Minnesota Public Facilities Authority. The remaining map panels combine investment data with ecosystem service metrics. Dark brown watersheds indicate areas where investments are likely to yield the greatest relative returns to that ecosystem service and where there has historically been relatively high levels of clean water fund investments. Methods used to estimate ecosystem service metrics are described in Appendix A.

Equitable distribution of Clean Water Fund investments

Updated guidance for expenditures under the Clean Water Fund now requires "an assessment of whether the funding celebrates cultural diversity or reaches diverse communities in Minnesota, including reaching low- and moderate-income households." This revised statutory language, adopted in 2023, reflects growing awareness of the equity and distributional impacts of environmental investments. In addition to state guidance, the Biden Administration has instructed federal agencies to ensure that 40% of federal investments flow to disadvantaged communities (Executive Order 14008, 2021). To support agencies in this evaluation, the administration has released a variety of tools to identify federally-designated disadvantaged communities and support the analysis and reporting of environmental justice impacts of federal programs and policies (Council on Environmental Quality, n.d.).To evaluate the distribution of Clean Water Fund investments we compared county-level data on investments from 2010 to 2022 with federal data on the location of designated disadvantaged communities (Figure 4). Federally-designated disadvantaged communities reflect communities that face both socioeconomic burdens and environmental burdens.

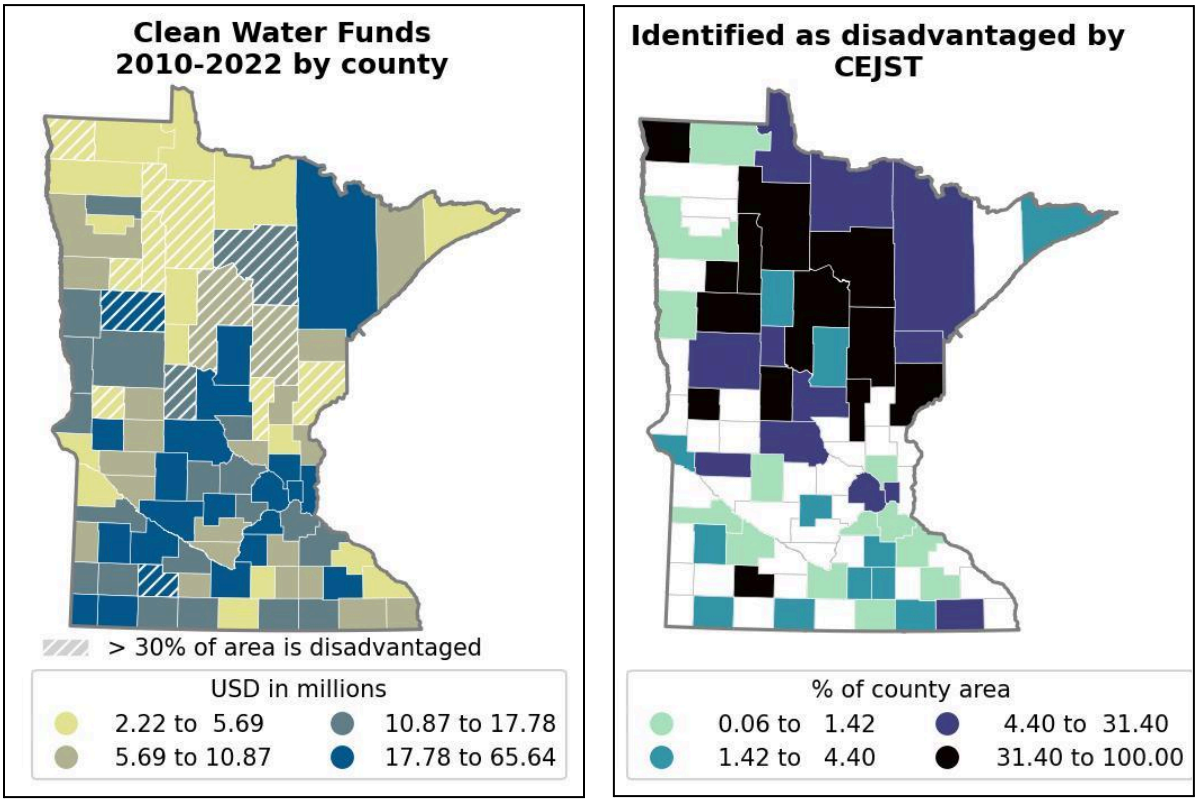

Figure 4: Clean Water Fund investments from 2010 to 2022 visualized by county and compared with spatial data on disadvantaged communities provided by the Climate and Economic Justice Screening Tool (CEJST). The tool defines the communities as disadvantaged if they are in census tracts that meet the thresholds for at least one of the categories of burden, or if they are on lands within the boundaries of Federally Recognized Tribes. We aggregated fully or partially disadvantaged census tracts to a county level by quantifying the fraction of county areas that contain disadvantaged tracts.

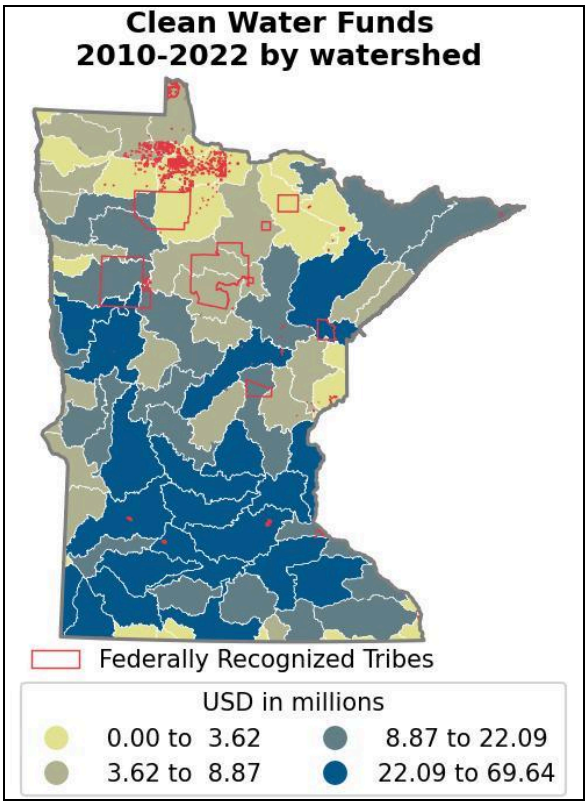

Figure 5: Clean Water Fund investments by watershed overlaid with the boundaries of federally recognized tribes within Minnesota.

To further explore the distribution of Clean Water Fund investments across the state, we sorted counties by their share of past Clean Water Fund investments and share of the state population. Figure 6 shows that approximately 50% of the state population received approximately 90% of state Clean Water Fund investments.

We were interested in how clean water funding was allocated across urban and rural regions of the state. Table 1 presents the total amount of Clean Water Fund investments allocated to counties associated with rural or urban classifications and the percent share of total Clean Water Fund dollars. Almost 70% of Clean

Rural and remote communities, those with limited language proficiencies, and low income communities are designated as disadvantaged. Counties with significant immigrant populations and that share geographies with federally designated Tribes are more likely to have greater area designated as disadvantaged.

The greatest cumulative investments tend to have been allocated to central and southern Minnesota counties, whereas counties with the greatest area designated as disadvantaged tend to be in the northern parts of the state, especially where Tribal lands make up a significant proportion of county area (Figure 5). As decisions are made about future allocations of funds, spatial data on disadvantaged communities can support decision makers seeking more equitable distribution of water-related investments.

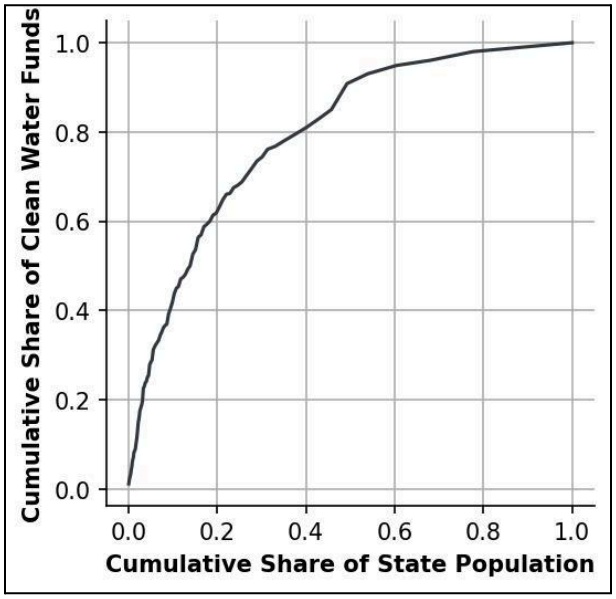

Figure 6. Data on the cumulative share of Clean Water Fund investments by county compared to cumulative share of the state population by county. Population data are from the 2022 American Community Survey: 5-Year Data.

Rural-Urban Commuting Areas (RUCA)	Number of counties	Population	Population, %	Clean Water Funds, USD	Clean Water Funds, %
Entirely rural	14	95,045	1.67%	116,430,354	10.31%
Town/rural mix	35	802,412	14.09%	451,710,162	39.99%
Urban/town/rural mix	25	1,177,192	20.67%	340,849,254	30.17%
Entirely urban	13	3,620,643	63.57%	220,621,120	19.53%
Total	**87**	**5,695,292**	**100.00%**	**1,129,610,890**	**100.00%**

Table 1: County population compared to cumulative clean water fund investments with counties allocated to corresponding rural-urban commuting areas. Population data from the 2022 American Community Survey: 5-Year Data and Rural-Urban Commuting Areas from https://www.ruralmn.org/rural-urban-commuting-areas-explanation-of-county-categories/.

Water Fund investments were made in counties designated as “town/rural mix” or “urban/town/rural mix” with the remaining allocated to “entirely rural” and “entirely urban” counties.

Demographic data are available at finer resolutions statewide, but investment data were only available at the county level making it difficult to attribute investments to particular demographic groups. Agency staff seeking to consider distributional considerations in Clean Water Fund prioritization or evaluation can take advantage of federal and state demographic data to continue to track how investments are distributed, with particular emphasis on communities designated as disadvantaged. These communities may be eligible for additional state and federal support due to this designation.

Section II: Review of watershed plans for climate and equity considerations

Collaborative watershed planning

The One Watershed, One Plan (1W1P) is a program administered by the Minnesota Board of Water and Soil Resources (BWSR) with the purpose of facilitating diverse partnerships for Comprehensive Watershed Management Plans (CWMP) based on watershed boundaries. The 1W1P is voluntary, but fulfills the requirements outlined in Minnesota Statutes §103B.801. These plans draw on existing local government services, agencies, and resources to implement targeted actions that address surface water and groundwater quality at the watershed level. Approved plans are eligible for watershed-based implementation funding from the Clean Water Land & Legacy Amendment if they meet set criteria for CWMPs (BWSR, n.d.).

Watershed plans offer a unique window into the priorities of local watershed partners, including water quality issues of concern, identified future threats to water quality, and goals and strategies for addressing threats. The 1W1P program has benefited from funding and support through the Clean Water Fund and is a key strategy in allocation of water restoration or protection strategies financed by Clean Water Fund implementation dollars.

Minnesota Statutes §103B.101 subd.16 requires BWSR to incorporate conservation practices, including climate adaptation, resiliency, and mitigation, into planning efforts. The plans must, at a minimum, include the following content outlined in 103B.801 Subd. 4:

- Surface water and ground water quality protection, restoration, and improvement, including prevention of erosion and soil transport into surface water systems;
- Restoration, protection, and preservation of drinking water sources and natural surface water and groundwater storage and retention systems;
- Promotion of groundwater recharge;
- Minimization of public capital expenditures needed to correct flooding and water quality problems;
- Wetland enhancement, restoration, and establishment;
- Identification of priority areas for riparian zone management and buffers; and
- Protection and enhancement of fish and wildlife habitat and water recreational facilities.

In addition to these requirements, Section B. “Other Topics” encourages plans to consider climate impacts on water resources, ecosystem health and resilience, contaminants of emerging concern, and equity and environmental justice. Climate impacts are also mentioned in the guidance under Section C. “Special Consideration: Extreme Weather” where plans can address the impacts of extreme weather events on their water and land resources (BWSR, 2022).

Emerging issues in watershed planning: Climate change

Climate change has the potential to affect water resources in multiple ways, with implications for watershed planning. The 2020 State Water Plan for Minnesota focused on the interaction between climate change and water resources, noting that a changing climate will affect the amount and timing of precipitation, the availability and demand for water, the timing of snowmelt, the duration of ice cover on lakes and streams, the beginning and end of Minnesota's growing season, as well as chemical, physical and biological processes that shape aquatic resources (Environmental Quality Board, 2020).

Information on expected changes in future climate are readily available via state and regional investments in predictive climate science. The USGS National Climate Change Viewer provides public access to climate projections by state or county (US Geological Survey, 2013). Additionally, Minnesota researchers have invested in the development of high resolution dynamically downscaled climate projections specifically for Minnesota (Liess et al, 2023). Climate projection data are designed to help planners and decision makers consider future climate in management decisions.

According to high resolution climate projections by the University of Minnesota, the future climate in Minnesota is expected to be both wetter and warmer (Liess et al, 2023). Average growing season temperature is expected to increase statewide (Figure 7). Changes in precipitation patterns are more variable, with the majority of the state seeing increases of at least an inch in annual precipitation (Figure 7). These temperature and precipitation deviations from historical data represent modest emissions scenarios under a mid-century time frame.

