Clean Water Council Budget and Outcomes Committee (BOC) Meeting Agenda Friday August 4, 2023 9:30 a.m. to 12:00 p.m.

Webex Only

2023 BOC Members: Steve Besser (BOC Vice-Chair), Dick Brainerd, Gary Burdorf, Steve Christensen, Warren Formo, Brad Gausman, Holly Hatlewick, Annie Knight

9:30 Regular Business

- Introductions
- Approve agenda & most recent minutes
- Chair and Staff update
 - Report on Minnesota Geologic Atlas program
 - o Reports on Industrial Water Conservation Grant Summary Report
- 9:40 Public comments
- 9:45 Election of chair
 - The chair is chosen by committee members. Our previous chair did not seek re-appointment.

10:00 BWSR: Buffer compliance and Watershed Project Tracking Tool

• Tom Gile, BWSR

10:15 Minnesota Agricultural Water Quality Certification (MAWQCP)

- Letter/discussion from NGOs
- Agency response
- 10:45 BREAK
- 11:00 MAWQCP Discussion Continued
- 12:00 Adjourn

August Meeting:

- Leya Charles, MPCA Impaired Waters List Coordinator on the Upcoming Draft Impaired Waters List
- Timeline for 2024 recommendations process

Budget and Outcomes Committee Meeting Summary Clean Water Council (Council) March 3, 2023, 9:30 a.m. to 12:00 p.m.

Committee Members present: Steve Besser (Committee Vice Chair), Dick Brainerd, Gary Burdorf, Warren Formo, Jen Kader, and Holly Kovarik (Committee Chair). **Members absent:** Frank Jewell and Todd Renville.

To watch the WebEx video recording of this meeting, please go to <u>https://www.pca.state.mn.us/clean-water-council/policy-ad-hoc-committee</u>, or contact <u>Brianna Frisch</u>.

Regular Business

- Introductions
- Approval of the March 3 agenda, moved by Dick Brainerd, seconded by Gary Burdorf. Motion carries.
- Chair and Staff update
 - Legislative update: The consolidated funds statement from Minnesota Management and Business (MMB) should be out soon. This will provide more accurate information on the total funds for the Clean Water Funds (CWFs). At a previous meeting, the Council did pass a motion to include the last items cuts as items for additional funds to be used.

Status of County Geologic Atlases (Part A), by Barb Lusardi, Minnesota Geological Survey (Webex 00:15:30)

- There are two parts to the County Geologic Atlases. Part A is the geology, completed by the University of Minnesota Geological Survey. Part B is the groundwater atlas, completed by the Minnesota Department of Natural Resources (DNR). This is important because counties, municipalities, cities, and townships are building new infrastructure. It is good to know where things are to make plans, and to ensure we have adequate resources to make all these items work.
- Geology is the "container" because it holds all our natural resources including minerals, aggregate, and water. The maps show the distribution of rocks, sediment, and resources. It also holds many undesirable things. By knowing the geologic framework, we can predicate where to find, plan how to use, and protect our natural resources. A geologic atlas provides comprehensive geologic and groundwater mapping and associated databases suitable for managing mineral and water resources. It is applicable to land-use planning, wellhead protection, source-water protection, remediation, appropriation, monitoring, and support for permitting decisions.
- They also are involved in education and engagement. They are available to anyone who uses these as a resource. They host workshops to help people use these items.
- Part A uses databases, bedrock geology, surficial geology, quaternary stratigraphy, sand distribution models, bedrock topography, and drift thickness. All available in print, pdfs, GIS files, and user guides.
 - For the data bases: exposure of the rock, core samples, water well construction records, scientific and engineering borings, drill cuttings, borehole geophysical logs, Giddings probe holes, texture analyses, soil auger holes, passive seismic soundings, and seismic reflection soundings.
 - For bedrock geology maps depict the type, structure, and distribution of all the different bedrock units beneath the quaternary sediment. They also do the depth to bedrock and bedrock topography maps.
 - They map the surficial geology: sand, not sand, and lake sediment. This shares a story of the past glacial paths. These maps can be coded to display certain values (i.e., by age or texture).
- The pandemic impacted their work. Work moved to remote, with limited field work. Additionally, there were early retirements, along with training new staff hired. It takes time to build that knowledge, and they are taking things a little slower to produce the best products.
- At this time, they have 48 complete, 24 underway, and 15 not started. A few earliest atlases have been redone to complete some updates. It is exciting, and these atlases are moving forward. There are 22 that have used CWFs.
- The mapping has been insensitive to the needs of the Tribal Governments, so they are working hard to remedy this oversight. There are Tribal Government boundaries to provide to them. They need to have the Tribal Government's expressed permission to complete any work on their lands. However, any work done is

public data, and the Tribal Governments are somewhat uncomfortable with this data becoming public. So four of the eleven Tribes decided not to allow the work. They do not want information related to their natural resources available to the public through the mapping. They will continue to work on the relationships with the Tribal Nations.

• At the start, there are digital well locations established (local contribution of in-kind services used). Then MGS completes Part A at a cost of about \$500,000, which generally takes four to five years. The DNR completes Part B in about three years. Once both parts are complete, there is usually a presentation, possibly a field trip, held for all interested users.

Questions/Comments:

• Steve Besser: One slide had old water and new water, and then tritium. That is kind of a rare state for water to be in. Are those just trace elements? *Answer:* Tritium is an element that appeared in the 1950s based on above ground nuclear testing. If there is tritium in the water, it is considered relatively young water. So, the deeper you can find tritium, in the water samples suggests there is a connection to the surface waters, which would have implications for pollution sensitively. If the young water is getting deep into the water system, there are vulnerabilities there.

Statewide Survey of Microplastics in Water, by Dave Duffey, Minnesota Pollution Control Agency (MPCA) (*Webex* 00:59:00)

- The Legislature provided funds to the MPCA to investigate microplastics in waters across the state. This funding was provided in 2019, but the pandemic happened, and the money was taken back. They just started summer of 2022. It was a Legislative directive. It is an interagency MPCA-led group, partnering with the other state agencies, USGS, and the University of Minnesota Duluth (UMD). The focus is only on waters (surface water, groundwater, and drinking water). The goal is to determine the presence and abundance of microplastics in water and identify next steps.
- Microplastics are plastics smaller than 5mm (5000 µm) in size. They are a variety of shapes, sizes, and colors. Plastics do not break down easily or uniformly. Microplastics are everywhere and they are around us all the time. We use plastic in our life, we can't get away from it, and we do not know what it is doing to us yet. There is ubiquitous exposure like inhalation and ingestion (found in dust, water, diet, etc.). Some common materials to relative particle size in microns: powdered sugar is 60 microns, ground coffee is 5 to 400 microns, and a dust mite is 100 to 300 microns. They have filters for certain sizes for sampling. When looking under the microscope, often it will reveal microplastics that are fibers, particles, films and fragments, and beads and foams.
- They started July 1, 2022 and will continue through to June 30, 2024. The groundwater/drinking water sampling will be collected by the MPCA and UMD. The surface water and sediment collection will be done by USGS. There is no standard method for sampling, so they are going by their experience. The UMD lab will analyze all samples with an FT-IR (Fournier transform infrared) spectroscopy.
- The groundwater sampling started in Fall 2022, with 50 locations selected across the state for this next year. There will be sampling at drinking water community water supplies as well. There are approximately 32 locations selected,-dependent on permission. They have budgeted for 200 samples. For the surface water/sediment sampling, they will be starting in April of 2023. There will be 116 samples across the state, with 18 lake locations (27 surface water, 27 sediment), 22 river locations (22 surface water, 22 sediment) and quality control samples. The sampling can take about 4 hours. There are no health standards for microplastics, and no enforcement action. We can't see particles that cross blood barrier. We also do not have studies to define human health risks. However, the plastics cannot be older than the 1950s because that is when they were produced.

Questions/Comments:

- Paul Gardner: I was impressed with the innovation and craftsmanship of the sampling. The work to create the apparatus to do this kind of work is impressive.
- Steve Besser: Plastic has been found in human blood. So, there are a lot of questions that blossomed after that report. It would be interesting to see what is more from water versus atmospheric. We will be interested to learn more about these results. *Response:* Yes, it will be nice to know more, and refine further research. There are staff at Minnesota Department of Health (MDH) that need more study results to make informed decisions on health data.

- Paul Gardner: Can you speak on the precautions you take to avoid contaminating the sample? *Answer:* Plastics are ubiquitous, and we are all probably wearing some kind of plastic right now. To minimize this, we try to wear one-hundred percent cotton clothes. They are easy to pick out and the lab can get rid of them. All the equipment is metal or Teflon (it doesn't shed nearly as much and can be used in this instance).
- Jen Kader: In instances where permission is not granted, are there back up locations? *Answer:* Yes, we do. We send out letters of request to more locations than we need in order to make sure we receive enough.

