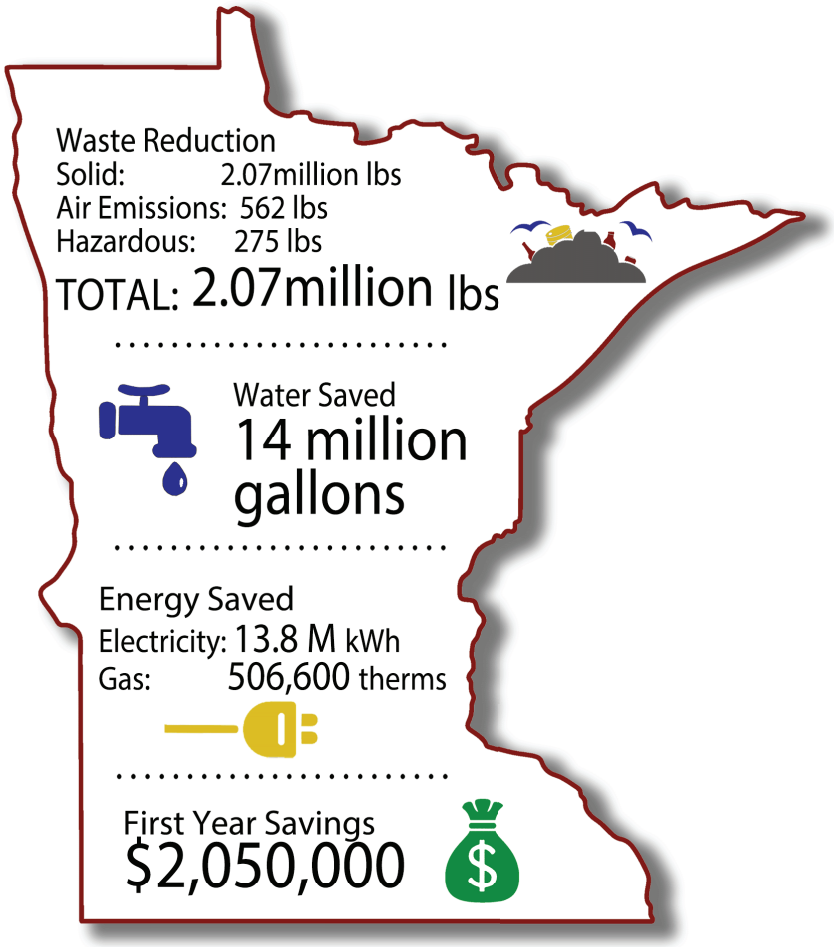
IMPACT

Minnesota Technical Assistance Program

2023 Annual Report



Strengthening Minnesota businesses by improving efficiency while saving money through energy, water, and waste reduction.

Minnesota Technical Assistance Program

University of Minnesota

MnTAP

Submitted to the Minnesota Pollution Control Agency
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About MnTAP

The Minnesota Technical Assistance Program (MnTAP) is an outreach and assistance program at the University of Minnesota, School of Public Health, Division of Environmental Health Sciences. MnTAP helps Minnesota businesses and organizations develop and implement tailored solutions that prevent pollution at the source, maximize efficient use of resources (including water and energy), reduce costs, and improve public health and the environment.

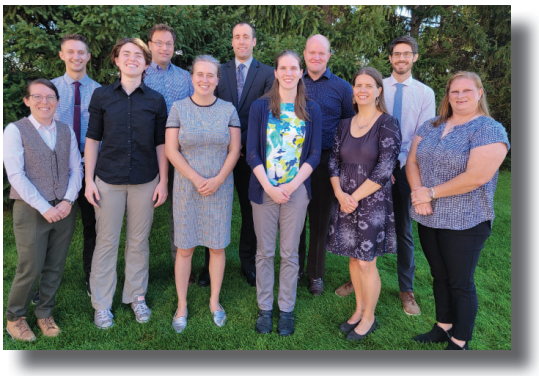
Realizing a need for waste reduction and pollution prevention assistance, the Minnesota legislature amended the Waste Management Act in 1984 to "provide for the establishment of technical and research assistance for generators of hazardous and industrial waste in the state." In 1990, the Minnesota legislature enacted the Minnesota Toxic Pollution Prevention Act, which directed the Minnesota Office of Waste Management to "establish a pollution prevention assistance program" for all persons in the state using, generating, or releasing toxic pollutants, hazardous substances or hazardous wastes. Today, the Minnesota Pollution Control Agency (MPCA) supports this assistance by funding the University of Minnesota School of Public Health to support MnTAP efforts across the state. MnTAP has leveraged this funding to win additional competitive grant funding totaling 60% of the FY2023 budget.