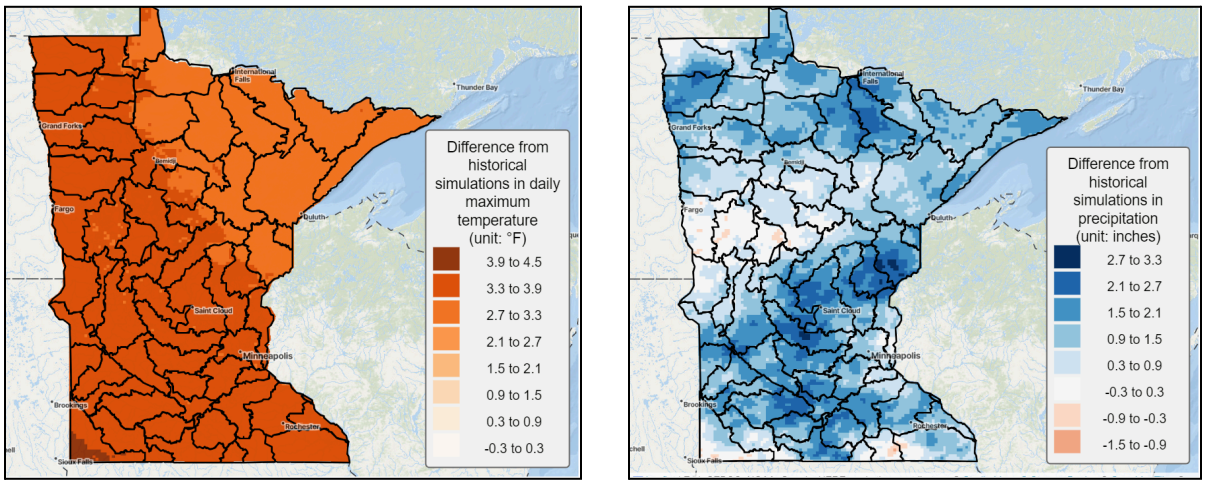

Figure 7. Differences between future growing season high temperatures (left) and annual precipitation (right) from historical simulations for mid century (2040-2059) under an intermediate emissions scenario (SSP 245). Boundaries represent 1W1P watershed planning areas. Data downloaded from the Minnesota Climate Adaptation Partnership's Minnesota CliMAT tool (Liess et al, 2023)

The 2022 Minnesota Climate Action Framework established a goal that all state funded or sponsored land, water, and species management plans identify actions to increase adaptation to a changing climate (Climate Change Subcabinet, 2022). Given both the guidance to incorporate climate considerations, and the availability of free publicly available and high quality climate projections for Minnesota, we were interested in seeing if and how climate science was being integrated into watershed planning.

Emerging issues in watershed planning: Equity and environmental justice

In addition to consideration of climate change, we were also interested in documenting how watershed plans integrated topics related to equity or environmental justice. Equity is mentioned as a potential “Other Topic” to include in watershed planning. Furthermore, state guidance documents, including the 2020 State Water Plan and the Clean Water Fund Strategic Plan, encourage the consideration of distributional and equity consideration in water-related planning and implementation. As noted in Section I, equity and environmental justice have grown in prominence in both state and federal policy. Watershed planning touches on several aspects of environmental justice, including procedural, distributive, and recognitional justice (Agyeman et al. 2016). Planning processes provide an opportunity to consider how decisions are made, how communities are engaged in watershed planning, and how resources are distributed.

For this report, we were interested in how watershed plans considered procedural dimensions of equity including the participation and involvement of diverse communities in watershed planning. We also explored how plans assessed potential distributional considerations, including assessments of the distribution of water related benefits and burdens within a watershed and how implementation activities could be targeted to enhance equity, especially in designated disadvantaged communities.

Review of watershed plans

As of June 2024, 48 watershed plans were either completed and approved or submitted as drafts for review. Nine watersheds are currently in the planning stage, with an additional six watersheds without a defined planning process. We reviewed all approved and draft plans for the inclusion of climate change and equity information, representing 76% of all possible plans.

We searched each plan to identify text associated with the themes of climate change and equity. To facilitate consistent analysis of large volumes of text, we used SciSpace, an AI tool that can search documents for keywords and flag associated text (SciSpace, 2022). ChatGPT was used where 1W1P documents were not readable in SciSpace because of document formatting (5 documents) (OpenAI, 2024). If documents could not be analyzed by either, reviewers manually read the documents (2 documents).

Within SciSpace, we used commands to search for keywords related to climate change, extreme weather, and equity (Table 2). If any of the keywords were present in a plan document, then SciSpace indicated which keyword and included a link to the page of the document where it was used. From there, we manually read through the section, noted important context, and identified illustrative quotes for inclusion in our analysis. We tracked our findings in a spreadsheet, with results shown in Table 3.

Theme	**Keyword Command**
Equity	Search for mentions of the following words or phrases: equity, equality, diversity, underrepresented, income, low income, indigenous, tribe, tribal, tribal communities, women, non-english speakers, people of color, black, hispanic, justice, minority, marginalized, underserved, poverty
Climate Change	Search for mentions of the following words or phrases: climate, climate change, global warming.
Extreme Weather	Search for mentions of the following words or phrases: changing precipitation patterns, precipitation patterns, extreme weather, drought, floods, increase, decrease (related to weather in any section on goals).
Climate Modeling	Search for mentions of the following words or phrases: climate modeling, predict, prediction, predictive, future, projections, projected, NOAA Atlas, Atlas 14, 2040, 2050, 2070, 2100, years, scenario.

Table 2: Themes and associated keywords used to analyze 48 1W1Ps.

We were also interested in how integration of climate change and equity information has changed over time. We consulted a 2022 report conducted by University of Minnesota Humphrey School students in partnership with BWSR that evaluated twenty-five approved and drafted 1W1P (Cullen et al, 2022). We adopted similar methods to the 2022 report, increasing the number of plans reviewed and expanding the scope of our analysis to explore how plans incorporated equity or distributional considerations. In the discussion section, we compare our findings with this 2022 report with particular attention to challenges related to the integration of climate information over time.

Findings: Consideration of climate change

All reviewed watershed plans included some mention of climate change or climate trends (Table 3). Climate change was most frequently considered under the “emerging issue” section (58% of plans). A majority of plans addressed climate change generally, rather than associating climate change with noted action items or goals. For example, plans included language such as “Minnesota’s climate is already changing and will continue to do so in the

future; therefore, it should be considered in a long-term planning effort" (Wild Rice-Marsh River, p. 64).

Just under half of plans considered climate change in articulated "goals or actions". For example, plans specified how watersheds can integrate climate resiliency through investments in carbon sequestration or water storage. Other climate-related goals included evaluation of the impact of climate change on watershed resources and infrastructure such as potential flood risks to infrastructure. In comparing the plans from 2016 to 2020 and then 2021 to present, there is an increase in the number of plans that are integrating climate change into their goals or actions, from 42% to 52% respectively.

All but one plan included text related to changing precipitation patterns and/or "extreme weather events." The text associated with mentions of extreme events included statements such as "the impact of extreme climate and precipitation events must be considered" (Sauk River p. 3-8) or are likely to "impact water resources and their management" (Root River p. 2-36, North Fork Crow River p. 2-35, Lake of the Woods p. 2-28, Missouri River Watershed p. 2-12, Watonwan River p. 4-8, Buffalo Red River p. 2-16). All consulted watershed plans used modeling programs like the Hydrologic Simulation Program-FORTRAN-Scenario Application Manager (HSPF-SAM), Soil & Water Assessment Tool (SWAT), or NOAA's Atlas 14 to simulate changes in precipitation and land use and associated impacts on water quality. Several plans integrated data on future changes in precipitation into their modeling to evaluate the effectiveness of hydrological management decisions based on changing precipitation regimes.

More than half of plans addressed extreme weather in their "goals or actions" section including reference to "mitigating increases in peak flow" (Greater Zumbro p. 5-7) or "increase the number of volunteer rain gauge readers to evaluate short and long-term trends and their relationship to groundwater supplies and lake levels" (North Fork Crow River p. 4-8). In comparing the plans from 2016 to 2020 and then 2021 to present, more plans are integrating extreme weather into their goals or actions, from 42% to 69% respectively.

While many plans considered climate impacts generally, only three plans incorporated data derived from climate projection models in their analysis. The St. Louis River 1W1P referenced the *Climate Change Vulnerability Assessment and Adaptation Plan* for the 1854 Ceded Territory (Stults, 2016*)* which integrates dynamically downscaled regional climate projections based on alternative emissions scenarios. The Lake Superior North plan references the Lake Superior Lakewide Action and Management Plan which models changes in climate based on a range of future emission scenarios through the 21st century for the region (Huff, 2014, p. 14). The Rainy Headwaters-Vermillion 1W1P WRAPS report includes climate change scenario modeling based on linear projections of historical climate trends based on national models.

In the 2022 University of Minnesota report on 1W1P conducted in collaboration with BWSR, researchers surveyed planners and watershed managers who participated in 1W1P efforts.

Over 40% of surveyed respondents indicated that they did not have the necessary information about climate change to account for climate impacts in their watershed planning (Cullen et al, 2022, p. 21). Survey respondents had mixed reactions to a survey question about their receptivity to agency mandates requiring integration of climate change information in watershed planning. 66% of respondents indicated support for mandated consideration of climate change, whereas 33% of respondents were opposed, often noting a perceived resistance to discussions of climate change in their communities.

Our review suggests an increase in the consideration of climate impacts in watershed planning over time, perhaps reflective of broadening public acceptance or awareness of climate change. At the same time, very few plans take advantage of publicly available climate projections for their watersheds, and most plans consider climate change in very general terms, without connecting plan implementation goals or actions to specific anticipated climatic changes. As the state invests in future rounds of watershed planning, we encourage watershed planners to take advantage of high resolution climate information and consider how climate may affect water quality and quantity and the associated effectiveness of restoration or protection goals.

Findings: Consideration of equity and environmental justice

The 2023 updated guidance for expenditures under the Clean Water Fund now requires "an assessment of whether the funding celebrates cultural diversity or reaches diverse communities in Minnesota, including reaching low- and moderate-income households." The Clean Water Council also requests that all agencies incorporate their stated principles for diversity, equity, inclusion, and/or environmental justice into Clean Water Fund-supported programs. We assessed approved plans and plans under review for topics related to cultural diversity or diverse communities and considerations of impacts to low-income households. Of the 48 plans that are currently approved or under draft review, 19 (40%) include at least one keyword related to equity (Table 3). In comparing the plans from 2016 to 2020 and then 2021 to present, more plans are integrating mentions of equity, from 26% to 48% respectively.

A majority of plans address equity in the context of plan implementation. In these plans, equity is most frequently mentioned as a general goal associated with sustainability, resilience, or community (Root River p. 2-10). The following text excerpt provides an example of how one plan discusses equity as it relates to plan implementation:

“Equity throughout communities and in larger geographies is important because of global climate change and the development of sustainable and resilient communities. Addressing equity at a watershed scale is a way of exploring, delineating, and prescribing actions for addressing the equitable management of natural resources for the welfare of all people in those communities within the plan boundaries. Though particular goals or actions directly addressing equity are not specifically prescribed in this plan, it is encouraged to be considered during plan Implementation” (The Kettle River/ Upper St. Croix p. 13-11).

Several plans suggest identifying areas of high value and cultural resources as part of the plan implementation (Lower Minnesota River East p. 98; Rum River p. 132). Other plans include a definition of environmental justice and provide maps that reflect environmental justice areas within the watershed (Otter Tail River p. 134; Mississippi River - Brainerd p. 84; South Fork Crow River p. 34-35; Chippewa River p. 2-19; Lower Minnesota East p. 59; Leaf-Wing-Red Eye, p. 114; Nemadji p. 130).

A few plans mention goals of protecting water-based cultural activities including protecting streams for recreation, for subsistence fishing, for culturally significant species, for wild rice production, and for drinking water (Mississippi River -Brainerd p. 33; Leaf-Wing-Red Eye p. 114). The St. Louis River plan considers how the watershed planning process can "*reduce historic and current inequities through meaningful involvement, support for cultural ties and heritage, acknowledgement of treaty rights, consideration of economic constraints, protection of public access, and support for human health including food access and consumption, protection from pollution, employment, and water quality*" (p. 33). Several plans describe how watershed goals impact cultural resources and equity, diversity, and inclusion (Rainy Headwaters Vermillion p. 36-37, 59-85; Sand Hill River p. 67-82; St Louis River p. 35-197).

Of the 48 watersheds that currently have approved plans or plans under draft review, 14 cover areas that overlap with federal Tribal Nation reservation land. Watersheds that overlap with tribal boundaries vary in the degree to which they engage with tribes and/or consider tribal priorities in watershed planning and implementation. A few plans include only a brief mention that tribal land exists within the boundaries of the watershed (Snake, Clearwater, Yellow Medicine, Lake Superior North, Red Lake River) and one makes no mention of equity or of Tribal Nations within their boundaries (Buffalo-Red River).

Several watershed planning efforts indicated outreach and collaboration with Tribal Nations. The Kettle River planners worked with Tribal partners to prioritize recreationally/culturally important lakes and streams within the watershed boundaries (p. 4-4). The Leech Lake River plan described connections with the Leech Lake Band of Ojibwe (LLBO) and highlighted the importance of water for the subsistence, cultural, and spiritual benefits of Tribal members (Leech Lake River p. 22). The Rainy Headwaters Vermillion Watershed Plan mentions working with the 1854 Treaty Authority in addition to the Bois Forte Nation (p. 12).

Aside from Tribal partners, there were no mentions of Black, Hispanic, non-English speakers, people of color, or other minority marginalized populations in any of our reviewed plans outside of environmental justice definitions. If plans included actions or goals for low-income households, all but two stated that pre-existing programs provide qualifying households with low-interest loans to replace septic systems. The first intended to review the watershed's population and income distribution to aid in equal outreach (Snake River p. 4-1). Notably, the second included statements throughout the plan describing how actions accomplish watershed equity goals (St. Louis River p. 44, p. 138, etc). We did not otherwise observe any plans that indicated implementation funds should be preferentially directed towards underserved or

disadvantaged populations, and rarely did plans explicitly state priority actions or goals around protection or restoration of culturally significant streams or lakes.

Beyond these distributional considerations, it was difficult to evaluate the procedural aspects of environmental justice represented in watershed planning processes. Tribal involvement on advisory committees or as stakeholders was mentioned in a few plans. However, we could not evaluate if planners followed best practices in community engagement or adhered to new federal guidelines on Indigenous Knowledge (Prabhakar, 2022).

Similar to climate considerations, our review suggests a trend towards greater consideration of equity implications in watershed plans in more recent years. However, there remain notable gaps in the consideration of Tribal nations in some watersheds where Tribal lands and ceded territories make up a significant proportion of the watershed. Non-indigenous minority populations in Minnesota are not considered in any plans. Low income populations, immigrant communities, and communities in flood prone areas may bear disproportionate risks associated with climate change. Future interactions of watershed planning could do more to integrate social and demographic data in climate-related risk assessments and in the prioritization of watershed implementation funding.