Latest Outcomes from Minnesota Agricultural Water Quality Certification Program (MAWQCP), by Brad Redlin, Director (*Webex 01:21:00*)

- Today is talking more about outcomes. A quick overview of the MAWQCP: it involves the whole farm, is a
 voluntary risk assessment with a local conservation and agronomy professional. It is available to renters and
 landlords of any size or type of operation. The MAWQCP addresses the Council's Strategic Plan in all the goals
 and many of the strategies within those goals. This is on-the-ground implementation work. It is an ongoing
 relationship.
- As a reminder, in the executive order 19-12, the Minnesota Department of Agriculture (MDA), MPCA, DNR, and the Board of Water and Soil Resources (BWSR) will incorporate MAWQCP in all watershed approaches and programs. They must honor MAWQCP contracts and include certified growers when implementing new laws or rules. We have a MAWQCP Advisory Committee as well.
- They have a huge list of MAWQCP Implementation practices. They are site specific. They work on the challenges that exist and work with the farmers on what options they have. There are over 1,305 certified producers on over 985,385 acres. The numbers are constantly changing.
- The MAWQCP has 2,600 new practices. Over 127,697 tons of soil is saved per year. There is over 43,476 tons
 of sediment reduced per year. Over 54,792 pounds of phosphorus loss is prevented per year. As much as a 49
 percent reduction in nitrogen loss. About 49,601 C02-equivalent tons of greenhouse gas is reduced per year.
 In addition, MAWQCP farms averaged \$25,000 a year (or 36 percent) higher profit than non-MAWQCP farms
 over the last three years. They also have 347 endorsements. Minnesota is quite unique in this approach.
- Agriculture is expensive and ag conservation is expensive. In comparison to other conservation programs, MAWQCP acre cost is impressive. It is at about \$24 per acre calculation of the one-time total cost for an entire 10-year term of MAWQCP-certification. For Conservation Reserve Program (2022) it was \$167.27 annually over ten years, the Environmental Quality Incentives Program (FY21) was calculated at \$212.16, and the Conservation Stewardship Program (FY21) was calculated to about \$103.68. Therefore, the MAWQCP at \$24, for ten years, is impressive. They are not all doing the same things, but it is good to compare the costs across the board.
- They have three years of Fame Business Management data, revealing the financial outcomes of MAWQCP farms. MAWQCP farms average a net income more than \$25,000 (or 36 percent) higher than non-certified farms. Their next report will be out in April 2023.
- They have completed 648 audits/reviews (from 2018-2022). It revealed that 94 percent remain in active certification status. If you remove sales and deaths, that percent is 98. There are many examples of continued deceases in tillage, improved nutrient management, and additional conservation practices. This audit/review also provides an opportunity to discuss new program benefits and provide technical assistance.
- A survey for producers was emailed or mailed to MAWQCP certified producers in November 2021. There was
 a 42 percent response rate. Another survey will be conducted in 2024. About 71 percent of producers heard
 about the MAWQCP from their SWCD. The top three reasons given for participating in the program: water
 quality ethic, review of farm management practices, and to obtain a regulatory certainty. Nearly 75 percent of
 producers have implemented additional conservation practices after earning certification, with cover crops
 and further reduced tillage being the top two additional practices. They also were very likely (60 percent) and
 somewhat likely (27 percent) to recommend the MAWQCP.
- Through the Regional Conservation Partnership Program (RCPP) they have been able to bring in additional funding. They have received two RCPP awards, which account for \$18 million, that Minnesota would otherwise never have received (and would have been allocated elsewhere). All RCPP funds are passed through to producers and partners to implement conservation.

- They also have a supplemental grant program for the farmers. They use a \$5,000 max with a 75 percent cost share. To date, they have 536 grants, totaling \$2,077,509 that have been awarded directly to producers. It can be used with at least 42 different practices.
- They also have Climate Smart Farms Project. This can be thought of as a "climate audit". The "Farmers' Guide to Carbon Market Contracts in Minnesota" provides legal analysis of carbon market contracts. It uses \$1,000 bridge-payment grants to provide growers: financial support during transition period, as well as time to work with a local certifier to explore and prepare for evolving climate marketplaces and public programs.
- The next outcomes they are looking towards include CFANS next generation agroinformatics data discovery and analysis platform GEMS (Genetic, Environmental, Management, and Socioeconomic data). The UMN also have another project happening that evaluates what motivates farmers' participation in the MAWQCP: looking at moral and economic perspectives. Specifically, they will look to provide evidence on what are farmer values, social norms, and personal norms that drive enrollment in the MAWQCP. Additionally, there is a capstone project from the Humphrey School. A capstone team will prepare a report of its research findings. It is an analysis of the challenges regarding farmer participation in the MAWQCP. This includes options the MDA should consider like property tax credit.
- The MAWQCP is also updating their tech platform. This will help unify functions and records like mapping, reviews, practice outcomes, endorsements, grants, etc. This is a single database.
- They also have a lot of partners doing outstanding work. A few to highlight: https://fieldtomarket.org/farmer-spotlight-series/improving-sustainability-efficiency-in-minnesota/ and https://fieldtomarket.org/farmer-spotlight-series/improving-sustainability-efficiency-in-minnesota/ and https://environmental-initiative.org/tools-guides/headwaters-agricultural-sustainability-program-return-on-investment-project/ Questions/Comments:
- Glenn Skuta, MPCA: What does "fence" mean from one of the top 5 practices? Is it a fence to keep cattle out of a river? *Answer:* Yes.
- Paul Gardner: I'm struck by the diversity of opinion by how each individual producer will manage their land. I've noticed two things on field days. First, peer pressure limits people to change (because of being worried about what the neighbors think). Second, farmers will also say it was easy to think about these changes because they stopped worrying about the highest yield, and started focusing on cash flow, and everything starts to fall into place. The idea of accepting new ideas became easier. Does this sound accurate? *Answer:* They do. It is all anecdotal, but I have heard these too. That is not necessarily an agricultural thing; it is a human nature thing. It is something to overcome in ag communities. Farmers have to do it all, looking at all the financial impacts. It is their business and home.
- Jen Kader: Do you have a timeline on results of the UMN report? The outcomes will be important for the Council to learn. *Answer:* The preliminary will be this summer, and the final findings will be out in the public available for everyone once published.

INDUSTRIAL WATER CONSERVATION IN THE TWIN CITIES METRO AREA

MINNESOTA TECHNICAL ASSISTANCE PROGRAM (MNTAP)



April – June 2023

Metropolitan Council Project Number: 141007 University of Minnesota Contract _49398

Introduction

Through this project, fifteen MnTAP interns will explore opportunities for water conservation with water users in the seven county metro area through a contract with the Metropolitan Council Environmental Services. Through this work Metropolitan Council Environmental Services will gain information on water conservation opportunities. As part of this project, results will be summarized in executive summaries on water conservation resulting from detailed intern project investigations and presentations at a public event.

The following summary complies with contract <u>Section III Method of Payment</u> for submitting a reasonably detailed statement of services.

Summary

Company project agreements were completed for the selected companies included under this industrial water conservation project. The University of Minnesota External Sales Office assisted with agreement processing.

Intern employment paperwork was completed, and students virtually visited the project companies for confirmation interviews.

The projects selected were:

- Avtec Finishing Systems, New Hope
- Co-operative Plating Co., St. Paul
- Olympus Surgical Technologies America, Brooklyn Park
- Seacole, Plymouth
- St. Paul Beverage Solutions (BevSo), St. Paul
- VA Medical Center, Minneapolis
- Wholesale Produce Supply, Minneapolis

Lucas Burnette, a graduate student in Civil Engineering at the University of Minnesota – Twin Cities, was hired to work at Avtec Finishing in New Hope. Lucas has mapped out water usage at the facility and identified opportunities for standardizing flow rates to rinse tanks. The water map and flow standardization will be key to identifying opportunities for water conservation. Current efforts are also underway to determine opportunities for installing conductivity and other parameter-based control devices to reduce water consumption within the rinse baths. Kelsey Klucas is the MnTAP advisor for this project.

Ryan Goepfrich, a recent Mechanical Engineering graduate of the University of Minnesota – Twin Cities, was hired to work at Co-operative Plating in St. Paul. He is focusing on water conservation and reducing the use of hazardous chemicals. Ryan has been verifying and updating the water map for the 18 plating lines, which will be used to create recommendations for reducing drag out and rinse flow rates. Reverse osmosis and water softening systems are also being assessed for potential water savings. Jane Paulson is the MnTAP advisor for this project.



Noah Roe, a recent graduate of the University of Minnesota – Duluth in Physics and Energy Engineering, was hired to work at Olympus Surgical Technologies America, in Brooklyn Park with the dual objectives of water and energy conservation. So far, he has identified significant savings potential through repairs and adjustments to the irrigation system. Reuse of RO water and optimization of the water softening system are additional water conservation targets. Jane Paulson is the MnTAP advisor for this project.

Jayaditya Reddy Jillella, a graduate student in Industrial Engineering at the University of Minnesota – Twin Cities, was hired to identify opportunities to save water with Seacole Specialty Chemicals in Plymouth. Jayaditya is mapping out the water usage on site and has identified many opportunities for water savings, including using low flow high pressure nozzles for cleaning, reducing cleaning time, reducing RO reject rates, and the potential reuse of RO reject water as first pass cleaning water. Jon Vanyo is the MnTAP advisor for this project.

Zach Bahrke, a senior majoring in mechanical engineering at the University of St. Thomas, was hired to work at St. Paul Beverage Solutions in St. Paul. Zach is investigating opportunities to reduce water use at the facility. Focus areas include the clean-in-place (CIP) systems, single pass cooling, and the bottle washers. Laura Sevcik is the MnTAP advisor for this project.

Sarah Zins, a senior in Environmental Engineering at the University of Minnesota – Twin Cities, was hired to work at the VA Medical Center in Minneapolis. Sarah is familiarizing herself with the boiler, cooling towers, laundry, kitchen, and irrigation systems and is working on recommendations for each of these areas. Gabrielle Martin and Jon Schroeder are the MnTAP advisors for this project.

Thomas Leibert, a rising senior at the University of Wisconsin - Madison majoring in Chemical Engineering, was hired to work at Wholesale Produce in Minneapolis. Thomas has mapped out water usage across two buildings and is researching cost-effective water reduction strategies. Preliminary solutions include swapping out high-flow nozzles for lower-flow nozzles for tomato and fresh-cut hoses as well as welding metal around a flume to prohibit water from hitting the production floor. Jon Schroeder is the MnTAP advisor for the project.

A two-day virtual orientation and training was held for all interns on May 16th and 17th. Project work plans were completed by advisors and reviewed by company supervisors. Interns began work after the training and have been familiarizing themselves with the processes and water conservation opportunities. Several advisors were able to visit interns on site during June. All advisors reviewed weekly summaries and met with interns via Zoom video conferencing.

Symposium

The summer intern projects will be concluding in mid-August. Interns will publicly present the results of their research at the 2023 MnTAP Intern Symposium on the afternoon of Wednesday, August 16, 2023 from 12:30 – 4:00 p.m. This will be a hybrid meeting, and we welcome our partners, companies, and other guests to join us in celebrating our successes in person or online. If members of your organization would be interested in attending the symposium in person, please contact Matt Domski at <u>mdomski@umn.edu</u> or Gabrielle Martin at <u>gamartin@umn.edu</u>.