Pollution prevention technical assistance is customized for businesses through site visits, student internships, the Minnesota Materials Exchange, workshops and website resources. Since MnTAP's inception in 1984, staff members have

- conducted over 5,228 site visits at facilities throughout the state.
- provided solutions to save businesses $59.7 million in first year savings through avoided costs.
- helped businesses avoid regulatory burdens and reduce their environmental impact.

Savings resulting from MnTAP assistance can be reinvested by businesses for improvements, expansions and new jobs while supporting local economies, preserving Minnesota's natural resources and promoting regional public health.

MnTAP Staff Members



Front: Kelsey Klucas, Gabrielle Martin, Kira Peterson*, Laura Sevcik, Jane Paulson, Alaina Ryberg

Back: Logan Wikstrom, Jon Vanyo, Kevin Philpy, Jon Schroeder, Matt Domski

Not shown: Laura Babcock*, Ashwin Nambudiripad †, Jocelyn Leung †

Kelsey Klucas
Director

Laura Babcock, PhD*
Director (retired)

Matt Domski
Intern Program Manager

Jocelyn Leung†
Communications Specialist

Gabrielle Martin, CEM, CWEP
Engineer

Ashwin Nambudiripad†
Associate Engineer

Jane Paulson, CEM
Senior Engineer

Kira Peterson, PE, CEM*
Engineer

Kevin Philpy, PE
Senior Engineer

Alaina Ryberg
Website and Data Manager

Jon Schroeder, LEED AP Sustainable
Materials Management Specialist

Laura Sevcik, CWEP
Engineer

Jon Vanyo, CEM
Senior Engineer

Logan Wikstrom, LEED Green Associate, GRI
Associate Engineer

*Left MnTAP: Laura Babcock (2023) and Kira Peterson (2024)

† Joined MnTAP in 2024: Ashwin Nambudiripad, Jocelyn Leung

SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF MINNESOTA

Technical Assistance Delivered Across Minnesota

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Director's Note

This year marked the end of an era with the retirement of Laura Babcock. Laura served as MnTAP Director for 12 years and put her stamp on the program with her deep technical knowledge and passion for helping Minnesota businesses. During Laura's tenure, MnTAP provided technical assistance over 2,700 companies and implemented over $12 million in first year savings. Laura worked tirelessly, and seemingly omnisciently, to position MnTAP to provide Minnesota businesses with the most relevant and needed technical assistance. We thank Laura for her many years of leadership and look forward to continuing the strong standard of work she established for the organization.

2023 Outputs and Outcomes

- Served 442 organizations, 59 located in areas with environmental justice concerns
- Conducted 75 site visits at 57 unique facilities
- Recorded 53 implemented recommendations at 29 facilities
- Realized reductions of
    - 2.07 million pounds of waste
    - 14 million gallons of water
    - 13.8 million kWh and 506,600 therms of energy
    - $2.05 million dollars in first year business cost savings

Highlights of MnTAP's efforts in 2023

- MnTAP provided energy efficiency cohort training to wastewater operators across the state of Minnesota. In 2023, 4 cohorts comprised of 18 operators were trained to optimize operations at their facilities. 19 recommendations were implemented with an energy savings of $82,400.
- MnTAP completed metal fabrication and finishing industry technical assistance. A webinar to share common findings and P2 best practices was presented to industry. There were 39 attendees. Through the duration of the project, 12 facilities received recommendations with potential to reduce 124,500 lbs hazardous waste and save 950,000/yr.
- MnTAP with MPCA and Minnesota Rural Water Association (MRWA) launched an Environment and Natural Resources Trust Fund (ENRTF) supported project to train operations staff at 200 wastewater pond systems to optimize nutrient reduction. Over 200 facilities were assessed through 2023. Work continues through June 2024 on assessments and implementation support.