Watershed	Adoption date	Equity	Climate change goals/ action items/ intent	Climate change classified as an emerging issue	Changing precipitation patterns and extreme weather events	Precip/ Weather goals/ action items/ intent
Root River	12/14/2016	x	x	x	x	
Yellow Medicine River	12/14/2016			x	x	
Lake Superior North	1/25/2017		x		x	x
Red Lake River	4/26/2017					
North Fork Crow River	6/27/2018			x	x	x
Leech Lake River	3/27/2019	x	x		x	
Lake of the Woods	9/25/2019			x	x	
Pine River Watershed	9/25/2019			x	x	
Missouri River Watershed	10/23/2019				x	
Cedar - Wapsipinicon	12/18/2019				x	
Thief River	3/25/2020			x	x	x
Cannon River	6/24/2020		x		x	
Pomme de Terre River	8/26/2020				x	
Leaf, Wing, Redeye	8/26/2020	x	x		x	

Watershed	Adoption date	Equity	Climate change goals/ action items/ intent	Climate change classified as an emerging issue	Changing precipitation patterns and extreme weather events	Precip/ Weather goals/ action items/ intent
Buffalo-Red River	10/28/2020			x	x	x
Lower St. Croix	10/28/2020		x		x	x
Nemadji	12/17/2020	x	x		x	x
Wild Rice - Marsh River	12/17/2020	x	x	x	x	x
Watonwan River	12/17/2020			x	x	x
Bois de Sioux and Mustinka	1/21/2021			x	x	
Two Rivers Plus	6/23/2021		x	x	x	
Sauk River	8/26/2021			x	x	
Mississippi Headwaters Watershed	9/22/2021	x			x	
Greater Zumbro	10/27/2021		x		x	x
Hawk Creek - Middle Minnesota	1/26/2022		x		x	
Shell Rock - Winnebago	4/27/2022			x	x	x
Rum River	5/25/2022	x	x	x	x	x
Middle-Snake-Tamarac Rivers	8/25/2022			x	x	x
Long Prairie River	10/26/2022	x	x	x	x	x
Clearwater River	10/26/2022		x		x	x
Snake River	1/25/2023				x	x
Otter Tail River	1/25/2023	x	x	x	x	x
St. Louis River	3/22/2023	x	x		x	x
Des Moines River	3/22/2023		x	x	x	x
La qui Parle Yellow Bank	3/22/2023			x	x	
Lower Minnesota River West	3/22/2023		x		x	x
Mississippi River Winona / La Crescent	3/22/2023				x	x
Roseau River	4/26/2023			x	x	x
Rainy-Rapid	5/24/2023	x	x	x	x	x
Le Sueur River	8/24/2023				x	x
Mississippi River - Brainerd	12/14/2023	x	x	x	x	x
Sand Hill River	1/24/2024	x	x	x	x	x

Watershed	Adoption date	Equity	Climate change goals/ action items/ intent	Climate change classified as an emerging issue	Changing precipitation patterns and extreme weather events	Precip/ Weather goals/ action items/ intent
Upper Minnesota River	3/27/2024	x		x	x	
South Fork Crow River	3/27/2024	x			x	x
Rainy Headwaters-Vermillion	4/24/2024	x	x	x	x	x
Kettle River / Upper St. Croix	Under final review	x	x	x	x	x
Chippewa River	Under final review	x		x	x	
Lower Minnesota River East	Under draft review	x		x	x	
		19	**23**	**28**	**47**	**28**
		39.6%	**47.9%**	**58.3%**	**97.9%**	**58.3%**

Table 3: Climate change and equity considerations for 48 One Watershed, One Plan (1W1P) documents. As of April 2024, 45 plans were approved and 3 were in draft review. 1W1P document names listed in the left column. Cells marked with an "x" indicate that the plan contained information on subject matter listed in the column header as defined by the keywords noted in Table 2.

Climate and the effectiveness of best management practices

Implementation follows watershed planning, with plans providing guidance around key threats to water quality, stressors of concern, target areas for investments, and identified activities to improve water quality. Given the prevalence of non-point source pollutants and water retention as key watershed goals, the implementation of best management practices (BMPs) to improve water quality is a core strategy for watershed managers. As noted above, climate change will affect temperature, plant productivity, and the timing, frequency, and intensity of precipitation statewide. BMP effectiveness will also be influenced by changes in climate. Watershed planners and managers would be wise to consider the impact of climatic changes on the effectiveness of BMPs. However, our review of 1W1P documents suggests a gap between the availability of climate data and integration of those data into planning and implementation processes.

This section of the report aims to assess how the effectiveness of BMPs may increase or decrease under climate change. Minnesota's Nutrient Reduction Strategy (NRS) identifies over 25 best management practices that can be used to mitigate the effects of agricultural sediment and nutrient pollution into waterways (Minnesota Pollution Control Agency [MPCA], 2014, appendix C). From 2010 to 2022 over 4.5 million acres of these practices were installed in Minnesota. Of these, nearly 1.5 million acres were funded by Clean Water Fund programs (BWSR: Competitive Grant Program, RIM/ Wetlands Reserve Program, MDA: Agricultural BMP Loan Program, and Water Quality Certification Program) (MPCA, 2023).

We focused on best management practices outlined in Minnesota's nutrient reduction strategy and identified on the MPCA's Nutrient Reduction Strategy BMP dashboard (MPCA, 2023). For each BMP, we searched Google Scholar with keywords focused on the name of the practice i.e. "cover crop" or "no-till", and regional keywords such as "climate change" and "midwest". We prioritized insights from research in Minnesota and surrounding geographies where available. We found three key references related to climate impacts of BMPs in the midwest. These three papers were then uploaded to the literature AI mapping tool *Research Rabbit* (Research Rabbit, 2021). Research Rabbit used these three papers to search for similar works based on author citations and relevant content, expanding our literature total to 18 papers. We supplemented papers identified by AI with additional searching using variations of the keywords above in Google Scholar. Twelve BMPs were found to have a significant body of research on the impacts of climate change to their effectiveness.

Research suggests that climate change may have positive, negative, or neutral impacts on BMP effectiveness (Table 4). We identified several key climate-related considerations in our research:

- Increased precipitation that results in stronger spring flooding and more intense rainfall events may provide more frequent flow pathways for circumventing BMPs, resulting in more opportunities for pollutant transport and loss.

- Changes in atmospheric carbon availability, warmer weather, and extended growing seasons could improve growing conditions for plants increasing the filtering ability of cover crops and other plant-based BMPs. Warmer weather also expands the geographies of invasive species and pests and might change the plant communities of the BMPs.

- Reduced snow and ice cover, and greater precipitation falling as rain may increase in the volume of water flowing through tile drains, resulting in more nutrients by-passing field surface level BMPs.

- Warmer temperatures and longer growing seasons may provide better conditions for denitrifying bacteria and increase rates of crop residue decay.

- Overall changes to precipitation patterns and temperature are likely to increase sediment and nutrient loading which may overwhelm individual BMPs, making it difficult to meet nutrient and sediment reduction targets.

In summary, climate change may increase effectiveness of some BMPs, but more dominant effects associated with increased frequency and intensity of precipitation events will likely decrease effectiveness of many BMPs. Despite potential reductions in on-field efficiencies of different practices, BMPs will remain important for climate adaptation due to estimated increases in sediment and nutrient loading. Changes in BMP efficiency will affect currently installed practices as well as future BMP investments. Future systems may need to be installed differently and established systems may need retrofits as a result of expected climatic changes. Watershed planning and implementation should take into consideration both how future climate

changes may increase the need for BMPs, as well as how BMP implementation and estimated effectiveness will shift under changing temperature and precipitation regimes.

Best Management Practice	Improve	Status quo	Reduce	Improvements in BMP Efficiency Rationale	Reductions in BMP Efficiency Rationale
No Till & Reduced Till	▲		▼ ▼ ▼	• Model results show no-till as the most effective individual BMP at reducing multiple pollutant loads in future climate scenarios[4]	• Higher rate of decay and nutrient cycling hinder crop growth and limit biomass production[1,2] • More residue movement will result from an increase in higher precipitation events[1,2] • Warmer winters result in more flow in tile drainage or infiltrating groundwater avoiding surface pathway[3]
Grassed Waterway		•	▼	• Carbon and temp. increases could increase plant vigor[1]	• More intense precipitation events will increase concentrated flow erosion and exceed treatment capacity[1]
Terrace & Contour Farming	▲		▼	• Model results show BMPs as effective at reducing multiple pollutant loads[5]	• More intense precipitation events will increase concentrated flow erosion and exceed treatment capacity[1]
Perennial Cropping		•		• Extended growing season • Increased plant growth rates [1]	• Changes in plant species composition • Exposure to different pests and disease[1]
Drainage Water Management (control drainage)	▲	•	▼	• Higher winter temps lead to more soil activity and denitrification[1]	• More intense precipitation events will increase phosphorus loading in non-tile drainage flows[2]
Saturated Buffer		•	▼		• More intense precipitation events will increase concentrated flow erosion and exceed treatment capacity[1] • Changes in plant species composition
Winter Cover Crops	▲ ▲ ▲	•	▼ ▼	• Warmer temperatures and atmospheric carbon may increase plant biomass and timing of fall establishment[1,2,6]	• Extended growing season for primary crops, increasing competition with cover crops for nutrients and water[1] • Warmer winters result in more tile drainage or groundwater infiltration reducing nutrient uptake by cover crops[3] • Warmer temperatures result in faster breakdown of cover crop plant residue
Filter Strips		• •	▼ ▼		• Stronger spring precipitation will increase likelihood for filter strips to be inundated with runoff carrying sediment and nutrients[2,3]
Riparian Buffers (Forest and Herbaceous)	▲		▼	• Extended growing season improve filtration capacity	• More frequent intense precipitation events will impact streambank stability
Nutrient Management Plans		• •	▼		• Increasingly unpredictable weather patterns could impact timing of nutrient application[1] • Temperature and moisture changes will alter nutrient

		uptake[1]

■[1] Johnson, 2022
■[2] Schmidt, 2019
■[3] Bosch, 2014
■[4] Wallace, 2017
■[5] Woznicki, 2011
■[6] Lee, 2017; Malone, 2020; Gupta, 2023
■ Pease, 2017

Table 4: Future BMP effectiveness under changing climate. Each shape (▲•▼) represents potential impacts to Best Management Practice (BMP) effectiveness in response to climate change. The primary conclusions driving the changes in effectiveness are listed under rationale, with citations to the source material shown with variations in color. The twelve listed agricultural BMP represent practices mentioned in Minnesota's nutrient reduction strategy with more than one academic paper on their response to changing climate. Two BMPs relied solely on Johnson, 2022, due to the breadth and scope of their literature review on this topic.

Section III: Cost of meeting water quality targets

Clean water investments through 2034

The $1.8 billion in funding from the Clean Water, Land and Legacy Amendment has yielded investments in planning, monitoring, research, and implementation statewide. We estimate that approximately half of total funds remain, approximately $1.6 billion through the expiration of the amendment in 2034 (Figure 1). As the state considers strategies for the duration of the fund under the current amendment timeline, we set out to estimate the potential costs associated with meeting a variety of stated clean water goals.

We consulted the most recent Clean Water Council Strategic Plan released in 2024 for quantifiable goals where reasonable cost estimates for meeting each goal could be obtained with available data. The cost of achieving goals associated with capacity building, monitoring, or outreach are not as easily quantifiable, whereas goals that specify acreage targets for protection or best management practices can be estimated based on a set of reasonable assumptions. For each selected goal, we obtained data on past investments associated with each goal, estimated state or federal payments associated with particular practices, cost estimates for restoration or implementation of best management practices, and estimated costs of land protection based on spatially-explicit parcel land value datasets.

Importantly, these estimates were designed to establish reasonable expectations for the costs associated with achieving specific goals as compared to the total remaining funds through the expiration of the legacy amendment. Cost estimates are subject to assumptions and data limitations. Where possible, we captured reasonable uncertainty estimates around cost projections.

Goal: Drinking water is safe for everyone, everywhere in Minnesota.

Selected Measure: Approximately 400,000 acres of vulnerable land surrounding drinking water wellhead areas statewide are protected by 2034. (Final Clean Water Council Strategic Plan for 2024-2028, p. 5)

To estimate the costs of protecting lands in source water protection areas, we relied on a 2022 University of Minnesota report commissioned by the Legislative Citizen Commission on Minnesota Resources (Noe, 2021). In this report, authors obtained high resolution parcel-specific land value data (Nolte, 2020) and combined these data with spatial data on the boundaries of drinking water supply management areas. Land value data were combined with data on land management to identify unprotected and unbuilt parcels that could, in theory, be acquired by the state and protected from future development. The report estimated that the total area of unprotected and unbuilt land in source water protection areas was over 634,000 acres, with an estimated cost of protection of $8.8 billion. Targeting a subset of the lowest value,

highest vulnerability land reduced the cost substantially. However, the report estimated that even protecting 15% of low value, high vulnerability parcels in drinking water supply management areas would cost over $100 million.

To apply these calculations to the Clean Water Fund goal of protecting 400,000 acres of vulnerable lands in drinking water supply management areas, we averaged parcel land values obtained through the report, arriving at an estimated cost per acre of $14,400. Applying this per acre estimate, we calculate that the cost of meeting the stated Clean Water Fund goal of protecting 400,000 acres to be approximately $5.7 billion.

Goal: Surface water protection and restoration

Selected Measure: Protection of 100,000 acres and restoration of 100,000 acres in the Upper Mississippi River headwaters basin by 2034 (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

The Council does not specify if targeted acres for restoration and protection are additive or inclusive of existing lands in public protection as of 2024. Here we assume that meeting this goal requires 100,000 additional acres of protection and restoration in the headwaters basin. We assume that 100,000 acres of existing unprotected unbuilt land will need to be acquired to meet the protection goal and assume no additional cost of land acquisition for acres that need to be restored.

To estimate the costs of protecting lands in the headwaters basin we used high resolution land value data and data on protected status, this time querying land values within the Mississippi Headwaters Basin (Figure 8). To estimate the least cost approach to protecting 100,000 acres of unprotected land, we identified the least cost parcels equivalent to 100,000 acres (average values for these parcels ranged from $562 to $2,431 per hectare) and summed their values. The total cost of 100,000 acres of the least expensive unprotected non-built land within the Mississippi Headwaters Basin is approximately $84 million. If we instead assume a median per hectare value of unprotected non-built land within the area of interest ($6,281 per hectare), then the total cost of acquiring 100,000 acres within the Mississippi Headwaters Basin increases to $254 million.