Note: The University and State of Minnesota continue to update measures and actions designed to limit the spread of COVID-19. MnTAP currently works a hybrid schedule with some days remote along with mask wearing in shared spaces to limit exposure. All University of Minnesota employees are required to be fully vaccinated.



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Industrial Water Conservation Grant Summary Report



February 2023

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

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The Metropolitan Council is the regional planning organization for the seven-county Twin Cities area. The Council operates the regional bus and rail system, collects and treats wastewater, coordinates regional water resources, plans and helps fund regional parks, and administers federal funds that provide housing opportunities for low- and moderate-income individuals and families. The 17-member Council board is appointed by and serves at the pleasure of the governor.

On request, this publication will be made available in alternative formats to people with disabilities. Call Metropolitan Council information at 651-602-1140 or TTY 651-291-0904.



A summary report outlining industry reasons for success of, or barriers to, water conservation recommendations and findings developed by the Minnesota Technical Assistance Program for assistance clients and intern host companies in the eleven-county metropolitan area from 2012-2017.

Submitted by

Minnesota Technical Assistance Program (MnTAP)

University of Minnesota Award Con00000049398 Under contract with

METROPOLITAN COUNCIL (MCES)

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Executive summary

The Minnesota Technical Assistance Program (MnTAP) at the University of Minnesota continues a successful, collaborative relationship with Metropolitan Council Environmental Services (MCES), working together to address the metro-area need for industrial sector water use efficiency awareness and water use reductions. Since the launch of the industry-focused technical assistance partnership in 2012, MnTAP has worked with numerous operations in the metro providing a range of practical suggestions to improve industrial water efficiency. Since 2013 MnTAP, with MCES support, has made 288 water efficiency recommendations representing potential annual water savings of over 487,600,000 gallons per year. Approximately 88% or 253 of the water efficiency recommendations resulted from 44 MnTAP intern projects. The remaining 12% or 35 water efficiency recommendations resulted from 10 MnTAP staff site assessments conducted during the 2012-2013 project period. Implemented recommendations as of this report total about 162,803,000 gallons per year or approximately 37% of the recommended opportunity which includes recent years that have not had time to reach full implementation.

| | Number of recommendations | Water saving potential (gal/year) | Recommendations implemented (gal/year) | Realized cost savings (\$/year) |
|---|---------------------------|---|--|------------------------------------|
| 2013-2022 MnTAP intern projects | 253 | 417,600,000 | 153,803,000 | 1,660,000 |
| MCES sponsored projects/grants and site assessments | 35 | 70,000,000 | 9,000,000 | Not Available |
| TOTAL | 288 | 487,600,000 | 162,803,000 | 1,660,000 |

MCES seeks to maximize the water efficiency achieved to maintain sustainable water supplies across the metro area for continued regional public health, quality of life and economic development. To inform future outreach efforts and identify leverage points that encourage implementation of industrial water efficiency activities, MnTAP proposed and MCES agreed to utilize a portion of the 2020 and 2021 intern effort to analyze past industrial water recommendations. This analysis classified the types of industrial water efficiency opportunities identified and the rates of implemented recommendations and developed a search tool to direct facility operations staff to water conservation recommendations and intern project summaries that may be applicable to their operations.

Introduction

The Minnesota Technical Assistance Program (MnTAP) is an outreach and assistance program at the University of Minnesota Twin Cities campus that helps Minnesota businesses develop and implement industry-tailored solutions that prevent pollution at the source, maximize efficient use of resources, and reduce energy use and costs to improve public health and the environment. MnTAP has been providing technical assistance services at industrial facilities across the state for nearly 40 years. MnTAP's technical assistance staff members hold degrees in engineering and science and provide staff site visits, support student intern projects, and generate resources as direct technical assistance for Minnesota businesses.

The Metropolitan Council is the regional policy-making body, planning agency, and provider of essential regional services for the Twin Cities metropolitan region. The Council's mission is to foster efficient and economic growth for a prosperous region. Metropolitan Council Environmental Services (MCES) is nationally renowned for its superior work treating wastewater, monitoring air and water quality, and planning for a long-range water supply to meet future demand. Effective and resilient water supplies for the region's municipalities are the focus of the Water Supply Planning Group of MCES.

In an effort to carry out the mission of providing resilient water supplies for the Metro region, MCES has funded MnTAP technical assistance and <u>MnTAP Intern Program</u> efforts to assist businesses with identification and implementation of water efficiency projects. MCES seeks to maximize the water efficiency achieved in order to maintain sustainable water supplies across the metro area. To inform future outreach efforts and identify leverage points that encourage implementation of industrial water efficiency activities, a portion of the intern effort in 2020 and 2021 was directed to analyze past industrial water recommendations. This analysis classified the types of industrial water efficiency opportunities identified and the rates of implemented recommendations and created a search tool to direct facility operations staff to water conservation recommendations and intern project summaries that may be applicable to their operations. This work has been funded by MCES through a grant from the Clean Water, Land, and Legacy Amendment.

MnTAP is well-qualified to lead these kinds of projects due to a strong history of applying pollution prevention and conservation solutions for businesses across Minnesota, including industrial water conservation. MnTAP staff members have many years of experience applying source reduction practices in industrial settings and hold a deep understand of business operations needed to offer customized solutions. Additionally, MnTAP is well known as a leading pollution prevention provider in the State of Minnesota. This reputation, as well as MnTAP's broad network of vendors, county and city government personnel, professional associations, and other contacts, is routinely leveraged to provide effective technical assistance.

Approach

This report compiles assistance information from MCES-sponsored client interactions aimed at improving water efficiency at industrial facilities located primarily within the seven-county metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington). Work prior to 2015 also included four additional counties (Chisago, Isanti, Sherburne and Wright). Recommendation and implementation data were analyzed to document what conditions tend to promote or constrain industrial investment in water efficiency. Improvement recommendations are categorized in the MnTAP data as implemented, planned, proposed, or not planned when the information is gathered during routine follow-up activities.

Background

An active partnership between the MCES Water Supply Planning and MnTAP was launched in 2012 to study aspects of industrial groundwater use in the eleven-county Twin Cities metropolitan region. The history of MCES and MnTAP collaborations includes the following:

Figure 1. Partnership timeline



This long-standing relationship has shown substantial documented success in identifying opportunities for industrial water efficiency. Specifically, 253 water efficiency recommendations were made through the MnTAP Intern Program through 2022 representing potential annual water savings of over 417,600,000 gallons. Implemented water efficiency recommendations from these projects total approximately 153,803,000 gallons in first year savings or approximately 37% of the recommended opportunities as of this report. This work continues to provide opportunities to revisit organizations that have received technical assistance for water efficiency. Follow up activities provide opportunities to inquire about facility success in implementing recommendations and identify any challenges encountered through the implementation process. This information is used to offer additional assistance and craft future approaches to water efficiency technical assistance to avoid barriers to implementation.

MCES-Sponsored Projects

MCES-sponsored projects have successfully combined MnTAP staff site assessment activities with intern projects aimed at fulfilling specific water efficiency goals. Table 1 identifies project work accomplished through surveying, water conservation site assessments, and in-depth water opportunity identification and implementation utilizing the MnTAP summer intern program. Published reports and case studies from these MCES-sponsored activities are available on-line.

Table 1. Projects and outcomes

| Year | Project | Outcomes |
|----------------|---|---|
| 2012 | "Assessing the Opportunity and Barriers for Water Conservation by Private Industrial Water Users" ¹ | Industrial well user survey Seven technical site assessments Three intern projects |
| 2013 | MnTAP SOLUTIONS ² | - Three intern project summaries |
| 2014 | MnTAP SOLUTIONS ³ | - One intern project summary |
| 2014 - 2015 | "Industrial Water Conservation in the North and East Metro Groundwater Management Area"4 | Water use analysis Ten technical topic outreach e-newsletters Three technical site assessments Three intern projects |
| 2015 | MnTAP <u>SOLUTIONS⁵</u> | - Four intern project summaries |
| 2016 - 2017 | "Metro Water Conservation Utilizing MnTAP Interns" | Ten intern projects Report on 2016-2017 grant objectives |
| 2016 | MnTAP SOLUTIONS ⁶ | - Seven intern project summaries |
| 2017 | MnTAP SOLUTIONS7 | - Five intern project summaries |
| 2018 | "Industrial Water Conservation Motivations Report" ⁸ | Report on motivations and barriers to industrial water efficiency |
| 2018 | MnTAP SOLUTIONS ⁹ | - Five intern project summaries |
| 2019 | MnTAP SOLUTIONS ¹⁰ | - Six intern project summaries |
| 2020 | " <u>MnTAP Water Efficiency</u> <u>BMP</u> " ¹¹ | Analysis of industrial water efficiency recommendations to identify best practices |
| 2020 | MnTAP SOLUTIONS ¹² | - Four intern project summaries |
| 2021 | "Industrial Water Efficiency Optimization Search Tool" ¹³ | Develop searchable database of MnTAP industrial water efficiency recommendations |
| 2021 | MnTAP SOLUTIONS ¹⁴ | - Three intern project summaries |
| 2022 | MnTAP SOLUTIONS ¹⁵ | - Seven intern project summaries |

¹https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Water-Conservation-by-Private-Well-Industries.aspx

http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2013-Solutions.pdf

³ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2014-Solutions.pdf

⁴ https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Industrial-Water-Conservation-North-East-Metro-G.aspx

⁵http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2015-Solutions.pdf

⁶ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2016-Solutions.pdf

⁷ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2017-Solutions.pdf

⁸ https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/INDUSTRIAL-EFFICIENCY-CONSERVATION/Industrial-Water-Conservation-Motivations-Report.aspx

⁹ <u>http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2018-Solutions.pdf</u>

¹⁰ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2019-Solutions.pdf

¹¹ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Intern/2020-2029/2020/bethany-mestelle-mntap-water-bmps-executivesummary-2020.pdf ¹² http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2020-Solutions.pdf

¹³ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Intern/2020-2029/2021/Executive-Summary/MnTAP-Water-BMPs-Executive-Summary.pdf

¹⁴ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2021-Solutions.pdf

¹⁵ http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Publications/Solutions/2022-Solutions.pdf

Technical site assessments are a primary way MnTAP staff members work with businesses throughout the year. This type of interaction has a short duration, utilizes experienced engineering staff, and results in focused recommendations that are left for the facility to implement. While staff site assessments offer limited time and resources for implementation activities, periodic follow-up is conducted to answer site staff questions and encourage implementation. Site assessments were a primary outcome of the industrial water efficiency project only in 2012, 35 water efficiency recommendations resulted from 10 MnTAP staff site assessments that year. Site assessments offer industrial facilities a minimal time commitment option to screen for water efficiency opportunities.