This report shares stories about the value found in the wide-ranging projects supported in 2023. The organizations engaged in these projects are becoming more resilient by reducing waste, optimizing processes and saving money while helping to sustain Minnesota's environment. We thank our clients, partners and sponsors for the collaborations during 2023, and we look forward to serving YOUR business in 2024.

Kelsey Klucas, Director, Minnesota Technical Assistance Program

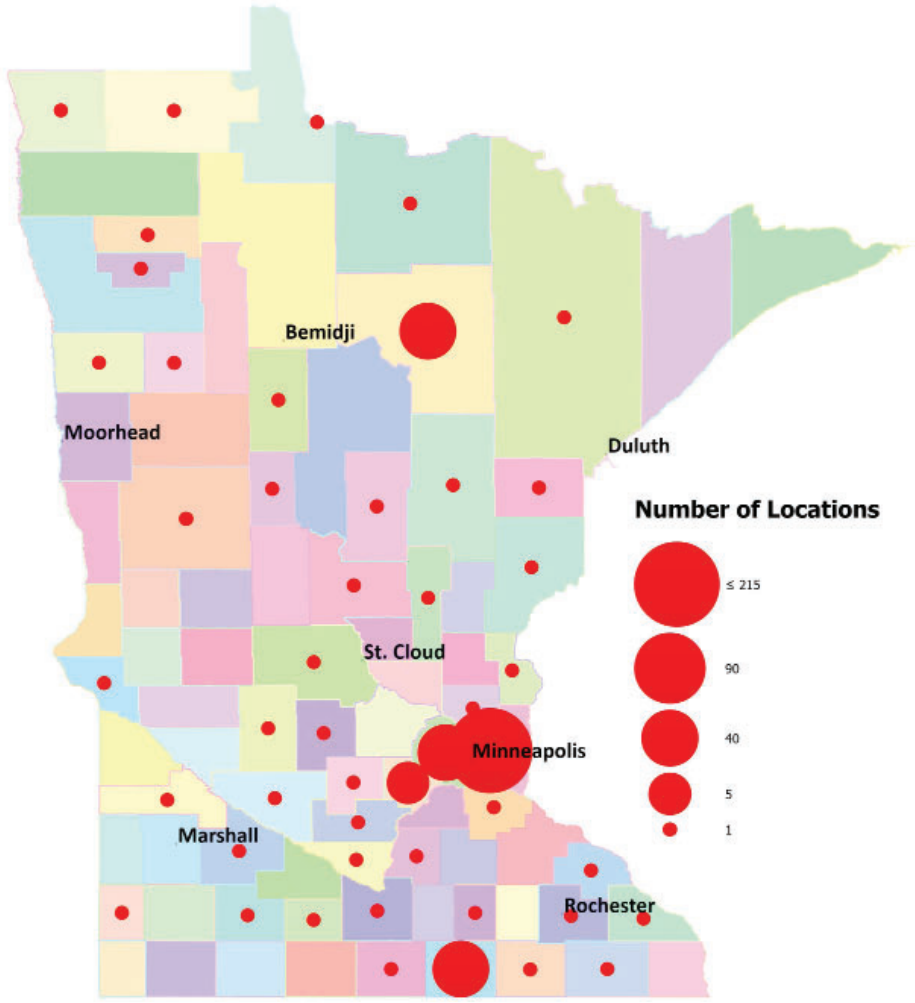
Helping MPCA's Long Term Goals

The Minnesota Pollution Control Agency (MPCA) is an important partner of MnTAP. Through the funds provided through their generous operating grant, MnTAP is able to help MPCA achieve many of their long-term goals for the state through pollution prevention technical assistance.

- **Water** - Pollution to Minnesota surface waters and groundwater is reduced or prevented.
- **Land** - Solid waste is managed to conserve materials, resources, and energy.
- **Air** - Reduce Minnesota's contribution to global concentrations of greenhouse gases.