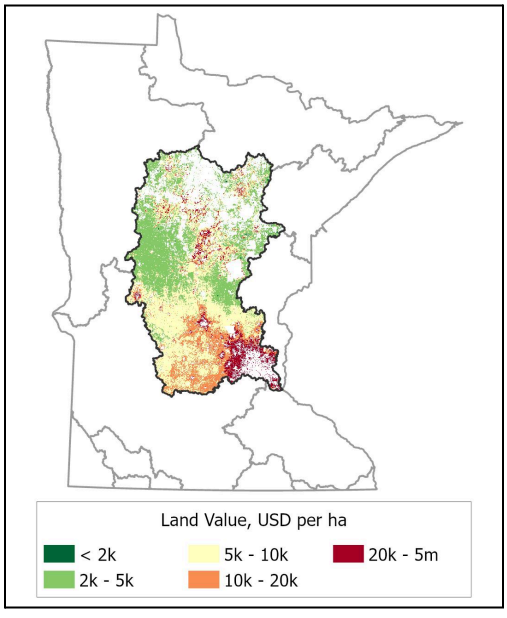

Figure 8. Land values in US dollars per hectare within the Mississippi River Headwaters basin. Land value data are from Nolte (2020).

To estimate the potential costs associated with 100,000 acres of restoration in the basin, we

consulted a 2015 study that reviewed costs associated with different types of habitat restoration in Minnesota, as well as portions of Wisconsin, Iowa, North Dakota, and South Dakota. These researchers administered a survey to restoration practitioners, using 16 different restoration scenarios for grassland ecoregions. Reported restoration costs ranged from $527 (crop field to moderately diverse prairie used for grazing or hay) to $2,285 per acre (degraded meadow to species-rich, high quality habitat) (Phillips-Mao, 2015). Applying these per acre costs to 100,000 acres of restoration would cost anywhere from $52.7 million to $228.5 million. These are assumed to be one-time costs and do not include annual maintenance costs of restored lands.

Goal: All Minnesotans value water and take actions to sustain and protect it

Selected Measure: Number of farmers and acres enrolled in Minnesota Agricultural Water Quality Certification Program, with a target of 5,100 farms and 6.5 million acres by 2030 (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

The Minnesota Agricultural Water Quality Certification program is a voluntary program that encourages farmers to adopt conservation practices designed to improve water quality. As of 2023, over 1,400 producers and 1 million acres have been certified, representing approximately 3.9% of all farmland in Minnesota. To achieve a target of 6.5 million enrolled acres, an additional 5.46 million acres are needed by 2030.

The costs associated with water quality certification in Minnesota has dropped from $541 per acre in FY2014 to a low of $24 per acre in FY2021 as the program has trained staff and increased efficiencies in program design and implementation. We assumed an estimated per acre cost of certification of $25 (Redlin,2022, p. 17). Applying this cost to the target of achieving an additional 5.46 million certified acres is estimated to be $137 million. This estimate includes only the one-time cost of certification. Once enrolled in the program, farmers are eligible to apply for up to $5,000 per year in cost-share grants to implement best management practices and there are additional annual costs associated with assessing program compliance and farmer outreach and engagement. If we assume that each additional farm needed to reach the 5,100 farm goal received a $5,000 grant for one year, then this would incur additional costs of $18.5 million.

Selected Measure: Achieve a goal of five million acres of row crop agriculture that use cover crops or continuous living cover by 2034 (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

According to the Census of Agriculture, there were 760,423 acres of cover crops in Minnesota in 2022 (Bryant, 2024). The costs of implementing cover crops in row crop agriculture include the cost of purchasing seed, chemicals, fertilizer, fuel and oil costs associated with planting and managing crops, as well as costs associated with equipment repairs and custom hire cost categories.

We obtained average cost data for installing cover crops from a 2022 report on the Economics of Cover Crops on Minnesota Farms (Nurden et al, 2022). Estimates presented in this report are based on 2022 dollars and reflect costs and conditions specific to Minnesota row crop agriculture. The report estimates costs ranging from $14 - $310 per acre, with an average cost per acre of $74 annually. If we assume that existing funding is supporting the annual cost of implementing current cover crops (760,423 acres as of 2022), then an additional 4,239,577 acres of cover crops needed to meet the 5 million acre target would cost an estimated $314 million per year.

Goal: Groundwater is clean and available to all in Minnesota

Selected Measure: Targets for nutrients in the state's Nutrient Reduction Strategy
Selected Measure: Nitrogen Fertilizer Management Plan implemented on 80% of row crop acres excluding soybean by year 2030, and implemented in all remaining townships by year 2034.
(Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

To estimate costs associated with compliance with the state's Nutrient Reduction Strategy and implementation of best management practices, we consulted Minnesota's Nutrient Reduction Strategy 5-Year Progress Report (MPCA, 2020). The report lists milestone goals for the year 2025 and final goals for 2040 that include achieving a 45% reduction in phosphorus for the Mississippi River Basin and a 50% reduction in Minnesota's Red River portion of the Lake Winnipeg Basin by 2040, and achieving a 45% reduction in nitrogen for the Mississippi River Basin and a 50% reduction in the Red River Basin (MPCA, 2020).

Agency staff have developed science-based scenarios to estimate compliance with the Nutrient Reduction Strategy and associated goals. Here we estimate costs associated with the best management scenarios included in the 2014 Nutrient Reduction Strategy Report (MPCA, 2014). These scenarios serve as examples of the level of best management practice (BMP) adoption needed to achieve the nutrient reduction goals in major river basins, when combined with point source nutrient reductions and other reductions (MPCA 2020, p. 34)

We estimated costs associated with five BMP scenarios that are collectively needed to reach the 2014 NRS milestones (MPCA, 2020, table 9). These include 4.9 million acres of field erosion control, 6.8 million acres of increased fertilizer use efficiency, 620,000 acres of drainage water retention and treatment, 440,000 acres of perennials, and 1.9 million acres of cover crops. We used NRCS data on the subsidies associated with each practice for our cost estimates (United States Department of Agriculture: Natural Resources Conservation Service, 2024). NRCS estimates refer to the cost the government is willing to pay a producer for a given practice and does not necessarily include the full cost associated with implementation of a given practice.

Practice	Target Acres	Cost per acre	Included practices	Annual cost
Field Erosion Control	4.9 million	$4.19	Average of no till to reduce soil erosion ($3.59/acre) and reduced tillage to reduce soil erosion ($4.78/acre) practices.	$20.53 million
Fertilizer Use Efficiencies	6.8 million	$6.40	Average of nutrient management ($4.04/acre), precision nutrient application ($8.72/acre), and prescription nutrient efficiency ($6.43/acre) practices.	$43.52 million
Drainage Water Retention	620,000	$1.56	Drainage water management ($1.56/acre).	$0.97 million
Perennials	440,000	$6.66	Short term perennials ($6.66/acre).	$2.93 million
Cover Crops	1.9 million	$9.27	Average for cover crop - basic ($8.24/acre) and cover crop - multiple species ($10.30/acre).	$17.61 million
Summed Annual Cost				**$85.56 million**

Table 5: Estimated annual costs associated with five BMP scenarios as articulated in the Minnesota State Nutrient Reduction Strategy report. Table includes acreage totals associated with each scenario and estimated per acre payments based on listed practices drawn from NRCS subsidy databases.

In Table 5 we summarize costs associated with each best management practice based on NRCS estimates and apply these costs to the targeted acreage totals. The most expensive goal is increased fertilizer use efficiency at $43.52 million, followed by compliance with field erosion control ($20.53 million), cover crops ($17.61 million), perennials ($2.93 million), and drainage water retention ($0.97 million). Assuming these are annual costs, the total cost of achieving all five BMPs goals is $85.56 million per year.

Findings: Total costs of meeting selected clean water goals

As noted above, cost estimates are limited by available data and subject to simplifying assumptions. Where possible we selected conservative estimates of costs, noting where costs may underestimate the total expenses associated with acquisition and management of lands. We also acknowledge that funding provided by the Clean Water Fund is meant to leverage other state and federal funds for conservation and restoration, and therefore is not representative of full purchasing power of the amendment dollars.

We estimated the cost of protecting 400,000 acres of vulnerable lands in drinking water supply management areas, protecting 100,000 acres and restoring 100,000 acres in the Mississippi

River Headwaters Basin, and certifying 6.5 million acres in voluntary water quality programs to total $6 to 6.4 billion. In addition to these costs, achieving 5 million acres of cover crops and meeting state nutrient reduction strategy goals through best management practices will add an additional $400 million annually. When comparing the costs of just these selected measures to the estimated $1.6 billion in total funds remaining in the Clean Water Legacy fund, it is clear that available funds alone will be insufficient to meet all stated water quality goals in the Council's strategic plan.

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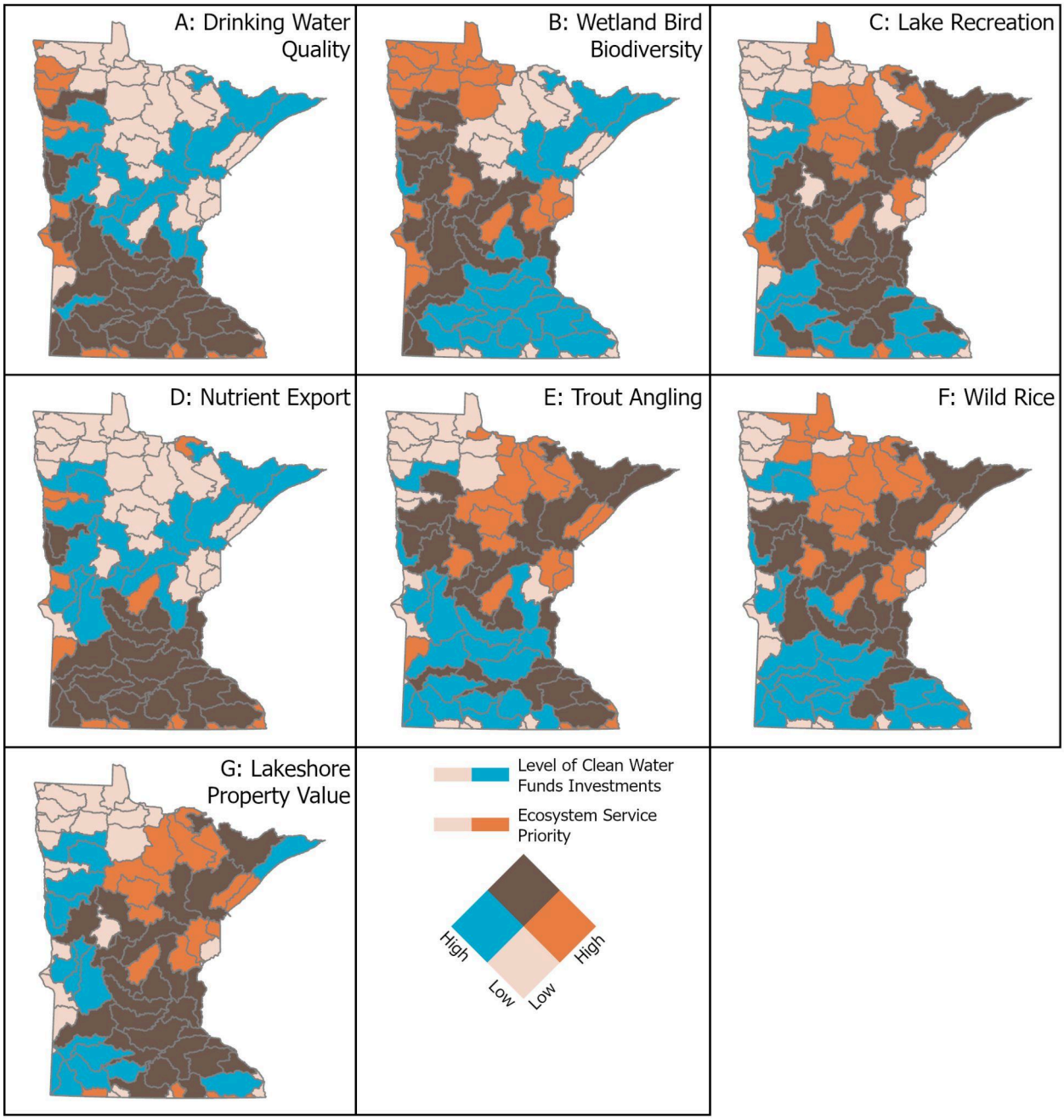
Appendix A: Methods used to generate watershed-level ecosystem service metrics



Bivariate Maps above illustrate agreement and disagreement between Clean Water Funds data and HUC8 watershed priorities data

The bivariate maps above allow us to capture the spatial variability of the relationship between the two variables of interest. The first variable (Clean Water Funds) is the same for all maps, and the second variable corresponds to one of the watershed priority metrics described in sections A-G. To generate the first variable, we exported data from the Minnesota Pollution

Control Agency (MPCA) Data Services and summed up the state funding from 2010 to 2022 and for the programs of interest. To compare the two variables, we started by classifying them separately using the quantile classification method to identify 40 watersheds with High and 40 watersheds with Low values. The resulting map is created by overlaying the two intermediate classified maps to show the agreement (Low-Low, High-High) and disagreement (Low-High, High-Low) between the two variables.

A: Drinking water quality

The drinking water quality metric is composed of three components: geologic vulnerability of groundwater to surface contamination, amount of agriculture in the HUC8 as a proxy for nitrate contamination exposure, and population consuming groundwater in each HUC8.

We defined geologic vulnerability using a statewide map[1] with low, medium, and high classification. We re-classified those classes to vulnerability scores of 1, 2, and 3 respectively, and calculated the average vulnerability score of each HUC8. To create a proxy for nitrate contamination threat, we calculated the proportion of each HUC8 that was in the 'cultivated crops' land cover according to the 2019 National Land Cover Dataset[2].

Estimating the population of groundwater consumers in each HUC8 required using two datasets and multiple processing steps. First we calculated the total population using the US EPA's 30m dasymetric population allocation raster[3] because traditional census data does not conform to HUC8 boundaries. Next, we estimated the number of people that are served by surface water because nitrate concentrations from agricultural runoff are primarily an issue for groundwater consumers, thus we needed to subtract surface water consumers in each HUC8. We joined data from the Minnesota Department of Health's Drinking Water Query tool[4] as reported in Appendix A of Noe et al. 2021[5] to the centroid of municipality boundaries[6]. We aggregated the population served by surface water to the HUC8 level and subtracted this estimate from the total population of the HUC8.

To combine the disperate units of the three components, we converted each to an index by mapping the lowest scoring HUC8 to 0, the highest scoring to 1, and scaling the remaining HUC8 scores proportionally between them. We then summed the three indices to create the final metric.

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[4] Minnesota Department of Health. Minnesota Public Health Data Access: Drinking Water Query. (2021) https://data.web.health.state.mn.us/web/mndata/drinkingwater_query

[5] Noe, R., Keeler, B., Mayer, T., 2021. Source Water Protection Challenges and Co-benefits. https://hdl.handle.net/11299/227195.