These preliminary site assessments often uncover substantial improvement opportunities that the company may not have time to implement. A follow-on intern project can be used to provide additional engineering resources at the site to launch implementation. Intern projects commit both MnTAP and the facility to invest time and money on the goals of an agreed upon project executed through the effort of an engineering student applied to the project full time over 12 weeks. This degree of project investment often supports implementation of some recommendations due to the presence of extra engineering help and the longer timeframe of the assistance activity. The MnTAP formal intern project team of student, advisor, and facility, along with the facility commitment of time, resources, and financial support makes a strong, productive relationship with a documented impact on water conservation.

Recommendation Analysis

MCES-Sponsored Intern Projects

Since 2013, MCES has provided full or partial support for 44 MnTAP facilitated intern projects in the greater metro area with an emphasis on water efficiency and conservation. Availability of consistent funding has strengthened MnTAP's ability to recruit sites and increase engagement to address water efficiency. The 44 intern projects resulted in 253 water efficiency recommendations as summarized in Table 2 below.

| Year | Sector | Number of recommendati ons | Water saving potential (gal/year)* | Number of implemented recommendations | Recommendations implemented (gal/year) | Realized cost savings (\$/year) |
|------|------------------------|----------------------------|--|---|--|---------------------------------------|
| | Metal products | 9 | 10,941,000 | 6 | 9,935,000 | 90,000 |
| 2013 | Food processing | 4 | 5,903,000 | 0 | 0 | 0 |
| | Food processing | 8 | 30,593,000 | 7 | 22,343,000 | 96,000 |
| 2014 | Filtration products | 7 | 7,070,000 | 3 | 2,620,000 | 6,000 |
| | Food processing | 2 | 2,203,000 | 2 | 2,203,000 | 15,000 |
| 2015 | Power generation | 5 | 6,910,000 | 5 | 6,726,000 | 10,000 |
| | Organics processing | 6 | 7,742,000 | 5 | 9,330,000 | 33,000 |
| | Education | 3 | 3,536,000 | 0 | 0 | 0 |
| 2016 | Building materials | 36 | 16,729,000 | 9 | 5,275,000 | 6,000 |

Table 2. MCES-Sponsored intern projects (2013-2022)

| Year | Sector | Number of recommendati ons | Water saving potential (gal/year)* | Number of implemented recommendations | Recommendations implemented (gal/year) | Realized cost savings (\$/year) |
|------|-----------------------------|----------------------------|--|---|--|---------------------------------------|
| | Residential properties | 1 | 3,000,000 | 1 | 12,450,000 | 3,000 |
| | Healthcare | 16 | 13,024,000 | 8 | 8,955,000 | 129,000 |
| | Power generation | 10 | 6,569,000 | 10 | 6,569,000 | 59,000 |
| | Electronics | 2 | 11,900,000 | 1 | 7,600,000 | 90,000 |
| | Bio tech | 7 | 6,072,000 | 5 | 4,468,000 | 42,000 |
| | Metal forming | 9 | 5,586,000 | 1 | 940,000 | 7,000 |
| | Horticulture | 2 | 48,000,000 | 0 | 0 | 0 |
| 2017 | Building materials | 5 | 19,109,000 | 2 | 11,600,000 | 30,000 |
| | Power equipment | 3 | 1,780,000 | 3 | 1,715,000 | 20,000 |
| | Beverages | 5 | 503,000 | 1 | 150,000 | 2,000 |
| | Museums | 4 | 5,819,000 | 1 | 58,000 | 1,000 |
| | Book printing | 5 | 10,550,000 | 2 | 2,300,000 | 17,000 |
| 2018 | Cosmetics | 9 | 6,047,000 | 7 | 3,148,000 | 57,000 |
| | Healthcare | 7 | 5,540,000 | 7 | 5,540,000 | 83,000 |
| | Paper products | 5 | 8,570,000 | 1 | 250,000 | 2,000 |
| | Municipal | 6 | 7,396,000 | 0 | 0 | 0 |
| | Metal can products | 3 | 5,733,000 | 3 | 5,733,000 | 54,000 |
| 2040 | Laundry services | 4 | 3,678,000 | 2 | 2,480,000 | 24,000 |
| 2019 | Zoos | 5 | 4,186,000 | 0 | 0 | 0 |
| | Medical products | 2 | 3,977,000 | 2 | 3,977,000 | 16,000 |
| | Food processing | 5 | 1,177,000 | 3 | 677,000 | 8,000 |
| | Medical products | 6 | 14,485,000 | 3 | 3,360,000 | 645,000 |
| 2020 | Food processing | 12 | 19,650,000 | 1 | 3,000,000 | 12,000 |
| 2020 | Medical Products | 2 | 1,135,000 | 0 | 0 | 0 |
| | Municipal | 3 | 10,190,000 | 1 | 1,890,000 | 21,000 |
| | Food processing | 5 | 987,000 | 1 | 38,000 | 1,000 |
| 2021 | Beverage products | 4 | 3,360,000 | 1 | 1,250,000 | 5,000 |
| | Sports facilities | 4 | 7,134,000 | 1 | 223,000 | 2,000 |
| | TOTAL | 231 | 326,784,000 | 105 | 146,803,000 | 1,586,000 |
| | Dairy products | 5 | 51,041,000 | 1 | 7,000,000 | 74,000 |
| | Audio and video products | 2 | 2,700,000 | - | - | - |
| 2022 | Leather products | 2 | 12,218,000 | - | - | - |
| | Healthcare | 5 | 4,025,000 | - | - | - |
| | Metal can products | 3 | 2,830,000 | - | - | - |

| Year | Sector | Number of recommendati ons | Water saving potential (gal/year)* | Number of implemented recommendations | Recommendations implemented (gal/year) | Realized cost savings (\$/year) |
|------|------------------|----------------------------|--|---|--|---------------------------------------|
| | Electroplating | 4 | 12,632,000 | - | - | - |
| | Public utilities | 1 | 5,370,000 | - | - | - |
| | TOTAL | 253 | 417,600,000 | 106 | 153,803,000 | 1,660,000 |

* Rounded up to the nearest 1,000.

SOURCE: MnTAP data, MCES project reports, and applicable <u>SOLUTIONS</u> publications.

Recommendations from the intern projects conducted in 2022 are excluded from a number of calculations because these sites have not had sufficient time to implement recommendations.

- The recommendations for water saving from 2013 through 2022 from 44 facility projects total 417 million gallons/year.
- Seven facilities from 2022 projects have 22 water recommendations with a total of 91 million gallon/year potential.
- Implementation from project years 2013-2021, 45% of the recommendations were implemented representing 45% of water savings potential across 37 of the 44 (84%) intern project sites.
- Implemented dollar values through 2021 ranged from \$0 to \$645,000 per site with a median implementation value of \$11,000 in first year savings.

The progress status of the intern project recommendations is documented internally by MnTAP. This information is updated annually based on information received during follow up activities. A total of 253 intern recommendations were made between 2013 and the end of 2022 (there were no MCES-sponsored intern projects in 2012). One hundred six (42%) of these recommendations have been implemented, 23 (9%) recommendations are planned to be implemented while 24 (10%) are not planned for implementation at this time. One hundred (39%) of the recommendations are still under consideration and listed as proposed. The status of all 253 recommendations is shown graphically in

Figure 2.

Figure 2. Intern project recommendations status by year



Industrial Water Efficiency Recommendations Analysis

Due to the high impact of water efficiency measures that have been demonstrated at industrial facilities, MCES and MnTAP were interested in determining if more guidance on industrial water efficiency opportunities could be provided by analyzing past project impacts. This 2020 intern project analyzed a set of 341 water conservation recommendations made by MnTAP between 2015 and 2020 using data compiled on June 22, 2020. The overarching goal of the analysis was to identify recommendations that consistently yield water conservation opportunities both across and within various industries.

Water Mapping

For all industries, the first step in any water conservation project should be creating a water map. This is standard procedure for projects completed by MnTAP and is identified as an integral step toward water conservation by many other organizations. To complete this, all water inputs and outputs within the system should be identified and quantified. An unbalanced water budget could be indicative of leaks within the system that should be addressed, or other hidden water uses to be identified. The mapping process also indicates where water is being used within an industrial facility by volume and thus where the potential for water conservation may reside.

Maintenance

Maintenance recommendations are those that involve repairing equipment or processes to function in the way they were originally intended. This often includes inspecting and repairing equipment, as well as developing a plan to identify and manage future or recurring leaks. Maintenance recommendations made up 10% of the total water conservation recommendations from the target data set and accounted for a total proposed reduction of 40,000,000 gallons of water. The implementation rate for maintenance recommendations is 48%, which is the highest of all types of recommendations. This may indicate that facilities are well positioned to implement maintenance recommendations through normal routine maintenance processes.

Management

A recommendation classified as a management makes a change to the process to perform the same operational function in a more efficient way. Though there may be changes made to the process, ultimately, the bulk of the process remains the same. Automating processes or switching to high efficiency fixtures and appliances, as well as adjusting schedules, run times, and capacity of existing equipment, are considered management recommendations. Management recommendations were the most common type of recommendation made by MnTAP in the target data set and made up 56% of total recommendations analyzed. The total proposed reduction for this type of recommendation was 170,000,000 gallons. Management recommendations had a 37% implementation rate.

Modifications

Modifying a system is a large-scale change to the process and the way water is used throughout the new system. This may include a change to the product itself, installing a water reuse system, or using waterless processes. These recommendations tend to take more time to implement and be more costly to the company but often yield high-value potential water savings. Modifications made up 34% of all MnTAP water recommendations in the target data set. The total proposed reduction for modification reductions was 420,000,000 gallons. At 31%, the implementation rate for these recommendations was

the lowest among the three major recommendation types, reflecting the more complex nature of the projects.