MnTAP Contributes to Minnesota's Economic Well-Being

MnTAP Impacts 2018–2023		
Number of Companies Assisted		1,513
Water Reduction (gal)	Recommended	202,000,000
	Implemented	119,000,000
Electric Energy Reduction (kWh)	Recommended	38,000,000
	Implemented	37,000,000
Waste Reduction (lbs)	Recommended	11,100,000
	Implemented	8,300,000
Gas Energy Reduction (therms)	Recommended	1,100,000
	Implemented	780,000
Cost Savings	Recommended	$8,500,000
	Implemented	$6,600,000



Executive Summary

2023 Outputs			
Technical Assistance Activity	2021 Results	2022 Results	2023 Results
Contacts (calls/emails/meetings)	1,146	1,162	1,154
Requests for Assistance	73	68	57
Total Staff Site Visits (unique facilities)	61 (48)	104 (77)	75 (57)
Student Interns	14	16	17
Events and Presentations	43	56	48

2023 Outcomes								
Activity	Waste			Energy		Water	Savings	
	Air Emissions (lbs)	Hazardous Waste (lbs)	Non-Hazardous/ Solid Waste (lbs)	Electric (kWh)	Fuel (therms)	(Gallons)	($)	
Site Visits	560	275	2,016,000	1,340,000	1,600	3,540,000	$141,900	
Interns	0	0	54,000	12,440,000	505,000	10,430,000	$1,900,000	
Materials Exchange	0	0	21,300	-	-	-	-	
TOTALS	2,071,000			13,800,000	506,600	13,970,000	$2,047,000	

On-Site Assessment

2023 Outputs

75 on-site visits

57 unique facilities

57 requests for assistance

442 unique org interactions

2023 Outcomes

2.07 million lbs waste

14 million gal water

13.8 million kWh

506,600 therms of fuel

$2.05 million annual savings

What they said...

"2023 brought a lot of change to MnTAP with new leadership and new projects getting underway. Through it all, the staff diligently worked to help Minnesota's manufacturers successfully identify and implement pollution prevention solutions that help protect Minnesota's environment."

– Mark Snyder,
Pollution Prevention Lead, MPCA

2023 Goals

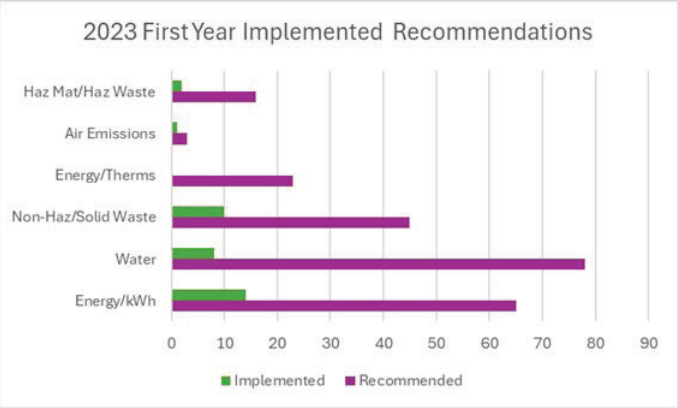
Conduct 125 site visits at 75 different facilities to identify opportunities for companies to prevent waste and pollution as well as conserve resources including water and energy. Support Minnesota businesses by responding to questions on waste generation and resource utilization.

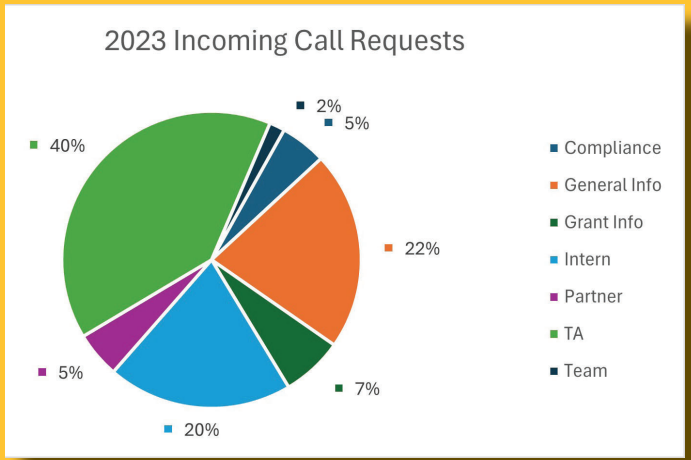
2023 Accomplishments

Site visit activities remained in demand in 2023 as MnTAP staffing levels stabilized and companies were increasingly open to technical assistance activities. Businesses continue to be challenged with staff turnover. However, MnTAP has received technical assistance requests from both new and long-tenured contacts highlighting the mix of opportunities and challenges that come along with staffing changes within organizations. MnTAP has continued to provide a mix of focused site assessments and general assessments. This has allowed technical assistance to be targeted for the needs of the organization which has been generally well received.