[6] Four of the 42 public water supplies using surface water, which serve a total of 15,512 people, did not join to a municipality. Inspection of individual records showed that over 12,000 of those people were associated with a public water supply that uses both surface and groundwater. Because of the relatively small population served and the use of some groundwater, we did not attempt to exclude these four public water supplies from this metric.

B: Wetland Bird Biodiversity

The wetland bird biodiversity metric is based on a habitat suitability model generated using data from the Minnesota Breeding Bird Atlas (MNBBA). Data from the MNBBA documented the statewide distribution and abundance of breeding birds over a five-year period (2009-2013) using volunteer-based sampling and systematic point counts.[7] Dominant and subdominant cover types of the survey locations were determined using the National Land Cover Database (2001).[8] Primary habitat types were identified at a scale of 30 m resolution. Habitat suitability models were developed using one of three modeling approaches (MaxEnt, glms, glms with QPAD offset)[9] for all breeding bird species[10,11,12] and can be viewed online at mnbirdatlas.org.

Using the MNBBA, we developed a habitat suitability metric for birds that depend on wetland habitat for breeding. We combined the individual species habitat models for American Bittern, Black Tern, Sedge Wren, and Yellow-headed Blackbird. These species were selected because they have been identified as Species in Greatest Conservation Need (SGCN) by the Minnesota Department of Natural Resources because they are rare, have populations that are declining, or are under threats that may cause them to decline.[13] The model output ranged from ~0 to 1, 1 being the highest "habitat suitability" value.

We then masked out urban land and water, and divided the remaining cells into quartiles based on their habitat suitability. We reclassified cells to 1 for those in the top quartile and 0 for the remainder. We aggregated the binary habitat suitability map to the HUC8 level, producing the proportion of each HUC8 that is in the highest quality class for wetland bird habitat potential.

C: Lake recreation

The lake recreation metric prioritizes land that influences the water quality of lakes important for public recreation. It applies to the catchments of lakes with a publicly accessible water access site. Land outside of these catchments receives a score of zero for lake recreation. Among lakes with public access, prioritization is based on three attributes; the sensitivity of the lake's clarity to additional phosphorus runoff,[14] the public amenities (e.g., dock, boat ramp, restrooms) of the lake,[15] and a proxy for lake visitation.[16] Catchments with publicly accessible lakes receive

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[7] Pfannmuller, L., et al., (2017) The First Minnesota Breeding Bird Atlas (2009-2013). Available at mnbirdatlas.org

[8] Homer, C., et al., (2004) "Development of a 2001 National Land-Cover Database for the United States." Photogrammetric Engineering and Remote Sensing 70: 829–840.

[9] Minnesota Bird Breeding Atlas. Methods of Analysis. https://mnbirdatlas.org/data-and-methods/methods-of-analysis/

[10] Miller, A.B., Leung, Y.-F., Kays, R., (2017) Coupling visitor and wildlife monitoring in protected areas using camera traps. Journal of Outdoor Recreation and Tourism 17, 44–53. https://doi.org/10.1016/j.jort.2016.09.007

[11] Walton, N., G. Niemi, E. Zlonis, P. Sólymos, A. Grinde. (In review). Getting the most out of breeding bird atlas data: multiple methods for modeling species' distributions.

[12] Pfannmuller, L., G. Niemi, J. Green, K. Rewinkel (editor). (In review). Breeding Birds of Minnesota (2009-2014) - their history, ecology, and conservation. University of Minnesota Press.

[13] Minnesota Department of Natural Resources, (2015) Minnesota's Wildlife Action Plan, 2015 – 2025. http://www.dnr.state.mn.us/cwcs/index.html

[14] Minnesota Department of Natural Resources. Lakes of Phosphorus Sensitivity Significance GIS shapefile. https://gisdata.mn.gov/dataset/env-lakes-phosphorus-sensitivity

[15] Minnesota Department of Natural Resources. Public Water Access Sites in Minnesota GIS shapefile. https://gisdata.mn.gov/dataset/loc-water-access-sites

[16] Sharp, R. et al. (2018) InVEST User's Guide: Visitation. http://data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/recreation.html

a minimum score of 0.2. The rest of the score is equally divided between a physical measure of the lake's sensitivity to phosphorus, and measures of the social benefit of the lake as measured by access amenities and a proxy for visitation. We aggregated this metric to the HUC8 level by averaging the recreation quality score in a watershed.

D: Nutrient export

Nutrient export uses estimates from 2012 USGS SPARROW modeling.[17] Specifically, we used the 'Total Nitrogen, Delivered aggregated yield (kg/km2)' variable aggregated to the HUC8 level. This includes Nitrogen from all sources (e.g., fertilizer, manure, municipal wastewater). To score each watershed we scaled nutrient export values from 0 to 1.

E: Trout streams

Land within the catchment of trout stream receives a score of 1 and land outside receives a score of 0. Trout streams were defined as State of Minnesota legally designated trout streams.[18] We do not differentiate among trout streams, nor does the metric account for the impact of management on trout habitat. To score each HUC8 we calculated the proportion of the area of each HUC8 with a score of 1.

F: Wild rice sites

Land within the catchment of a wild rice site receives a score of 1 and land outside receives a score of 0. Wild rice sites were defined as current (i.e., not prehistoric) wild rice sites identified by the DNR.[19] We do not differentiate among wild rice sites, nor does the metric account for the impact of management on wild rice habitat or water quality. To score each HUC8 we calculated the proportion of the area of each HUC8 with a score of 1.

G: Lakeshore property value

We used land value estimates[20] described in Nolte 2020.[21] We extracted all cells within a 50m buffer of lakes, converted them to dollars per hectare, and averaged the resulting estimates at the HUC8 level.

[17] Robertson, D.M., and Saad, D.A., 2019, Spatially referenced models of streamflow and nitrogen, phosphorus, and suspended-sediment loads in streams of the Midwestern United States: U.S. Geological Survey Scientific Investigations Report 2019–5114, 74 p. including 5 appendixes, https://doi.org/10.3133/sir20195114.

[18] Minnesota Department of Natural Resources. State Designated Trout Streams, Minnesota GIS shapefile. https://gisdata.mn.gov/dataset/env-trout-stream-designations

[19] Minnesota Department of Transportation. MnModel Wild Rice Locations, Minnesota GIS shapefile. https://gisdata.mn.gov/dataset/biota-wild-rice

[20] Nolte, Christoph (2020), Data for: High-resolution land value maps reveal underestimation of conservation costs in the United States, Dryad, Dataset, https://doi.org/10.5061/dryad.np5hqbzq9

[21] Nolte, C. High-resolution land value maps reveal underestimation of conservation costs in the United States. Proc. Natl Acad. Sci. USA 117, 29577–29583 (2020). https://doi.org/10.1073/pnas.2012865117

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Valuing state investments in clean water

An analysis of Minnesota's Clean Water Fund through the lens of ecosystem services, equity, and climate change

Presentation to the Clean Water Council
September 16, 2024

Dr. Bonnie Keeler
Center for Science, Technology, and Environmental Policy

Valuing state investments in clean water: An analysis of Minnesota's Clean Water Fund through the lens of ecosystem services, equity, and climate change

Keeler, Bonnie; Boiko, Olena; Hohensee, Taylor; Nichols, Rachel; Niehoff, Erin (2024-06)

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Title

Valuing state investments in clean water: An analysis of Minnesota's Clean Water Fund through the lens of ecosystem services, equity, and climate change

Authors

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Boiko, Olena
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Published Date

2024-06

Type

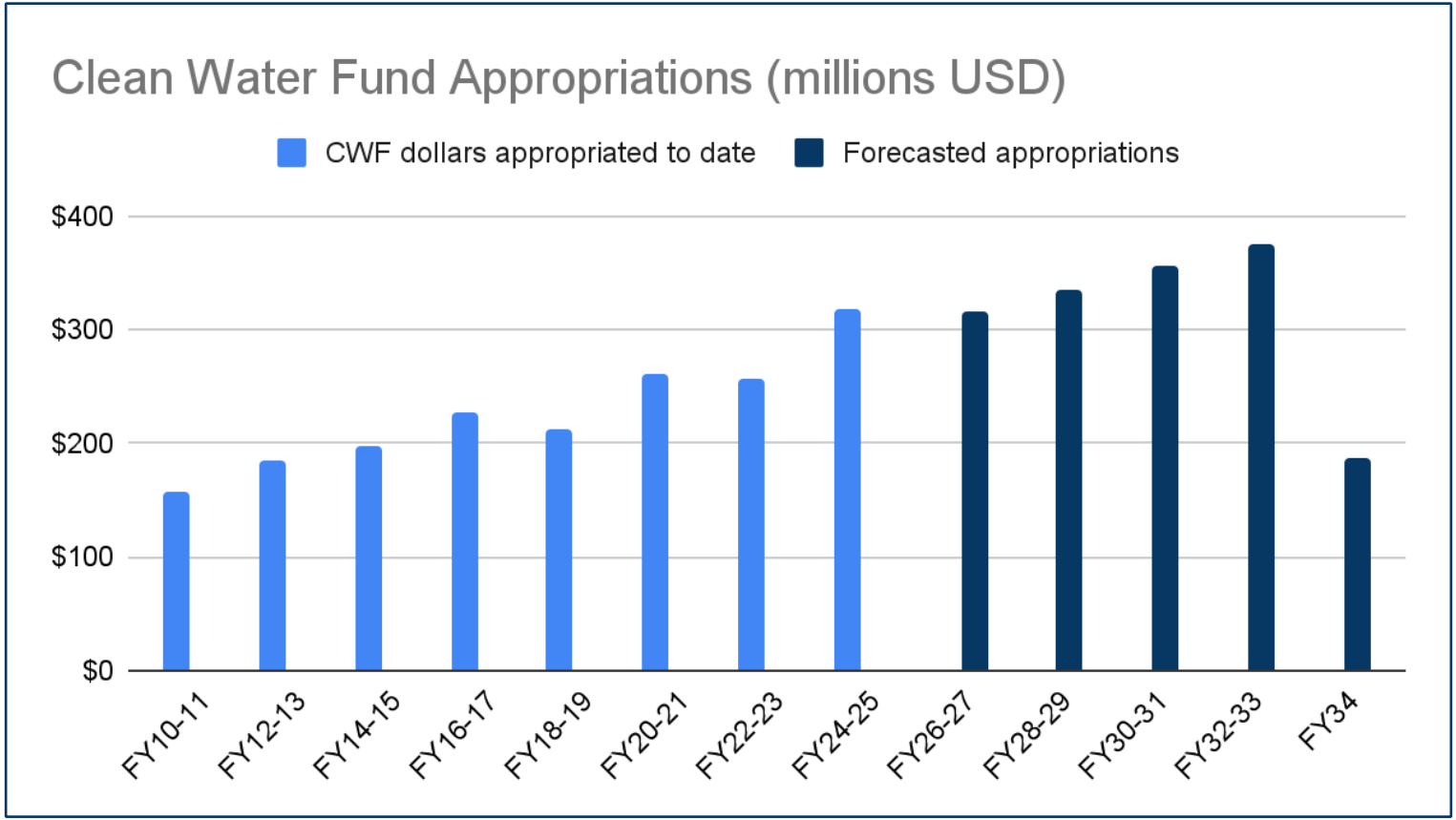
Report

Abstract

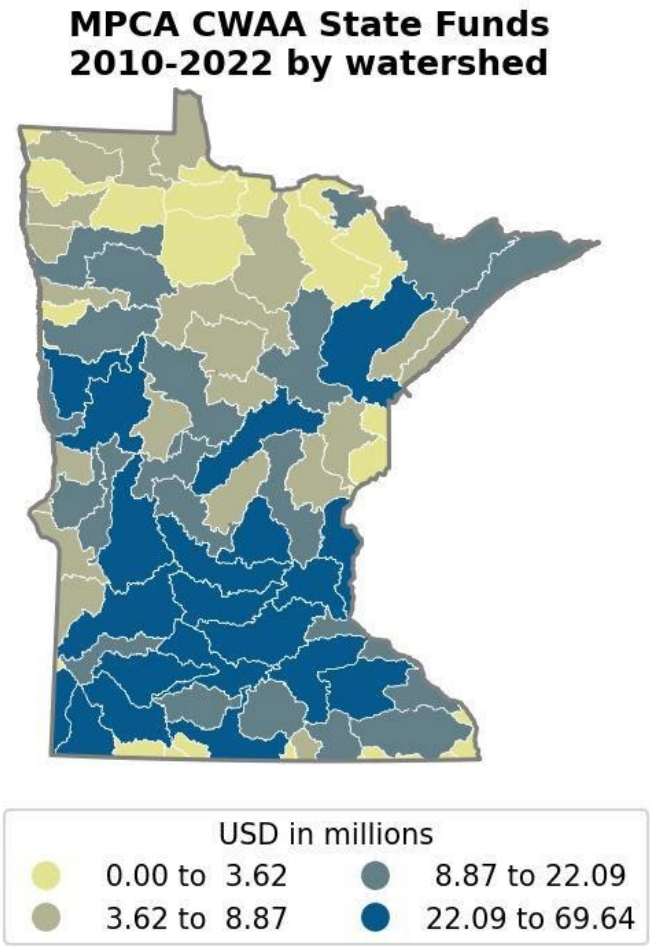
This report aims to support strategic planning through the duration of the Clean Water Land and Legacy amendment. Our goal is to provide insights to the Council and legislature to help inform remaining years of the fund, prioritize future allocations, and suggest recommendations for more efficient and equitable management. To address these gaps, we aligned our research with the fol-

Research Questions

1. Have CWF investments led to multiple benefits?
2. Are CWF investments being implemented equitably?
3. How are climate and equity considered in watershed planning?
4. How will climate change affect the implementation of watershed BMPs?
5. Does the CWF have sufficient resources to accomplish multiple water quality goals?

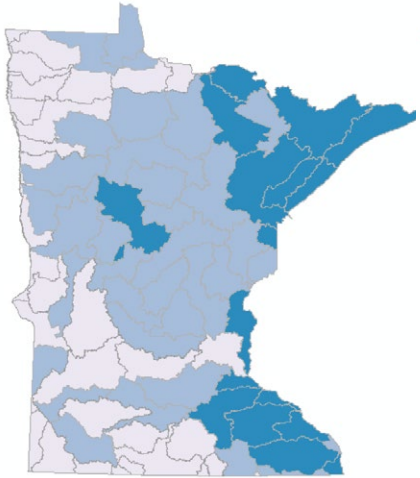


Funding appropriated in each biennium from the Clean Water Fund and forecasted appropriations assuming a linear extrapolation of historical data.