Water Use

To evaluate how water was used in a facility, all water conservation recommendations were labeled as either process, meaning it was related to the operations going on in the building; irrigation, referring to exterior lawn or grounds seasonal water use; or domestic, related to water associated with human occupancy of the building. The latter two water uses make up the larger category of "non-process water" as they are typically part of the facility building operations rather than the manufacturing operations. Of the 341 water conservation recommendations, 233 are related to water use within a process (68%) while 54 (16%) represented domestic uses and an additional 54 (16%) represented irrigation uses. Within this data set, recommendations related to industry processes were implemented more frequently and yielded higher savings than recommendations focused on domestic water use or irrigation. This may be due to MnTAP's focus on process related improvements and generally work with staff focused on operations activities.

The 233 recommendations related to process uses equates to a total proposed reduction of 580,000,000 gallons. Most process water use (75%) was found in the following applications.

- Ingredient water becomes part of the product
- Conveyance water used to transport material within a facility
- Sanitation water used for cleaning operations
- Steam water used for generation of steam
- Heat Management water used for heating or cooling processes.

The distribution of recommendations made and implemented and the associated water volume is shown in Table 3.

| Use Type | Number of Recommendations | Implemented Recommendations | Total Proposed Reduction (gal) | Total Actual Reduction (gal) |
|------------|------------------------------|--------------------------------|-----------------------------------|---------------------------------|
| Ingredient | 28 | 14 | 17,000,000 | 12,000,000 |
| Conveyance | 8 | 3 | 32,000,000 | 2,300,000 |
| Sanitation | 86 | 27 | 88,000,000 | 51,000,000 |
| Steam | 8 | 6 | 4,800,000 | 3,400,000 |
| Heating | 9 | 5 | 20,000,000 | 15,000,000 |
| Cooling | 43 | 17 | 260,000,000* | 30,000,000 |
| Total | 182 | 72 | 421,800,000 | 113,700,000 |

| Table 3 – | Total a | nd Imple | emented | Recomme | endations | for N | laior | Process | Water | Uses |
|-----------|----------|----------|---------|-------------|-----------|-------|-------|---------|-------|------|
| | i otai a | | menteu | IX COULTING | maalions | | | 1000033 | value | 0363 |

*One unimplemented recommendation for 200,000,000 gal

Despite non-process water making up a smaller portion of total recommendations than process use, these recommendations are significant. Domestic water use and irrigation account for 32% of total water use recommendations across all industries and represent a total proposed reduction of 85 million gallons. While this represents considerable water efficiency opportunity, only 23% of these recommendations have been implemented. Implementation of non-process recommendations should be encouraged as a means for improving water conservation. Opportunities for irrigation and domestic water use conservation may be more generally applicable across more business sectors and often have relatively low implementation costs and short payback periods.

Example

The intern classified the data by industry sector using NAICS codes with more specific classification for recommendations focused on manufacturing. The type of water efficiency recommendation, Maintain, Manage, or Modify, was applied to each sector to chart the distribution of recommendations by industry. For example, food processing was the largest component of the manufacturing sector, with 51 recommendations. Of these recommendations 21 were implemented, giving an implementation rate of 41%. A majority of recommendations (90%) were directly related to the industrial process, while 8% focused on domestic water use and 2% were related to irrigation. The food processing recommendation distribution includes 20% maintenance recommendations, 51% process management recommendations, and 25% more substantial process modifications to reduce water use.

Industrial Water Efficiency Optimization Search Tool

This 2021 intern project expanded on the intern water efficiency recommendation classification effort previously described by developing a search tool for the database created in 2020. The goal of this work was to allow users to search the database collection of industry specific water efficiency recommendations to identify high volume, high value efficiency options for replication in their own facilities. A key feature of this work was to allow access to types of water efficiency recommendations that have been made and access to published intern summaries, while maintaining confidentiality of the businesses originally receiving the recommendations.

With a history of intern projects focused on industrial water conservation, MnTAP has a solid base of practical water efficiency suggestions and recommendations made to companies. These recommendations are based on in-the-field technical assistance which makes these practical examples other facilities can adopt. These suggestions are published as individual MnTAP Intern Program executive summaries on the MnTAP website but are not easy to find and utilize.¹⁶ The development of this tool to compile published industrial water efficiency recommendations and make the data searchable has the potential to expand the impact of past and future projects beyond the participating facilities. Because these recommendations are sourced from published case studies, no sensitive company information was revealed.

The industrial water efficiency optimization search tool was built on the data visualization platform Tableau. This platform allowed for a direct connection to the MnTAP database containing suggestion data. The tool consists of a filterable table with statistics and details of each suggestion which meets the criteria for this project including the following.

- Savings and implementation cost
- Type of suggestion maintain, manage, modify
- Industry sector
- Link to a MnTAP Intern project executive summary

Filters to allow users to search through suggestions include adjusting the range of dollars or gallons saved by each suggestion, choosing industries from which they would like to see suggestions,

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¹⁶ http://www.mntap.umn.edu/interns/pastprojects/

choosing to see only suggestions that are of certain methods, and a blank keyword search. The link to the executive summary allows users to find details for each suggestion.

Instructions for how to use the tool can be found on the MnTAP website.¹⁷

Conclusions

Between 2013 and 2022, MnTAP Interns made 253 water efficiency recommendations identifying potential annual water savings of over 417,600,000 gallons per year. To date, implemented water efficiency recommendations total over 153,803,000 gallons per year, 37% of the recommended opportunity. Implementation from project years 2013-2021, projects that have had time to implement recommendations made, 45% of the recommendations were implemented representing 45% of water savings potential across 37 of the 44 or 84% of the intern sites. This high participation rate in implementing MnTAP Intern Project water efficiency recommendations indicates there is generally accessible water efficiency opportunity that companies can access with a modest amount of support.

Analysis of these water efficiency recommendations indicates they fall into three categories, maintain – return operations to original efficiency, manage – conduct similar operations with improved efficiency, and modify – reinvent how water is used within a process. Maintenance related recommendations have the highest implementation rate, however recommendations to manage process water use have the most recommendations in MnTAP's work. Recommendations to modify how water is used in industrial processes offer significant water reduction opportunity, however these recommendations take much longer to implement due to process engineering and financial investments required.

Follow-up is conducted after any technical assistance activity to determine how the facility is progressing toward implementation of recommendations and to identify if additional resources may be needed. These interactions positively reinforce company actions and help maintain the MnTAP-client relationship. Due to the protracted implementation timeline for industrial projects, follow-up is critical for measuring and verifying the impact of applied technical assistance services.

MnTAP will continue to successfully combine experienced MnTAP program staff, in-depth internships for appropriate projects, and long-term follow-up to successfully support industrial water efficiency initiatives and achieve meaningful results.

¹⁷ <u>http://www.mntap.umn.edu/wp-content/uploads/simple-file-list/Resources/Extended-User-Guide.pdf</u>



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MINNESOTA GEOLOGICAL SURVEY

TO: PAUL GARDNER, CLEAN WATER COUNCIL

FROM: BARBARA LUSARDI

SUBJECT: MGS CGA PROGRESS REPORT

DATE: 6/22/2023

CGA PROGRAM AND FINANCIAL STATUS

The MGS County Geologic Atlas Program has active projects in 25 counties. Atlases are just getting underway in Beltrami, Martin, Cottonwood, LeSueur, and Itasca counties. Locating has started or will start in the coming months but MGS work will not start until sometime in the next two years. We anticipate starting 3 new counties per year as we move forward.

Three more counties (Lake, Otter Tail and Lac Qui Parle) have been printed. The only task that remains is to compile all the digital files for DVD and online applications. We will make good progress on several additional counties that are nearing completion including Dakota, Lincoln, and Pipestone.

The projects in Pennington, Red Lake, Polk, Chippewa, Yellow Medicine, Douglas and Grant counties are getting to the later stages, with some counties further along than others. The focus is on map compilation, cross sections, and sand distribution models. Waseca, Faribault, Lake of the Woods and Ramsey counties completed drilling, logging and sampling of core this past winter. Data from those samples will be analyzed and compiled into maps and cross sections over the next several months.

This continued contract, while not supporting an individual county project, has been used to expand our rotary sonic drilling program in several counties (listed above). The funds in addition to support from the ENRTF and CWF allowed us to drill more sites or drill deeper through the entire glacial sequence where glacial sediments are several hundreds of feet. We need to know what is at the bottom.

As of June 22, 2023:

\$900,000 2021/2022 award -<u>\$329,412 total expenses</u> \$ 570,588 balance

MGS hosts an <u>Open Data Portal</u> on which many of our county geologic atlases are presented as "Story Maps" that allow for direct access of the data without any special software or interface.



Minnesota River Basin River Watch 2022-2023 PROGRAM REPORT

Prepared For MPCA & FMV



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Program Overview

River Watch (RW) engages high school, middle school, and elementary school students in a multidisciplinary study of Minnesota's water health and management through hands-on, field based experiential watershed science. Schools across the Minnesota River Basin monitor the quality of their local river and stream, and investigate potential impacts to the water. The in-class and field activities are designed to prepare future scientists and stewards to understand the complex nature of water quality and advocate for solutions to improve the health of our most important resource.

Funding for River Watch during the current FY22-FY23 biennium is provided by the Minnesota Legislature through an appropriation of the Clean Water Legacy Funds to the Minnesota Pollution Control Agency. Beginning during the 2018-2019 school year with five high school teams, River Watch has grown to a program including twenty-two high school teams. Over the 5 years River Watch has operated in the Minnesota River Basin, it has engaged an increasing number of students in water quality data collection, which is shared with the MPCA to supplement their Surface-Water Database. Across 2022- 2023 school year, River Watch Staff worked with nearly 3300 students from the following 22 high school teams, 2 middle school classes. and 10 elementary classes, to collect water quality field data and investigate topics in water science.