MnTAP staff members were able to interact with 442 unique organizations via phone, email, virtual or in person meetings and site visits. Of these sites, 59 were located in areas defined as having environmental justice concerns by the MPCA.

MnTAP staff made 230 recommendations with a value of $4.9 million for resource conservation at Minnesota businesses in 2023 from all onsite services. Of the recommendations made during 2023 engagements, 35 (15%) have been implemented.





Project Success: MnTAP a Resource for Minnesota

MnTAP received 57 unsolicited requests for assistance in 2023. While the distribution of questions varies by year, a little under half the requests received were for technical assistance. About a quarter were for general information about MnTAP programs, activities or resources. Requests for assistance in applying for pollution prevention loans or grant applications and requests for information on compliance issues rounded out the incoming requests for assistance from MnTAP clients.

On-Site Assistance: Intern Program

2023 Outputs

17 intern projects

24 company applications processed

54 student applications

What they said...

"Working with Daniel and the MnTAP program was a great success. The real solutions and data we gained through this are valuable and will help the Cemstone Companies move closer to achieving our sustainability goals. Daniel showed that he is a very quick learner and was able to work with a variety of people to achieve all he was asked to do. It was a great experience partnering with MnTAP, and we would encourage other companies to look into it."

–Alex Olin, Environmental, Facilities, and Engineering Manager, Cemstone

Funding Partners

Minnesota Pollution Control Agency

Metropolitan Council Environmental Services

US EPA, Region 5

Xcel Energy

Environment and Natural Resources Trust Fund

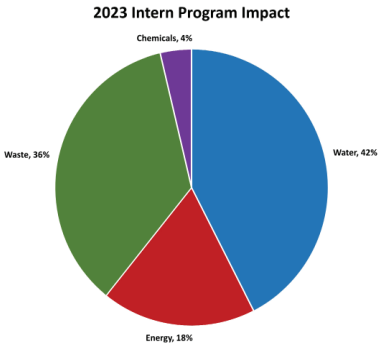
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

2023 Goals

Place student interns with businesses to identify and implement pollution prevention, water conservation and energy efficiency solutions.

2023 Accomplishments

MnTAP interns come from a variety of disciplines. Our 2023 interns studied chemical, mechanical, bioproducts and biosystems, industrial and systems, civil, and environmental engineering as well as physics and chemistry. Most interns attended the University of Minnesota, with nine coming from the Twin Cities campus and two coming from the Duluth campus. Two students attended the University of St. Thomas, and one student came from each of the following higher education institutions: Michigan State University, the University of Wisconsin – La Crosse, and the University of Wisconsin – Madison. This summer's projects focused on water conservation, energy efficiency, waste reduction and alternative chemical use.



Read more about MnTAP's intern projects in our annual program summary, Solutions: www.mntap.umn.edu/resources/solutions.html

2023 Outcomes - Intern Program Implementation*

Project Year(s)	Waste (lbs)			Energy		Water (gallons)	Savings
	Air Emissions (lb)	Hazardous Waste (lb)	Non-Haz/ Solid Waste (lb)	Electricity (kWh)	Gas (therms)		
2019	400	51,000	235,000	5.3 million	55,000	26 million	$1,030,000
2020	--	121,250	738,900	1.1 million	23,400	7.9 million	$1,100,000
2021	--	2,100	153,000	9.7 million	67,200	38.2 million	$941,000
2022	0	5,200	216,700	2.5 million	136,100	8.3 million	$515,000
2023	0	0	54,000	12.4 million	505,000	10.4 million	$1,905,000

*Implementation identified in target year from any program year.

Highlight: A Summer Spent as a MnTAP Intern

"My summer with MnTAP and All Flex Solutions was an informative and exciting introduction to the industrial sector. I was impressed by All Flex's openness to new solutions, and it was inspiring to witness my ideas manifest into tangible change. Through this program I learned to approach engineering with a more creative and holistic perspective, and I also developed numerous technical skills. I am incredibly grateful to have had this opportunity. Thank you again to All Flex and MnTAP!"