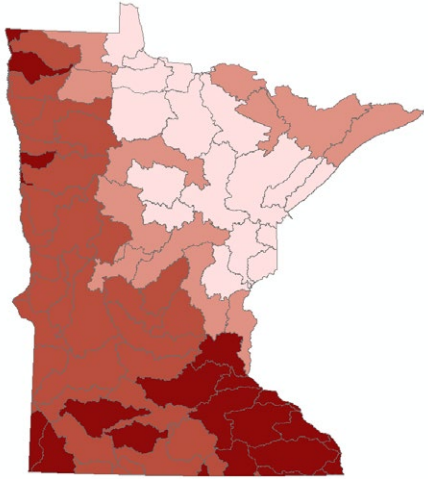
1. Have CWF investments led to multiple benefits?

Visualizing the Multiple Benefits of Clean Water Investments



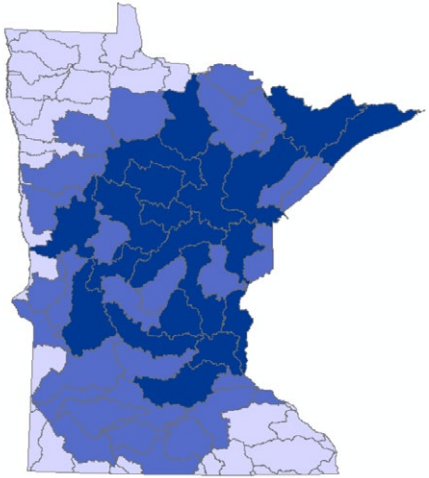
Trout miles and visitation

- Low priority
- Medium priority
- High priority



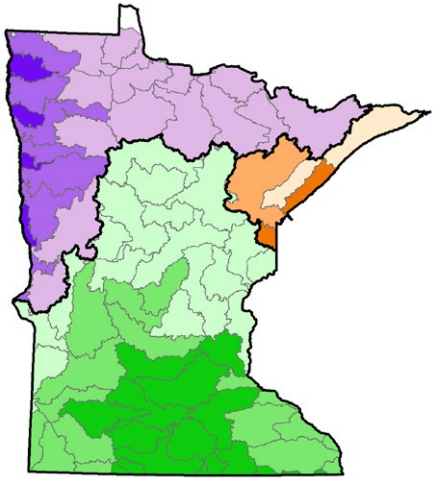
People reliant on groundwater and contamination susceptibility

- Lowest priority
- Low priority
- Medium priority
- High priority



Lake P sensitivity and visitation

- Low priority
- Medium priority
- High priority



Watershed N export per acre delivered to respective basins

Winnepeg basin

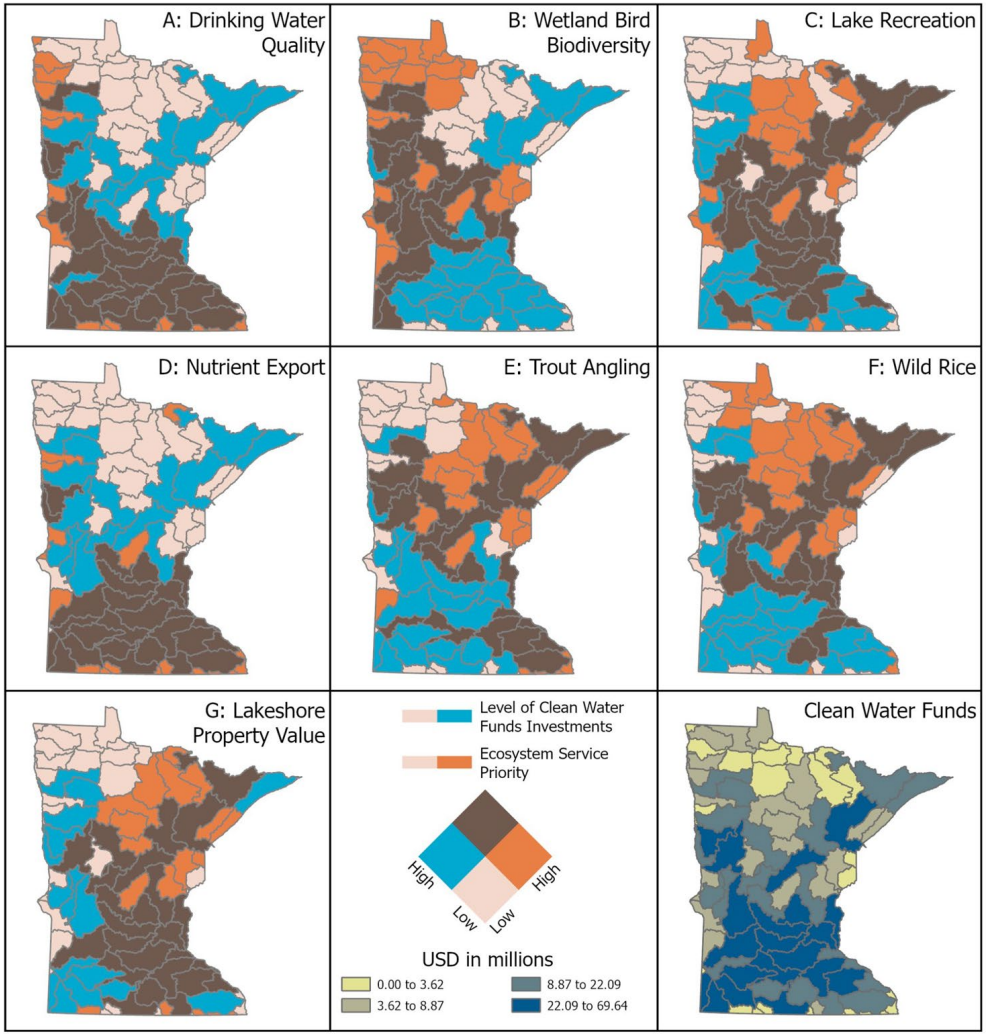
- Low priority
- High priority

Great Lakes basin

- Low priority
- High priority

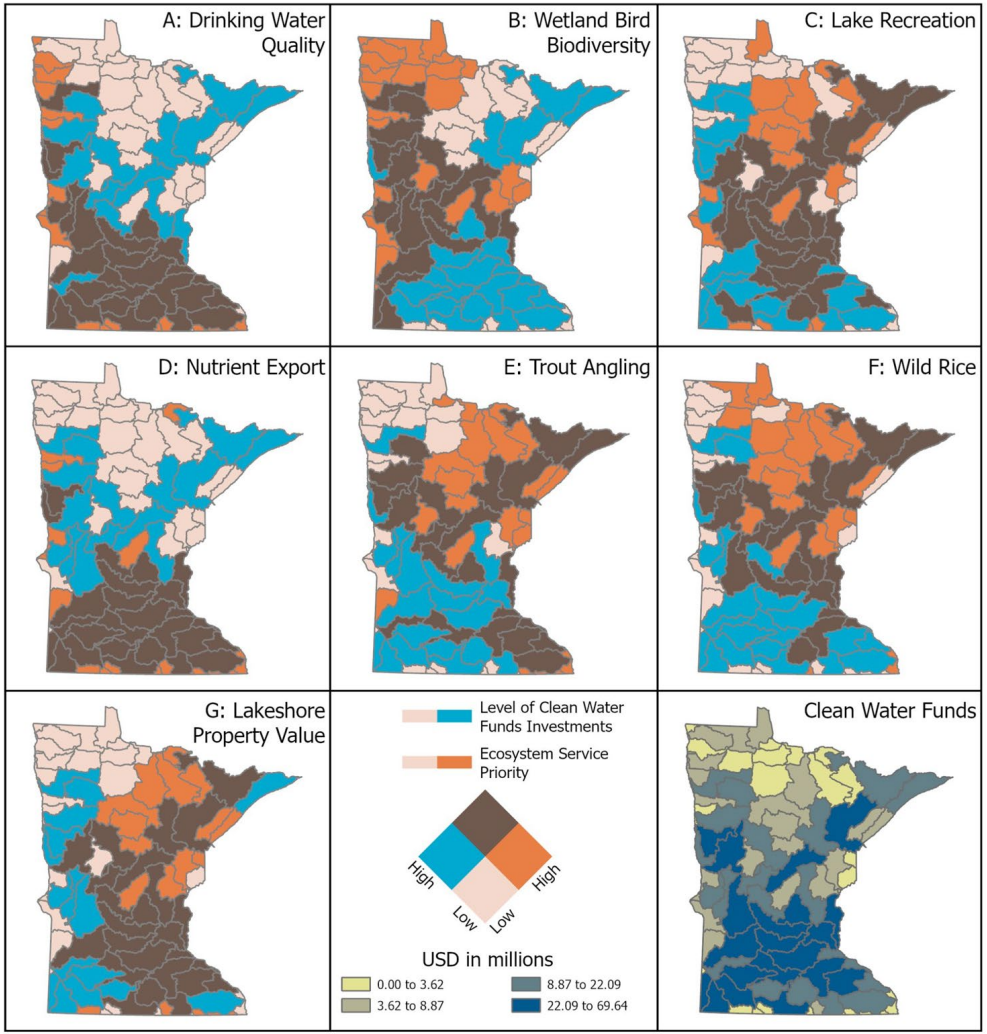
Mississippi basin

- Low priority
- High priority



Seven ecosystem services

- Drinking water quality
- Lake recreation
- Nutrient export
- Trout angling
- Lakeshore property value
- Wild rice production
- Wetland bird conservation



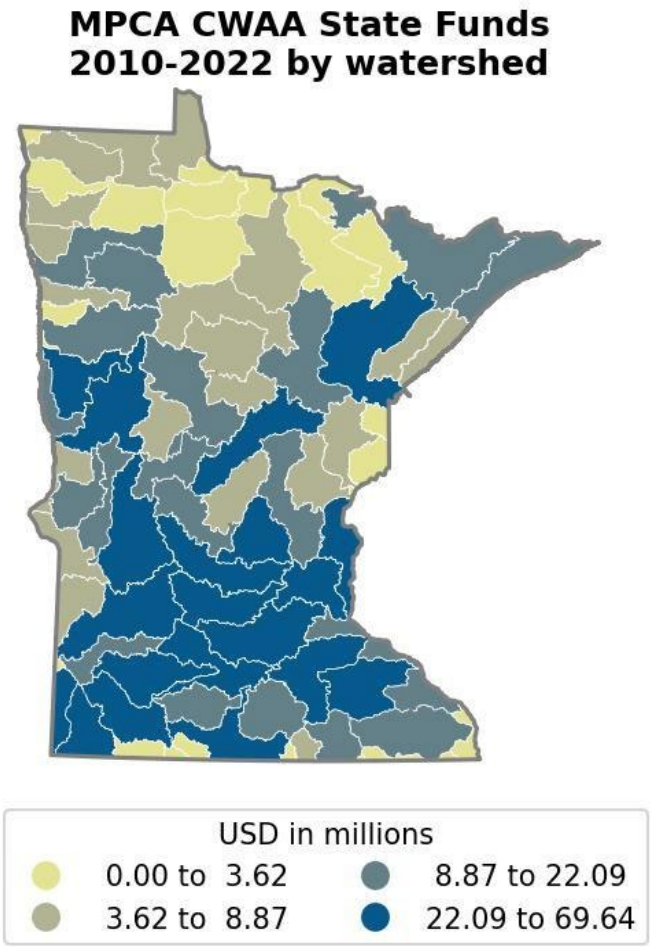
High Alignment

- Drinking water quality
- Nutrient export

Low Alignment

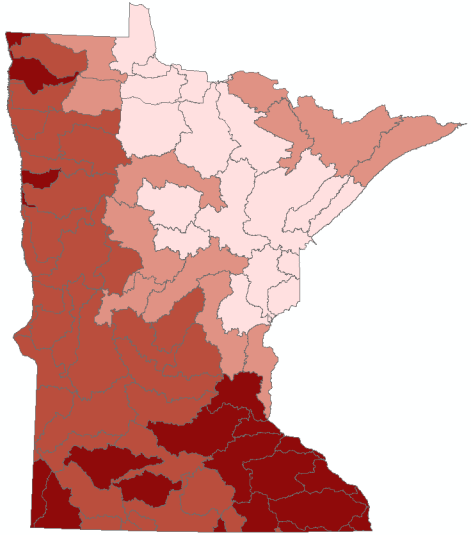
- Wetland bird biodiversity
- Wild rice

Takehome: Evidence that CWF are delivering multiple ecosystem services, but better alignment for some services over others



2. Are CWF investments being implemented equitably?

Why consider equity in CWF investments?