- The Blake School
- Bloomington Jefferson
- Burnsville
- Cedar Mountain
- Comfrey
- Eden Prairie
- Madelia
- Mankato East
- Mankato Loyola
- Minnesota Valley Lutheran
- Morgan
- Nicollet Middle School
- New Ulm Cathedral

- New Ulm Public
- Prior Lake
- Redtail Elementary
- School of Environmental Studies
- Sibley East
- Shakopee
- Sleepy Eye Public
- Sleepy Eye St. Mary's
- Springfield
- Tri-City United
- Waseca
- MN Valley Izaak Walton League Green Crew Team

When possible, River Watch empowers its teams to act as educators of younger students and the greater community. The "River of Dreams" workshops pair student leaders with younger learners to explore topics in water science. One macroinvertebrate workshop partnered 167 high schoolers with 379 elementary students to study benthic macroinvertebrate (water bugs). The "Community River Walks" had students leading hikes focused on educating community members on the history and health of the Minnesota River watershed. The expansion of activities is the result of River Watch's partnership with the Minnesota Valley Chapter of the Izaak Walton League, which provides outdoor classroom facilities, and access to the Minnesota River floodplain.

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Water Quality Monitoring

Students collect and record water quality conditions of local rivers and streams using state-of-the-art YSI Sonde monitors to gather "Grab" Samples. Teams also collect and identify macroinvertebrates to further assess the health of the river or stream.

River of Dreams Workshops

Student leaders facilitate water science workshops and day camps for middle and elementary school students. The workshops cover a wide range of water conservation topics, focusing on handson exploration of water conservation, aquatic fauna, and their natural environment.

<u>Community River Walks</u>

Student-led hikes, supervised by professional River Watch staff, along the floodplain of the Minnesota River aimed at educating community members on water conservation practices and human-driven impacts on the Minnesota River.







Project Progress

This report is for the Minnesota River Basin River Watch Project covering January 2022 through June 2023. The Friends of the Minnesota Valley is the project sponsor with programmatic support provided by the Izaak Walton League. The remainder of this report is organized by activities undertaken between 2022-2023.

Water Quality Monitoring

The beginning of the Spring 2022 sampling season welcomed a new Program Coordinator, Tom Crawford. In preparation for the imminent sampling, MN River Watch staff redesigned the educational materials, creating a more visually engaging and academically thorough in-class presentation (Appendix A). River Watch staff also completed the "Getting Ready for the New MN Science Standards" program offered by the Minnesota Department of Education. Every effort was made to incorporate Minnesota STEM standards into the classroom instruction and the hands-on water quality monitoring and macroinvertebrate identification (Appendix B).



The in-class lesson includes discussions on the following topics: water monitoring equipment, proper field-sampling methods, water quality metrics (pH, temperature, dissolved oxygen), pollutants (nitrates, phosphates, sediment, salt), the impact of natural and constructed environments on water quality, personal water conservation measures, common macroinvertebrates, and their varying sensitivity to pollution.





Water Sampling Fieldwork

All of these topics are revisited as students participate in collecting water quality field data and making environmental observations of the riparian ecosystem surrounding their local sampling site. Students are separated into groups and rotate between using the various pieces of equipment to collect water quality data.

A field sampling event includes the use of:

- YSI Sonde Handhelds to collect water quality measures
- A Van Dorn sampler to collect water samples from the middle of the watercourse
- A Secchi Tube to assess the turbidity or clarity of the water sample
- A Phosphate Test Kit to assess the level of phosphate in the water sample
- A Weighted Tape Measure to determine the stage, or height of the water level in relation to the sampling point
- Aquatic D-Nets to collect macroinvertebrates from the watercourse
- Macroinvertebrate Assessment Tools: Collection Tray, Taxonomy Charts, Magnifying Lens, Macroinvertebrate Pollution Sensitivity Index



Beginning in May 2022, River Watch partnered with 12 schools across 23 sampling events. By the end of October 2022, we added 6 more new River Watch teams, bringing the number of participants up to 1450 across 48 sampling events. After a productive winter building partnerships and curriculum, River Watch brought on 4 more high school teams, 2 middle school teams, and partnered with 10 elementary classes for a one day "River of Dreams" [RoD] workshop. In 2023 the number of participants from the 25 schools, across 50 sampling events and 4 RoD workshops, totaled 1613. River Watch is thrilled to have engaged so many young minds in hands-on investigation of complex water systems across our state and world; and to have collected crucial water quality data for the MPCA.



River of Dreams Workshops

Summer 2022 marked the start of the "River of Dreams" program, aimed at involving middle and elementary school students in a hands-on, place-based investigation of the basics of hydrology. "River of Dreams" events included: a Cross-grade Collaborative Workshop (CCW) exploring the importance of macroinvertebrates; and Green Camp, a multi week day camp exploring topics in water science and conservation. All "River of Dreams" activities were designed to fulfill the Next Generation Science Standards content requirements, and structured to emphasize the three dimensions of science learning: core knowledge, scientific practices, and crosscutting concepts.

Cross-Grade Collaborative Workshop

As a year-end project, the River Watch team from Prior Lake High School took on the role of an educator, preparing and facilitating a lesson for Redtail Elementary students. To prepare, the River Watch team members had to learn about macroinvertebrates: how to collect and identify them, what their populations can tell us about the health of the water, and how to communicate these ideas to younger learners. Once the lesson content was established, the River Watch members collected and identified macroinvertebrates to share with the young learners.

The day of the workshop, the young learners were paired off with River Watch members, who led the chosen activity, a game of memory using macroinvertebrates. Each learner tried to collect pairs of the bugs associated with low pollution tolerance/high quality water. The goal was to show how populations of macroinvertebrates can indicate high or low water quality. After the activity, the young learners were able to observe the real macroinvertebrates (collected by the River Watch team) under microscopes. It was amazing to see both groups of students, young and old, energize each other and share their growing knowledge of water and conservation in general. Overall, the one workshop involved over 550 participants.



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<u>River of Dreams Workshops (Continued)</u>

Green Camp

Green Camp is a multi-week day camp that partners with school district summer programs to provide an outdoor, hands-on, place-based exploration of water science, environmental ethics, and conversation service. Piloted with Blake Schools during the summer of 2022, the 2023 Green Camp program grew to include 4 summer programs (Blake Schools, Burnsville, Bloomington, and Hiawatha College Prep HS). Each week campers explore a new topic in water science through hands-on experiments, and spend the afternoon collecting water quality data from streams in the Minnesota River Valley.

Green Camp is located on the Izaak Walton League of America's Minnesota River Valley Chapter (IWLA-MNV) property along the border of the Minnesota Valley National Wildlife Refuge. This proximity to a designated wildlife refuge allowed students to explore the natural riparian environment and directly observe the seasonal changes in the nearby wetlands, floodplain, and river channel.

Green Camp was implemented in partnership with the IWLA-MNV Chapter's Green Crew and the AmeriCorps Climate Resilience Fellows. The IWLA-MV Chapter Green Crew is a youth environmental and conservation leadership training program for high school and college students. The Green Crew, which draws young leaders from across the state, has its own River Watch team within the Friends of the Minnesota Valley program.







Leave No Trace Statement

Friends of the Minnesota Valley believes the River Watch program must not only engage the scientifically minded individuals, but also the environmentally conscious ones. As such, we integrate the Leave No Trace principles into every facet of our outdoor education programs. The seven Leave No Trace principles support ethical and environmentally conscious

decision-making in both natural and constructed environments. Furthermore, Leave No Trace provides a framework for stewardship that will serve students throughout their whole personal and professional lives.

Community Engagement

In an effort to build awareness of water quality issues in the broader community, River Watch, in collaboration with the Green Crew River Watch team, hosted a number of outreach events in 2022-2023. During the warm months, the high school students of the Green Crew River Watch team led Community River Walks; a hike along the Minnesota River from the Izaak Walton property to a MPCA testing site at the Bloomington Ferry Bridge. These events were open to the Public, which provided the Green Crew team members an opportunity to share the lessons learned from River Watch, and deepen their understanding of water science through teaching others. The aim of these River Walks was both networking with other young scientists interested in water conservation and educating community members on the importance of water quality and the extent of human's impact on our natural water resources. This Community Engagement effort reached over 50 community members across 8 River Walk events.

Presenting at the Minnesota State Fair as part of the MPCA's Eco-Experience Showcase allowed River Watch Professional Staff to interact with individuals and families across the US, prompting them to consider the health of Minnesota's largest rivers, the Mississippi and the Minnesota. Due to the geographically diverse audience, the exhibit was designed to encourage conversations around how one can reduce their impact on water quality, instead of focusing on recruitment to the program. As such, the day was filled with conversations about peoples' past and present experiences with the Minnesota and Mississippi Rivers.