~ Nile Timmerman, All Flex

General Outreach & Communications

2023 Outputs

8 Source newsletters

4 P2 Week mini-webinars

2022 Impact

2023 Solutions

48 presentations, booths and training events

2023 Outcomes

4,830 Source newsletter subscribers

21,507 new website users

49,241 website page views

2023 Goals

Develop and disseminate technical information for Minnesota businesses to help them implement pollution prevention and energy efficiency practices and technologies. Promote MnTAP services and results through publications and presentations.

2023 Accomplishments

Communication methods included electronic newsletters, targeted email campaigns, project-specific printed materials and webinars. Highlights include:

- Our analysis of MnTAP email and website traffic revealed the following trends:
  - The MnTAP Intern Symposium showed the highest web user engagement
  - P2 week webinars had high click through rates from the sent emails
  - The MnTAP Healthcare pages continue to draw users to waste and sustainability topics
- Completed the third series of P2 Week Mini-Webinars to highlight pollution prevention and other source reduction projects. http://www.mntap.umn.edu/resources/publications/p2/
- Revamped LinkedIn presence and started an Instagram account.

Minnesota Materials Exchange

2023 Outputs

17 published newsletters

228 newsletter subscribers

177 listings from 18 organizations

330 successful exchanges

2023 Outcomes

21,300 lbs of material claimed for reuse

2023 Goals

Facilitate an online business reuse network to encourage Minnesota businesses to exchange unwanted, reusable items with other businesses and, thus, reduce the amount of solid waste being sent to landfills: www.mnexchange.org.

2023 Accomplishments

The Minnesota Materials Exchange (MME) is a website that links organizations with reusable goods they no longer need to others who can use them. This no-cost reuse network helps prevent usable materials from becoming waste and saves users money. www.mnexchange.org

MnTAP focused on expanding the reach of MME. This resulted in:

- Doubling the frequency of MME articles to share available items on a timely basis
- Increased number of exchanges by over 100 times
- Increased large scale waste reduction opportunities with organizations exiting their premises.

From January through the end of December, 330 exchanges were recorded. These exchanges resulted in 21,300 lbs. of reusable material rescued from becoming waste. Items exchanged ranged from office equipment and supplies to kitchen wares, furniture, scientific/laboratory equipment, lockers, and electronic devices.

Grant-Funded Project List

2023 Goals

Target technical assistance services to new business sectors and clients while leveraging state investment to attract additional resources for focused projects.

Project & Funding Source	Highlighted Activities	Page
Metro Area Industrial Water Conservation *Metropolitan Council Environmental Services Water Supply Planning Unit*	This project seeks to improve the efficiency of water use in industries throughout the Twin Cities area. This work is accomplished by MnTAP Interns.	10
TCE Alternatives Project *Supplemental Environmental Project (SEP)*	The TCE Alternatives Project wrapped up in 2023 with funding through a supplemental environmental project (SEP). The focus was on helping Minnesota businesses replace trichloroethylene (TCE) with safer, effective alternatives while avoiding regrettable substitutions.	11
Pollution Prevention in the Metal Fabrication Industry *MPCA – Resource Management and Assistance Division, U.S. EPA Region 5*	This project wrapped up in 2023. The project utilized informational interviews with industry stakeholders to define critical P2 and sustainability targets in the metal fabrication industry. Best practices were shared through presentations and a webinar, and site assessments supported implementation of these best practices.	12
WWTP Cohort Energy Efficiency Training *MN Department of Commerce, Division of Energy Resources*	This project implements a cohort-based energy efficiency training program targeting no and low-cost opportunities available at municipal, mechanical wastewater treatment facilities.	13
Industrial Water Conservation in Greater Minnesota *Legislative-Citizen Commission on Minnesota Resources (LCCMR)*	This project supports water efficiency training and technical assistance outreach to businesses in communities experiencing water stress.	14
Wastewater Pond Nutrient Optimization, Implementation *MPCA with funding from the Environment and Natural Resources Trust Fund (ENRTF)*	This project shares operational strategies found to improve nutrient removal with at least 165 pond systems in communities with <5,000 population. Work will also promote a competitive grant funding opportunity targeting repair of broken wastewater pond infrastructure.	15
PFAS P2 Best Management Practices (BMP) Options and Opportunities *MPCA – Resource Management and Assistance Division, U.S. EPA Region 5*	Define P2 strategies for PFAS within Minnesota industries to prevent PFAS pollution and limit PFAS exposure from packaged food. The focus is to share source reduction strategies and support businesses as they seek to reduce or eliminate PFAS.	16
P2 BMPs for Minnesota Food Industry *MPCA – Resource Management and Assistance Division, U.S. EPA Region 5*	Provide technical assistance for food processing industries to reduce hazardous material use and optimize wastewater quality while conserving water and energy use to reduce industry environmental impacts and maintain strong businesses within the state.	17