People reliant on groundwater and contamination susceptibility

- Lowest priority
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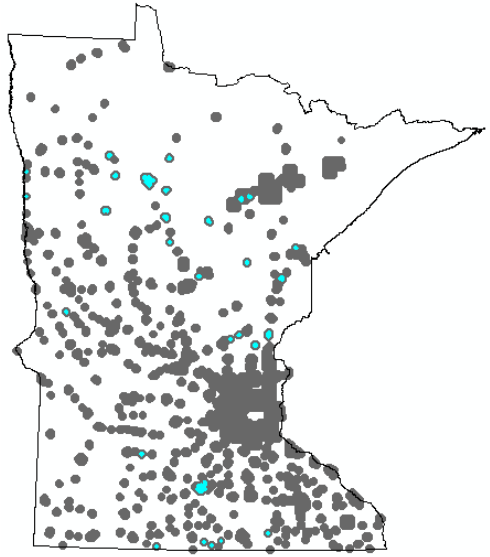
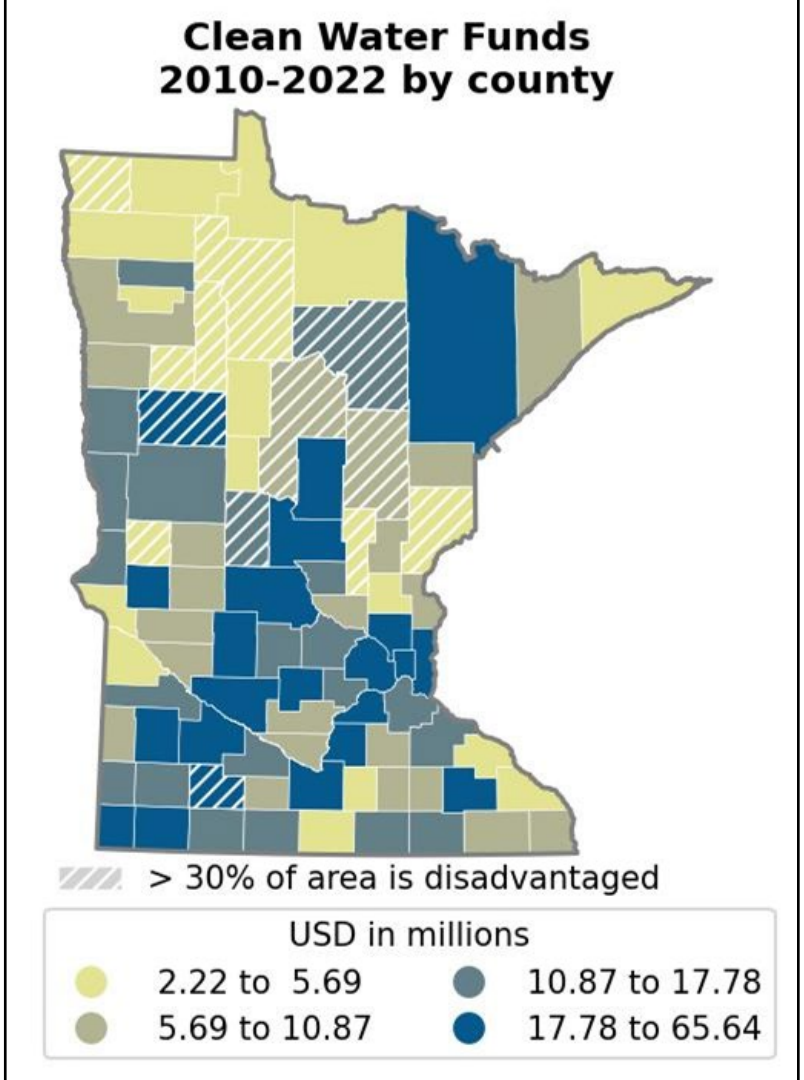


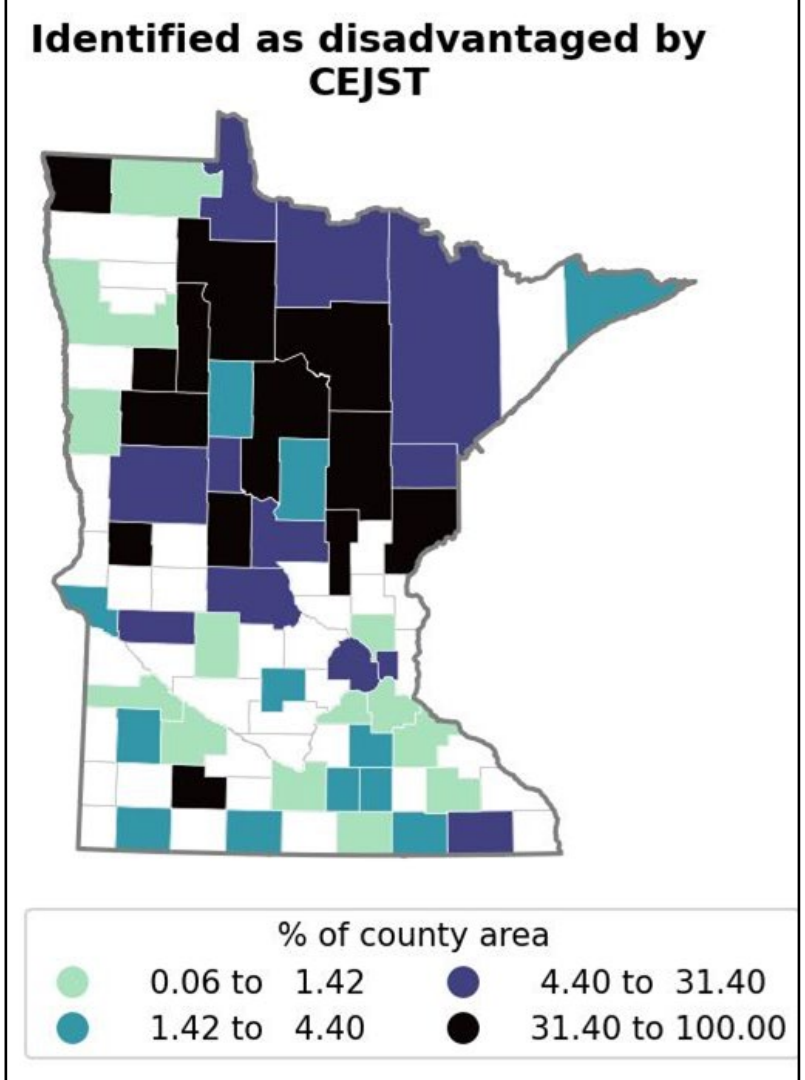
Source water wells with population below poverty line

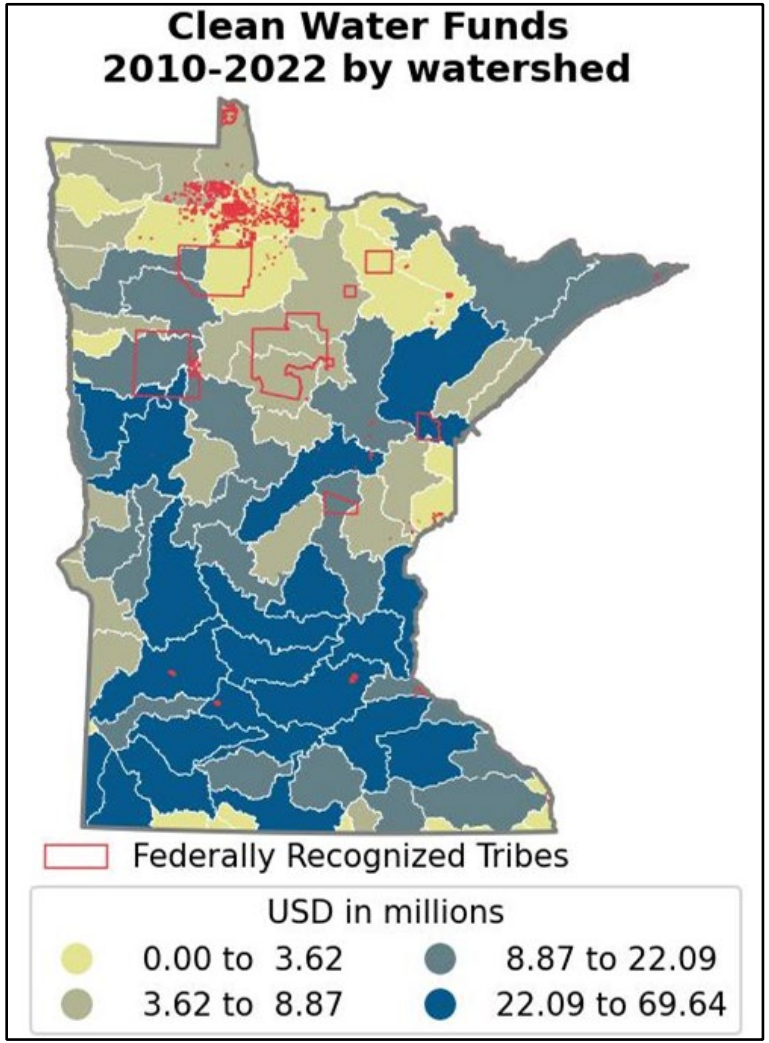
Native American households are 19 times more likely to lack indoor plumbing than white households

81 percent of households do not test their wells at the frequency MDH recommends.

High income households are 2.4 times more likely to install treatment


Clean Water Funds
2010-2022 by county
> 30% of area is disadvantaged
USD in millions
2.22 to 5.69
5.69 to 10.87
10.87 to 17.78
17.78 to 65.64

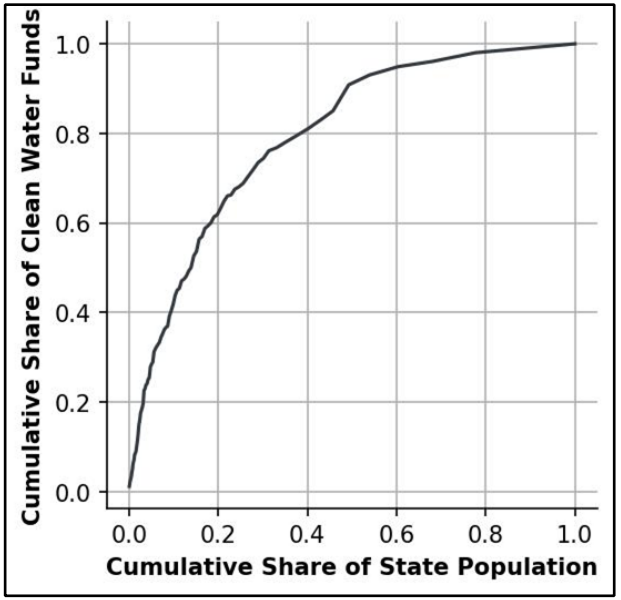

Identified as disadvantaged by
CEJST
% of county area
0.06 to 1.42
1.42 to 4.40
4.40 to 31.40
31.40 to 100.00



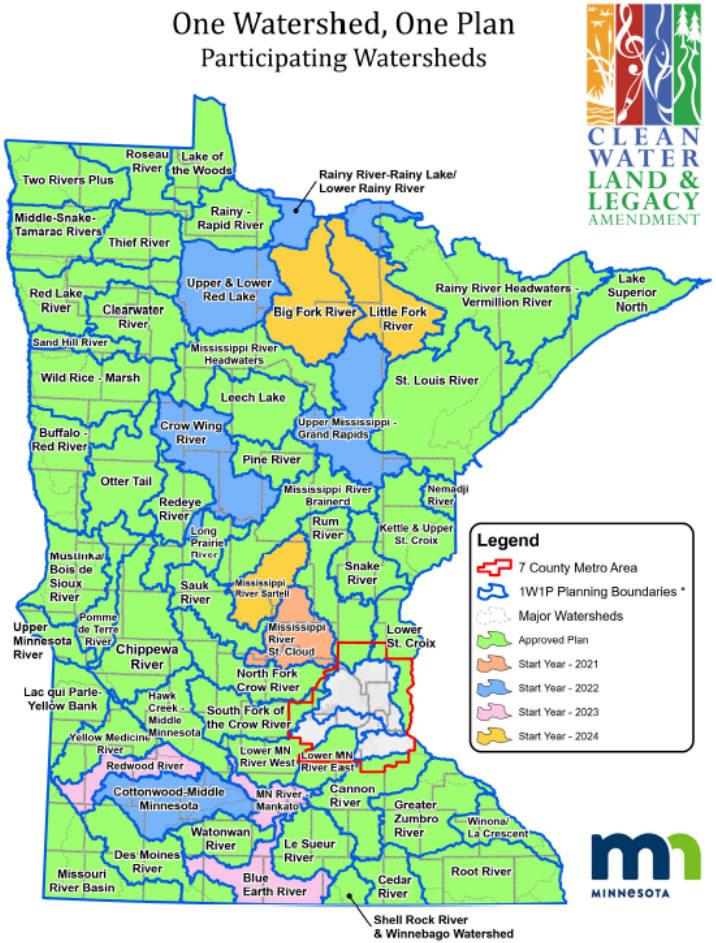
CWF investments and the location of federally recognized tribes

Takehome: Limited CWF investments in tribal communities.

A minority of the state population (mostly rural) received the majority of CWF investments

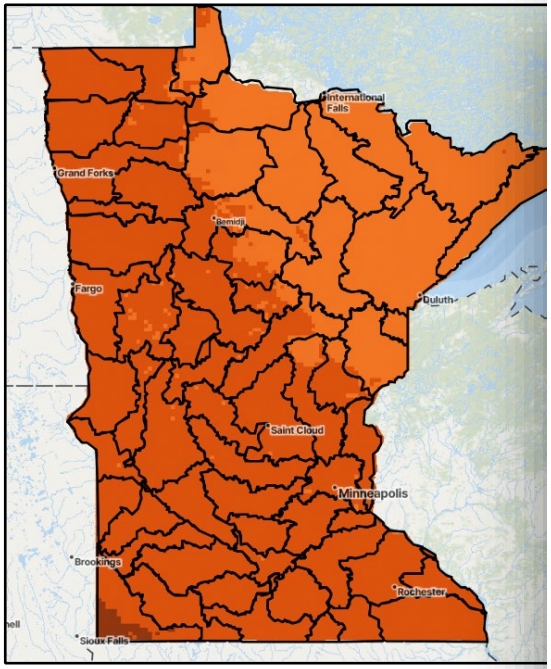


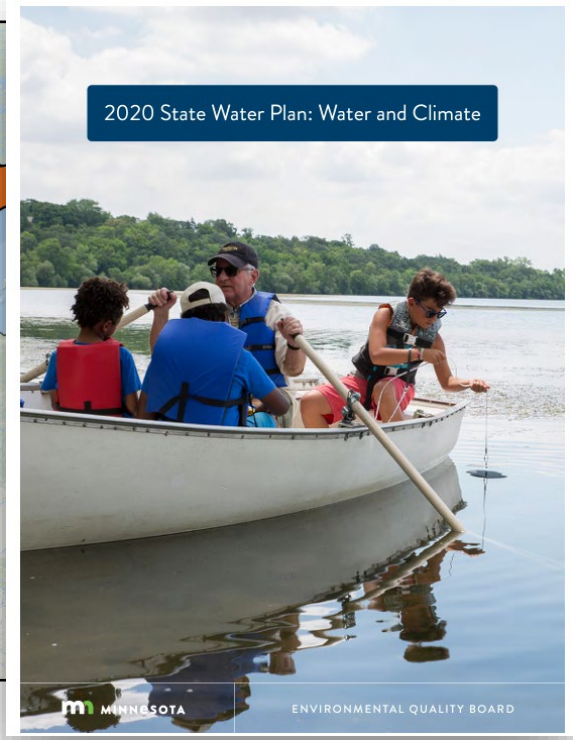
Rural-Urban Commuting Areas (RUCA)	Number of counties	Population	Population, %	Clean Water Funds, USD	Clean Water Funds, %
Entirely rural	14	95,045	1.67%	116,430,354	10.31%
Town/rural mix	35	802,412	14.09%	451,710,162	39.99%
Urban/town/rural mix	25	1,177,192	20.67%	340,849,254	30.17%
Entirely urban	13	3,620,643	63.57%	220,621,120	19.53%
Total	**87**	**5,695,292**	**100.00%**	**1,129,610,890**	**100.00%**

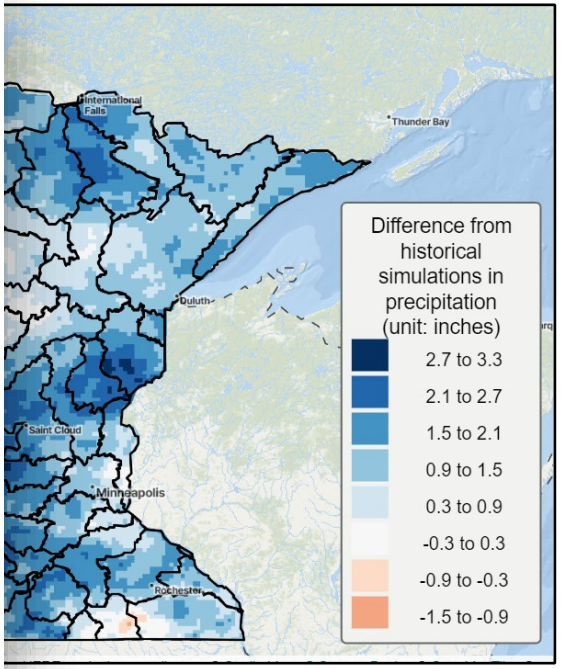


3. How are climate and equity considered in watershed planning?

Climate change: Warmer and wetter







Data downloaded from the Minnesota Climate Adaptation Partnership's Minnesota CliMAT tool (Liess et al, 2023)

Approach: One Watershed One Plan Review

- Reviewed all approved and submitted plans as of June 2024 (48 total)
- Read and coded plans for mentions of climate, climate change, extreme weather, and equity considerations.
- Identified trends across plans and exemplary plans that stood out for consideration of climate or equity

Theme	Keyword Command
Equity	Search for mentions of the following words or phrases: equity, equality, diversity, underrepresented, income, low income, indigenous, tribe, tribal, tribal communities, women, non-english speakers, people of color, black, hispanic, justice, minority, marginalized, underserved, poverty
Climate Change	Search for mentions of the following words or phrases: climate, climate change, global warming.
Extreme Weather	Search for mentions of the following words or phrases: changing precipitation patterns, precipitation patterns, extreme weather, drought, floods, increase, decrease (related to weather in any section on goals).
Climate Modeling	Search for mentions of the following words or phrases: climate modeling, predict, prediction, predictive, future, projections, projected, NOAA Atlas, Atlas 14, 2040, 2050, 2070, 2100, years, scenario.