Project Management & Reporting

This final 2022 report is to be submitted to the MPCA project manager. The report will also be submitted to the Board of Friends of the Minnesota Valley. Invoices have been submitted quarterly and the final summary of the project budget is shown below.

| v | Adjusted MPCA Funds | MPCA Funds | | |
|-------------------|---------------------|-------------|---------|---------------------|
| Line Item | Awarded | Expended | Balance | Budget Expended (%) |
| Personnel | \$69,958.75 | \$69,958.75 | \$0.00 | 100% |
| Travel | | | | |
| Reimbursement | \$4,700.07 | \$4,700.07 | \$0.00 | 100% |
| Equipment & | | | | |
| Supplies | \$25,273.61 | \$25,243.38 | \$30.23 | 100% |
| Lodging and Meals | \$67.57 | \$67.57 | \$0.00 | 100% |
| Total: | \$100,000.00 | \$99,969.77 | \$30.23 | 100% |



Appendix A: 2022-2023 River Watch Water Monitoring Participation Data

| School | Sampling Events | Students Involved |
|--|---------------------|--------------------|
| Bloomington - Jefferson | 2 | 49 |
| Burnsville | 2 | 29 |
| Cedar Mountain | 3 | 75 |
| Comfrey | 2 | 28 |
| Eden Praire | 2 | 41 |
| MN Valley Izaak Walton League Green Crew Team | 7 | 40 |
| Madelia | 6 | 67 |
| Mankato East | 4 | 50 |
| Mankato Loyola | 5 | 80 |
| Minnesota Valley Lutheran | 2 | 40 |
| New Ulm Cathedral | 8 | 139 |
| New Ulm Public | 11 | 297 |
| Prior Lake | 25 | 747 |
| School of Environmental Studies | 4 | 113 |
| Sibley East | 1 | 4 |
| Shakopee | 9 | 267 |
| Sleepy Eye Public | 4 | 39 |
| Sleepy Eye St. Mary's | 1 | 7 |
| Springfield | 4 | 83 |
| Tri-City United | 3 | 68 |
| Waseca | 3 | 20 |
| 22 River Watch Teams | 104 Sampling Events | 2,368 Students |
| River of Dreams Workshops | 10 | 645 Participants |
| Community River Walks | 8 | 50 Participants |
| Totals | 122 Learning Events | 3,063 Participants |

Appendix B: Newly Developed Educational Materials





| Program Level | Applicable Standards | Benchmark |
|---------------|----------------------|--|
| High School | 9E.4.2.2.1 | Apply place-based evidence, including those from Minnesota American Indian Tribes and communities and other cultures, to construct an explanation of how a warming climate impacts the hydrosphere, geosphere, biosphere, or atmosphere. |
| | 9C.2.1.1.1 | Analyze patterns in air or water quality data to make claims about the causes and severity of a problem and the necessity to remediate or to recommend a treatment process. |
| Middle School | 6E.3.2.1.3 | Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. |
| | 6E.3.1.1.3 | Develop a model, based on observational and experimental evidence, to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. |
| | 7L.3.2.1.1 | Construct an explanation based on evidence for how environmental and genetic factors influence the growth of organisms and/or populations. |
| Elementary | 1E.4.2.1.1 | Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. |
| | 4E.1.2.1.1 | Make observations and measurements to provide evidence of the effects of weathering or the rate of erosion by the forces of water, ice, wind, or vegetation. |

Appendix D: Project Workplan

520 Lafayette Road North St. Paul, MN 55155-4194

Friends of the Minnesota Valley Project Workplan

Doc Type: Contract

SWIFT Contract number: Purchase Order number: Agency Interest ID:191308 Activity ID:PRO20210001

Project title: Friends of the MN Valley River Watch

1. Project summary:

| Organization Contractor contact nam Titl Addres Phon Ema | n: Friends of the MN Va e: Thomas Crawford e: Project Coordinator s: 6601 Auto Club Rd e: (763)-656-9179 il: tom@friendsmnvalle | ulley Bloomington, MN 55 ey.org | 5438 | |
|---|--|--|---|------------------------------------|
| MPCA project manage Title Phone Emai | r: Kelly O'Hara e: Program Coordinator e: (651) 757-2226 jj: kelly.ohara@state.co | om | | |
| Project information Countie Start dat Total cos Full time equivalent Major watershed(s): | es: Blue Earth, Carver, C e: Nicollet, Renville, Sc st: 09/20/21End date:0 \$100,000.00 1.4 | Chippewa, Cottonwoo ott, Sibley, Swift, Was 16/30/2023 | d, Dakota, Hennepin, Lac qu eca, Watonwan, Yellow Medi | i Parle, Lyon, Martin, cine. |
| Chippewa RiverRedwood RiverMiddle MN River | ☑ Lac qui Parle ☑ Cottonwood River ☑ Lower MN River | ⊠ Pomme de Terre ⊠ Watonwan River | ⊠ Yellow Medicine River ⊠ Le Sueur River | ⊠ Hawk Creek ⊠ Blue Earth River |
| Organization Type Project type: | ☑ Non-profit☑ Education/Outreach/B | Engagement 🛛 Mon | itoring 🛛 Researd | ch |

Brief project summary

River Watch (RW) enhances watershed understanding and awareness for tomorrow's decision-makers through direct hands-on, field-based experiential watershed science. High School based teams throughout the Minnesota River Basin participate in a variety of unique and innovative watershed engagement opportunities such as Water Quality Monitoring and Macroinvertebrate surveys that are suited to their school, community, and watershed needs.

Goal of project

Provide classroom instruction and a hands-on learning experience on water quality and water quality monitoring to 16 high school based teams during the 2021-2022 school year and 20 high school based teams during the 2022-2023 school year. These students, tomorrows adult citizens and decision makers, will learn about water quality, science skills, and the importance of water quality.

2. Workplan Detail/Measurable Outcomes

OBJECTIVE 1:Develop and Implement Science, Technology, Engineering, and Mathematics (STEM) Curriculum for River Watch Team Water Quality and Macroinvertebrate Monitoring Programs. Curriculum to Include MPCA Water Quality and Macroinvertebrate Standard Operating Procedures.

Task 1: Implement STEM education into professional teacher development training in the 2022-2023 program year. Provide professional teacher development on Water Quality Monitoring and Macroinvertebrate Monitoring through oneon-one training sessions between teachers and FMV staff during fall of 2021. Regional summer or fall kick-off training in summer/fall of 2022.

- Measurable Outcome 1; Develop and secure a STEM curriculum suitable for training teachers of High School level, Middle School level, and Elementary School level education. Completed May 2022 (Elementary/Middle School) Completed December 2022 (High School)
- Measurable Outcome 2; 16 teachers trained. At least one teacher in each of 16 different teams will be engaged in and complete a River Watch Training session during late summer/early fall of 2021. Completed August 2022.
- Measurable Outcome 3: 20 teachers trained. At least one teacher in each of 20 different teams will be engaged in and complete a River Watch Training session during late summer/early fall of 2022. Completed May 2023

Task 2.Utilize STEM curriculum while engaging 16 River Watch Teams during the 2021-2022 school year in at least four monitoring events during the school year and engaging 20 River Watch Teams in at least four monitoring events per team during the 2022-2023 school year.

- Measurable Outcome 1; 16 teams will be recruited and will participate in four Water Quality and Macroinvertebrate monitoring events during 2021-2022. Completed June 1, 2022.
- Measurable Outcome 2; 20 teams will be recruited and will participate in four Water Quality and Macroinvertebrate monitoring events during 2022-2023. Completed June 1. 2023.
- Measurable Outcome 3; Water Quality monitoring data will be submitted to MPCA for each of the planned 64 monitoring events in 2021-2022. Completed November 2022.
- Measurable Outcome 4: Water Quality monitoring data will be submitted for each of the planned 80 monitoring events in 2022-2023. Data submittal will be completed using the EQuIS platform by 11/1/21, 11/1/22 and 6/30/23 respectively. Completed June 2023

OBJECTIVE 2: Development of Elementary/Middle School River Education Program

Task 1: Design and test implement an elementary and middle school component (possibly River of Dreams) that engages High School River Watch students in teaching younger students.

- Measurable Outcome 1; Identify and secure a curriculum suitable for use by High School team members teaching younger students. Completed January 1, 2022.
- Measurable Outcome 2; Create and share media from educational events via Rive Watch website and social media, these posts can include photo images, maps, and participant observations at least 1 time per month. In Progress January 2023.

Task 2: Secure participation and Implement Elementary and Middle School Program Component

- Measurable Outcome 1; During the 2021-2022 school year, test and implement the elementary/middle school program in at least 4 schools. Completed June 2022.
- Measurable Objective 2; During the 2022-2023 school year, implement the elementary/middle school program in at least 10 schools. Completed June 2023.

Objective 3: Project Oversight, Reporting, and Invoicing

Task 1: Track project grant-related expenditures. Compile and organize invoices, pay bills and submit for expense reimbursements in a timely manner.

• Grant-related expenditures tracked, bills paid, and expense reimbursements submitted quarterly at-minimum.

Task 2.Track objectives, tasks, and FTE to ensureoutcomes are being met. Prepare and complete reports and results from the program as follows:

- Interim report and initial evaluation to MPCA, Legislative and Education Committees by February 15, 2023.
- Final report of project outcomes, budget/FTE, and final evaluation results by June 15, 2023 to all entities who are receiving the February 15, 2023 report noted above.
- Annual site visit with MPCA project manager completed by Spring 2022 and Spring 2023.

3. Project Budget

| Staff total cost* | | \$68,000.00 |
|--|----------|---------------------------------------|
| | | \$70,021.25 \$69.958.75 |
| Travel reimbursement** | | \$4,000 |
| | | \$ 4,519.29 \$ 4,700,07 |
| Equipment, supplies, and shipping (see detailed list below) | | <u>\$4,700.07</u> |
| | | \$25,391.89 |
| | | \$25,273.61 |
| Meals*** | | \$500 |
| | | <u>\$67.57</u> |
| | Total. | \$100.000.00 |
| Estimated FTE: 1.4 (Final Report shall include actual FTE) | 10101. | 5100,000.00 |
| | | |
| * Staff rates shall not exceed the following: | | |
| Staff 1 rate: Project Coordinator | \$ 30.00 | |
| Staff 2 rate: Contracted Area School Monitoring Coordinator (4 staff) | \$ 25.00 | |
| Staff 3 rate: Contracted Project Fiscal and Accounting | \$ 25.00 | |

Mileage billed at current IRS Mileage Rate * Meals billed at current Commissioner's Plan Rate

| Equipment and Supplies List | | | | | | |
|---|--------------------|--------------|--|--|--|--|
| Equipment - limited to items greater than \$500 with a life expectancy greater than 1 year | Quantity needed | Unit Cost | Total Cost | | | |
| YSI Sonde Monitor with Probes | 2 | \$5,500 | <u>\$11,000</u> | | | |
| Supplies (Field and Safety) - items less than \$500 Consumable chemicals, replacement parts, shipping. | | | \$16,500 \$14,391.89 \$14,273.61 | | | |
| Total: | | - | \$27,500 \$25,391.89 \$25,273.61 | | | |

Buffer Compliance Progress

BOARD OF WATER AND SOIL RESOURCES

BUFFER COMPLIANCE ALL WATERCOURSES

Statewide

- 35 counties are fully compliant
- 52 counties have enforcement cases in progress at some level.
- Active enforcement cases in progress (WDs and Counties)
 - 424 Corrective Action Notices (CANs)
 - 77 Administrative Penalty Orders (APOs) active.
 - 2,459 of enforcement cases resolved.