Metro Area Industrial Water Conservation

2023 Outputs

7 metro-area intern projects

39 proposed recommendations

29.7 million gal of proposed water savings

$760,000 recommended savings opportunities

2023 Outcomes*

11 implemented recommendations

9.44 million gal of implemented water savings

$791,000total implemented savings

**Implemented 2023 from all recommendation years*

Sponsors

Metropolitan Council Environmental Services Water Supply Planning Unit

Project Overview

MnTAP's strategic emphasis on water conservation and efficiency assistance in the Twin Cities Metro continued in 2023 with support and direction from the Metropolitan Council Environmental Services (MCES) Water Supply Planning Unit. 2023 marks the beginning of another three-year grant period to support 15 additional intern projects through 2025.

Cumulative Results

2023 marks the 11th anniversary of the partnership between MnTAP and MCES in supporting MnTAP interns working with industrial facilities to identify and launch implementation of water efficiency projects.

Since 2013, project outputs include:

- 44 MnTAP facilitated intern projects in the greater metro area
- 292 actions with 447 million gallons of annual water conservation potential
- 119 (43%) implemented recommendations to date
- 167 (37%) million gallons saved annual from implemented water conservation recommendations
- $2.5 million annually in cost avoidance associated with water use

2023 Activities

Water conservation recommendation potential for the seven metro interns assigned to sites in 2023 totaled 29.7 million gallons of water and carried a cost savings opportunity of $760,000 from 39 recommended actions. By the end of the year, 11 recommendations from the Intern Program had been implemented, saving 9.44 million gallons of water and $791,000 per year.

Water efficiency projects often carry co-benefits in reducing energy use when implemented because water is often heated and conditioned prior to process use. Recommendations made by the 2023 interns included over 50,800 therms of natural gas energy reduction when fully implemented. While the cost of water is generally low, the cost savings from additional chemical or energy reduction associated with water efficiency can help economically justify project investment that may be needed for implementation.

Project Success: Saving Water Water by Optimizing Equipment

St. Paul Beverage Solutions, formerly Schroeder Milk Company before being purchased by Dairy Farmers of America (DFA) in 2019, has been operating for 139 years. Keeping process lines clean is of paramount importance for food and beverage manufacturers and often uses large volumes of water to achieve this goal. Zach Bahrke, a mechanical engineering student from Univeresity of St. Thomas, was up for the challenge of rethinking how water was used and where it could be optimized within the facility. His task for the summer was to understand how all the facility's water was being used and then optimize that usage. In so doing, he proposed the following recommendations:

- Automate Bottle Washers and Install Flow Orifices.
- Utilize Existing Ammonia Chiller to Chill Aseptic Liquefier.
- Decrease Post-Rinse/Intermediate Rinse Times for CIP Systems.
- Decrease Pre-Rinse Times for CIP Systems.

"The insights and initiatives worked on and proposed by Zach during his internship have been invaluable, paving the way for significant operational improvements and sustainability measures."

~ Travise Beaton, Senior. Manager, Maintenance and Engineering, St. Paul Beverage Solutions

TCE Alternatives Project

Project Outputs

126 companies contacted

11 companies engaged

7 assessments completed

7 articles

8 mini webinars

2 presentations

Project Outcomes

9 sites completed transition

83,000 lbs TCE reduced

Project Partners

TURI (Toxics Use Reduction Institute), U Mass Lowell

Sponsors

U.S. EPA, Region 5

Minnesota Pollution Control Agency

Water Gremlin Supplemental Environmental Project (SEP)

Project Overview

Trichloroethylene (TCE) is a hazardous air pollutant (HAP) that can contaminate soil, air, and water. TCE is a known human carcinogen that can affect the liver, kidneys, the immune system, the reproductive system, fetal development, and the central nervous system. On June 1, 2022, Minnesota implemented a first-in-the-nation ban on TCE use for all businesses requiring an air permit, and on October 23, 2023, the EPA announced a proposal to ban all uses. MnTAP is committed to helping businesses adjust to this change, and similar regulatory requirements, by finding long- term safer solutions through testing and technical assistance.