Findings: Climate change

- All reviewed watershed plans included some mention of climate change but most address it generally, rather than associating climate change with noted action items or goals.
- Increase in the consideration of climate change over time, with greater consideration in more recent plans
- Only three plans incorporate data derived from climate change projection models, but none using MN specific data
- Missing were connections between climate change and implementation goals or actions

Findings: Equity

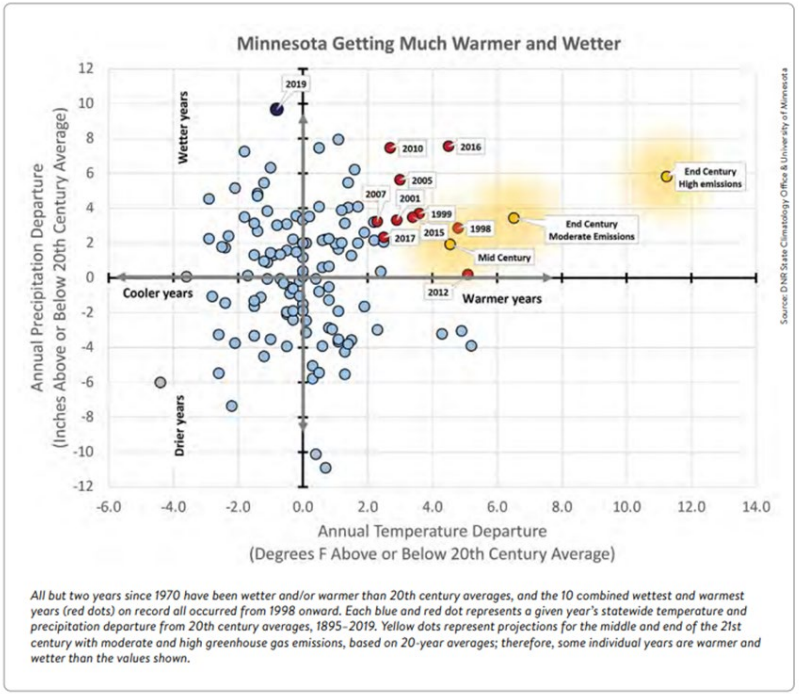
- No mentions of “Black, Hispanic, non-english speakers, people of color” or any other marginalized populations. A few mentions of “low income”
- 14 plans cover areas that overlap with federal Tribal Nation reservation land; 6 make cursory mentions, 1 has no mention of equity or of Tribal nations in their boundaries
- Compared to 2016 to 2020, in more recent plans (2021-2024) we noted increase attention to equity or distributional considerations

Findings: Equity

“Equity throughout communities and in larger geographies is important because of global climate change and the development of sustainable and resilient communities. Addressing equity at a watershed scale is a way of exploring, delineating, and prescribing actions for addressing the equitable management of natural resources for the welfare of all people in those communities within the plan boundaries. Though particular goals or actions directly addressing equity are not specifically prescribed in this plan, it is encouraged to be considered during plan Implementation”
(The Kettle River/ Upper St. Croix p. 13-11).

4. How will climate change affect the implementation of watershed BMPs?

- From 2010 to 2022 over 4.5 million acres of BMPs were installed in MN. Of these, nearly 1.5 million acres were funded by CWF programs
- Approach: Literature review of climate and BMP effectiveness



Best Management Practice	Improve	Status quo	Reduce	Improvements in BMP Efficiency Rationale	Reductions in BMP Efficiency Rationale
No Till & Reduced Till	▲		▼ ▼ ▼	• Model results show no-till as the most effective individual BMP at reducing multiple pollutant loads in future climate scenarios[4]	• Higher rate of decay and nutrient cycling hinder crop growth and limit biomass production[1,2] • More residue movement will result from an increase in higher precipitation events[1,2] • Warmer winters result in more flow in tile drainage or infiltrating groundwater avoiding surface pathway[3]
Grassed Waterway		•	▼	• Carbon and temp. increases could increase plant vigor[1]	• More intense precipitation events will increase concentrated flow erosion and exceed treatment capacity[1]
Terrace & Contour Farming	▲		▼	• Model results show BMPs as effective at reducing multiple pollutant loads[5]	• More intense precipitation events will increase concentrated flow erosion and exceed treatment capacity[1]
Perennial Cropping		•		• Extended growing season • Increased plant growth rates [1]	• Changes in plant species composition • Exposure to different pests and disease[1]
Drainage Water Management (control drainage)	▲	•	▼	• Higher winter temps lead to more soil activity and denitrification[1]	• More intense precipitation events will increase phosphorus loading in non-tile drainage flows[2]

Climate impacts on ag BMP effectiveness

- Increased precipitation may provide more frequent flow pathways for circumventing BMPs, more opportunities for nutrient or soil transport and loss.
- Changes in atmospheric CO2, warmer temps, and extended growing seasons could improve growing conditions for plants increasing the filtering ability of cover crops and other plant-based BMPs; caveat of invasive species & pests
- Warmer temps and longer growing seasons may provide better conditions for denitrifying bacteria and increase rates of crop residue decay.
- Changes to precipitation patterns and temperature are likely to increase sediment and nutrient loading which may overwhelm individual BMPs, making it difficult to meet nutrient and sediment reduction targets

5. Does the CWF have sufficient resources to accomplish multiple water quality goals?

- Drinking water is safe for everyone
- Surface water protection and restoration
- Value water and take actions to sustain and protect it
- Groundwater is clean and available

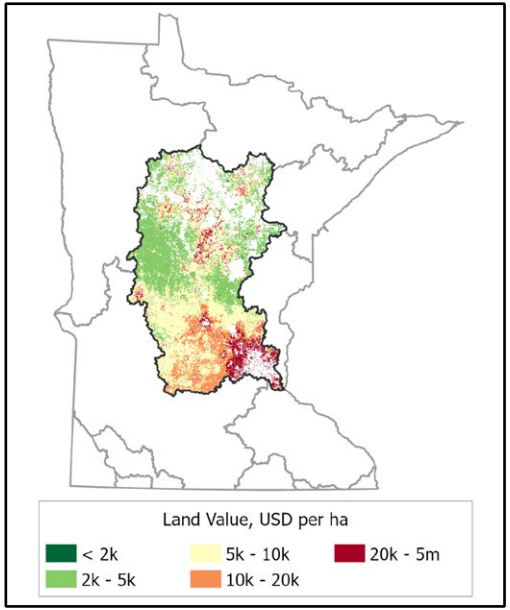
Drinking water is safe for everyone, everywhere in Minnesota

Selected Measure: Approximately 400,000 acres of vulnerable land surrounding drinking water wellhead areas statewide are protected by 2034. (Final Clean Water Council Strategic Plan for 2024-2028, p. 5)

Cost: $5.7 billion

Protecting 15% of low value, high vulnerability parcels would be over $100 million

Surface water protection and restoration



Selected Measure: Protection of 100,000 acres and restoration of 100,000 acres in the Upper Mississippi River headwaters basin by 2034 (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

Cost of Protection: $84 million to 254 million

Cost of Restoration: $52.7 million to 228.5 million

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

Selected Measure: Number of farmers and acres enrolled in Minnesota Agricultural Water Quality Certification Program, with a target of 5,100 farms and 6.5 million acres by 2030 (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

One-time Cost of Certification: $137 million

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

Selected Measure: Achieve a goal of five million acres of row crop agriculture that use cover crops or continuous living cover by 2034 (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

Per Year Cost: $314 million

Assuming that existing funding is supporting the annual cost of implementing current cover crops (760,423 acres as of 2022), then an additional 4,239,577 acres of cover crops needed to meet the 5 million acre target

Groundwater is clean and available to all in Minnesota

Selected Measure: Targets for nutrients in the state's Nutrient Reduction Strategy
Selected Measure: Nitrogen Fertilizer Management Plan implemented on 80% of row crop acres excluding soybean by year 2030, and implemented in all remaining townships by year 2034. (Final Clean Water Council Strategic Plan for 2024-2028, p. 9)

Practice	Target Acres	Cost per acre	Included practices	Annual cost
Field Erosion Control	4.9 million	$4.19	Average of no till to reduce soil erosion ($3.59/acre) and reduced tillage to reduce soil erosion ($4.78/acre) practices.	$20.53 million
Fertilizer Use Efficiencies	6.8 million	$6.40	Average of nutrient management ($4.04/acre), precision nutrient application ($8.72/acre), and prescription nutrient efficiency ($6.43/acre) practices.	$43.52 million
Drainage Water Retention	620,000	$1.56	Drainage water management ($1.56/acre).	$0.97 million
Perennials	440,000	$6.66	Short term perennials ($6.66/acre).	$2.93 million
Cover Crops	1.9 million	$9.27	Average for cover crop - basic ($8.24/acre) and cover crop - multiple species ($10.30/acre).	$17.61 million
Summed Annual Cost				**$85.56 million**

Findings: Total costs of meeting selected clean water goals

Estimated total fund remaining in the CWF through expiration = $1.6 billion

Estimated costs of selected goals = over $6 billion

Main Takeaways

- Use demographic data when tracking investments
- Encourage and support watershed planners in using climate projections as part of planning efforts
- Encourage watershed planners to consider how BMPs will function and be effective under changing temperature and precipitation regimes
- Watershed planning should integrate social and demographic data in actions and goals
- Insufficient projected funds to meet all stated water quality goals in the Council’s strategic plan

Selecting the science that is fit to purpose

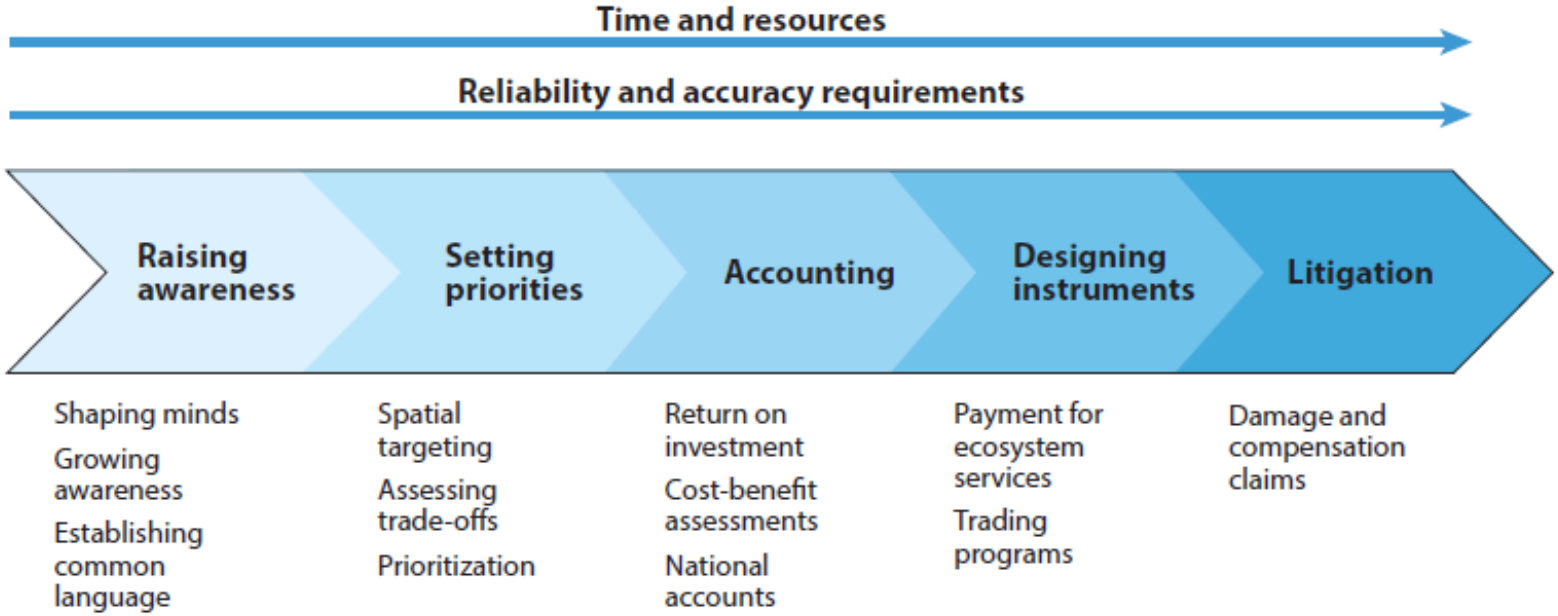


Figure adapted from Keeler, 2020

Questions?

Report:
https://hdl.handle.net/11299/264063

Contact: Bonnie Keeler, keeler@umn.edu