7/27/2023

BWSR Enforcement

- ONLY counties that did not elect jurisdiction
- 103 parcels subject to enforcement
- 5 active Corrective Action Notices (CANs)
- 3 Administrative Penalty Orders (APOs) issued by BWSR that are still active.
- 95 resolved.

7/27/2023

Other Enforcement Considerations

- Compliance is always a best estimate based on local reporting and regularly fluctuates.
- The numbers presented only represent those parcels that have formal enforcement actions in process.
- Many SWCD's identify non-compliance and work with the landowners to resolve it voluntarily before initiating formal enforcement actions with Counties/Watershed Districts or BWSR.
- CRP expirations, renters change, incidental encroachment, parcels change ownership, weather related events, alfalfa rotates out of a field.

Questions Contact: Tom Gile Resource Conservation Section Manager <u>tom.gile@state.mn.us</u> 7/27/2023 May 26, 2023

TO: Thom Peterson, MDA Commissioner of Agriculture Peder Kjeseth, MDA Assistant Commissioner of Agriculture Brad Redlin, Program Manager, MDA Minnesota Agricultural Water Quality Certification Program (MAWQCP) MPCA Clean Water Council <u>Membership</u>

SUBJECT: Recommendations to the Minnesota Agricultural Water Quality Certification Program MAWQCP (v2.0)

Please find the following recommendations building upon MDAs current water quality program with expanded funding, policy, outreach, resource, and certification criteria. The recommendations ensures producers have assistance needed to implement truly sustainable practices which in turn provide measured water quality improvement outcomes across Minnesota. Measured water quality outcomes have not been regularly reviewed within the program, but estimated outcomes from the certification tool have. Actual water quality data, measurements, and results are monitored, reported, and published regularly by MDA as well as other state agencies (MPCA, BWSR, DNR, MDH). Collaboration for improved water quality outcomes and additional agency initiatives have changed since the program's inception 10 years ago. Connection into state agency initiatives for improved water quality, health, and climate outcomes should be integrated into, and be a result of, this program. As the funding vehicle, MPCAs Clean Water Council must recommend methods of ensuring that awards from the Clean Water Fund specify outcomes to be achieved as a result of the funding, and specify standards to hold the recipient accountable for achieving said outcomes.

Criteria: Currently, MDAs certification tool provides differing weights and scores for different farming and conservation practices. To ensure practices provide <u>measurable</u> <u>outcomes and ROI</u>, some practices should be removed, some carry less weight, and some garner more. 'Impact' = measurable reduction and removal of agricultural pollution from Minnesota water bodies, surface water, groundwater, and soils.

• **Per NRCS**: Conservation Practice Standards include <u>physical effects</u> of how the application of that practice will affect the resources (soil, water, air, plants, animals, energy, human) and the resource concerns associated with each... Tools should provide the best estimate of the effects, either positive or negative, of that practice on resource concerns. MDA needs to ensure actual improvements on the ground are due to new or changed practices implemented. § <u>Practices with Highest Impact</u>: Managed rotational grazing, agroforestry, silvopasture, no-till cover cropping with crimper/roller/mow termination, organic, perennial native plantings between fields or crop types, perennial pasture, land set aside for conservation via CRP, RIM, CREP, etc.

§ <u>Practices with Medium Impact</u>: Perennial cropping, no-till with chemical termination, cover cropping 3+ species.

§ <u>Practices with Low Impact</u>: Low-till (strip-till, ridge-till), cover cropping single species, more than one species on the same field in the same growing season.

§ <u>Practices to Omit</u>: Spreading more manure than prescriptive local or surrounding landscapes can hold - within watersheds or water bodies already impaired with E.coli, bacteria, etc., tiling, tillage, 'precision' agriculture, confined livestock operations, annual 2-crop (corn/soy) rotations.

- **Tracking Impact:** Require randomized annual soil and water testing for improvement outcomes of various implemented practices. Producer knows at application they may be chosen for random tracking during agreement term.
 - Delineate tracking by soil types, and practices implemented. Minimum of 3 results per year for sandy soils, clay soils, medium loam soils both in-field and edge of field during certification periods.
 - Soil types confirmed through NRCS Web Soil Survey (WSS): <u>Web Soil Survey (usda.gov)</u>
 - $\circ~$ Organic matter (OM) testing at enrollment, and at year 5.
 - Tile line testing where infrastructure currently exists.
 - Producer well testing for nitrate and pesticides in groundwater / drinking water during certification period.
 - Review all agricultural water pollution sources and data collected from MDA (and partner agencies) yearly with MAWQCP advisory board. Target priority need areas by setting a minimum # of practices implemented. Review results in following years.
 - Work towards water quality improvements within MPCA
 <u>Impaired Waters</u> list and other monitoring sources by focusing

on reported data regionally, by watershed, basin, water body, etc.

- DWSMAs: Prioritize outreach and implementation and develop a secondary certification for lands within protected areas. No provisions of 10 yr certification assurance.
- Compare per practice efficacy with U of MN plots testing the same practices producers are implementing. Review results and assess high, medium, low priority.
- **Funding:** Increase overall directed funding for the program consistent with the acreage needed to mitigate and build resiliency from climate change at the rate scientists recommend.
 - Prioritize high impact practices first (receives the greatest funding) and measurable outcomes (from agency statistics & reports) for a given biennium recommendation.
 - Provide motivating cost-share funding to assist producers in adopting the highest impact practices, per acre, when qualifying for certification. Consider perennial plantings receiving perennial payments as long as the producer stays in compliance for the term of the agreement.
 - Provide grants to certified producers based on practices added after certification is obtained. Graduated incentive % for highest impact practices implemented.
 - Consider providing additional grants when improvement metrics rise within their watershed or other agency-measured water quality metrics displaying overall reductions of agricultural pollutants. Producer has to continue the same practices for the term of the agreement.
- **Outreach:** Expand MDA's MAWQCP capacity (i.e. funding for staffing) to grow outreach efforts.
 - Provide referral stipends to farmers who assist other farmers in completing applications and are enrolled for 10 years in the program. Provide half of stipend at enrollment completion, half in 5 years.

- Advisory Committee: Members of the advisory board are farmers or ranchers who have obtained MN Ag Water Quality Certification.
 - Excludes agricultural, or agribusiness organizational representatives not themselves certified. If by the next renewal period to serve on the advisory board they are not certified, they yield their seat to an incoming advisory board member currently certified.
 - Exclude expired certified producers. Members must be currently certified while serving on the advisory board (active/in good standing).
 - Due to no current requirements, include a minimum of 1 advisory board seat for a Sustainable Agriculture or Environmental Sustainability non-profit member.
 - Provide transparency regarding governance, processes, and requirements for advisory board member choices.

We, along with individual stakeholder and organizational input from across Minnesota, support these recommendations to ensure a stronger MAWQCP for producers and ensure improved water quality outcomes for all Minnesotans.

Land Stewardship Project (LSP) Minnesota Center for Environmental Advocacy (MCEA) Just Food and Water MN Well Owners Organization (MNWOO) Roots Return Heritage Farm LLC

References:

<u>Minnesota Water Management Framework (state.mn.us)</u>, <u>Minnesota Agricultural Water Quality Certification Program | Minnesota</u> <u>Department of Agriculture (state.mn.us)</u>

<u>Sec. 17.9891 MN Statutes</u>, and <u>Agricultural Chemical Monitoring and Assessment | Minnesota Department of Agriculture</u> (state.mn.us), and <u>Vulnerable Groundwater Area Map | Minnesota Department of Agriculture (state.mn.us)</u>

Sec. 18B.045 MN Statutes, and Sec. 18B.10 MN Statutes

Clean Water Land and Legacy Amendment | Minnesota Department of Agriculture (state.mn.us), and Sec. 114D.30 MN Statutes

River and stream water quality | Minnesota Pollution Control Agency (state.mn.us), Watershed approach to water quality | Minnesota Pollution Control Agency (state.mn.us), Water quality initiatives | Minnesota Pollution Control Agency (state.mn.us)

<u>Stressors Candidate Causes (state.mn.us)</u>, <u>Agricultural Lands | MN Board of Water, Soil Resources (state.mn.us)</u>, <u>Drain Tiles and</u> <u>Groundwater Resources: Understanding the Relations (mgwa.org)</u>, <u>GW3_Final_HiRes.pdf (freshwater.org)</u>, <u>Watershed Health</u> <u>Assessment Framework | Minnesota DNR (state.mn.us)</u>

FY 2024/25 Biennial Budget: Climate Adaptation and Mitigation (state.mn.us)

2022 Clean Water Fund Performance Report - Report Card (state.mn.us)

Minnesota Agricultural Water Quality Certification Program

CWC Budget & Outcomes Committee Meeting

August 4, 2023

Program Overview:

- 1,365 certified producers
- 987,335 certified acres
- 2,663 new conservation improvements
 - Ex: WASCOBs, prescribed grazing, nutrient management, grass waterways, cover crops, etc.
- 413 Endorsements
 - 88 Integrated Pest Management Endorsements
 - o 65 Wildlife Endorsements
 - 116 Soil Health Endorsements
 - 140 Climate Smart Endorsements
 - o 4 Irrigation Water Management Endorsement (earned via UofM Ext. coursework)

Pollution Reduction Numbers:

- TSS reduction: 46,454 tons per year
- Sediment reduction: 137,301 tons per year
- Phosphorus reduction: 57,651 lbs per year
- GHG reduction: 50,167 metric tons per year

MAWQCP Farm Financials

- The average net farm income of MAWQCP certified farms is \$23,540 higher than non-certified farms.
- "Producers who achieve water quality certification have a management style that enhances profitability" (April 2023 report by Ag Centric and Minnesota State Agricultural Center of Excellence)

MAWQCP Participant Survey

How likely are you to recommend the Minnesota Ag Water Quality Certification Program to others?

Created with Datawrapper

Have you implemented additional conservation practices since becoming certified?

These practices do not include those required for certification.

Created with Datawrapper

Nearly **75% of producers** implemented additional conservation practices <u>after</u> earning certification