MnTAP received an EPA Region 5 Pollution Prevention Grant with MPCA to provide technical assistance for Minnesotan businesses looking to eliminate TCE from their facilities in 2018, and this was expanded with additional funding from a TCE-focused Supplemental Environment Project (SEP). The goal of the TCE Alternatives project was to decrease air emissions of TCE by working with Minnesotan industries to replace TCE with safer, effective options while working to avoid regrettable substitutions such as n-propyl bromide (nPB) and trans-1,2-dichloroethylene (tDCE). Formal outreach on the TCE alternatives project closed at the end of June 2023.

Overall Project Activities

Over the course of the project, MnTAP has reached out to businesses across Minnesota that may have been using TCE with training, testing, and technical assistance to help identify safer alternatives for process use.

- 126 facilities received outreach from MnTAP to connect with the program.
- 34 people from 6 facilities participated in training on the hazards of TCE and how to select safer alternatives.
- 8 facilities received safer cleaning alternative assessments for TCE-based processes.
- 11 facilities had site-based assessments of their TCE use.
- 83,000 lbs of TCE use were transitioned to alternatives by companies interacting with MnTAP.
- 29,600 lbs of TCE were replaced with verified lower hazard alternatives.

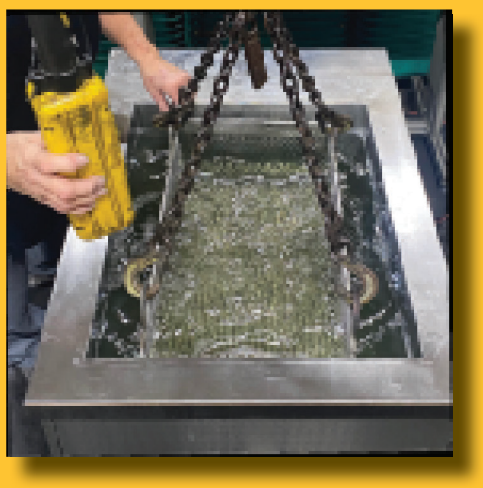
MnTAP will continue to provide technical assistance to any site seeking to find safer alternatives to TCE or regrettable substitutions for TCE such as tDCE or nPB.

Aqueous Cleaning: A Toolkit for Resilient Business

Over the past 5 years of working with facilities to help identify and implement safer alternatives to TCE, we discovered our business community has a need for an independent perspective on mitigating the risks associated with cleaning solvents and degreasers, and clearer information about alternatives. MnTAP has developed a toolkit as a resource to define the benefits and considerations of switching to safer alternatives for cleaning applications. Major topics in this toolkit include the following:

1. Mitigating the Business Risks of Hazardous Cleaners
2. Conversion Costs and Benefits
3. The Nuts & Bolts of Converting to Aqueous

The toolkit will provide guides, videos, and downloadable content for businesses and technical assistance providers. The toolkit became available on the MnTAP website in June 2023.



Pollution Prevention in the Metal Fabrication Industry

Project Outputs

18 industry interviews

12 site assessments

1 white paper

4 promotional resources generated

2 public presentations

1 webinar presented

Project Outcomes

913 lbs water pollution avoided

125,000 kWh of energy savings

6,550 gal of water savings

$96,300 of cost savings

Project Partners

Minnesota Precision Manufacturing Association

Sponsors

U.S. EPA Region 5

Minnesota Pollution Control Agency

Project Overview

This project seeks to identify pollution prevention priorities for the metal fabrication and metal finishing industries through informational interviews with practitioners, vendors, and other industry stakeholders. Site assessments support implementation of best practices and identify additional improvement opportunities. Follow-up activities increase motivation to implement recommendations, confirm actions and develop case studies to share key outcomes that can be replicated elsewhere.

2023 Activities

MnTAP developed and delivered a webinar to share the cumulative findings and best practices identified during the project in April 2023. There were 39 attendees at the webinar. The webinar covered metal fabrication and finishing best practices and highlighted some of the most common P2 opportunities that were identified over the course of the project. Industry members showed interest in material and cost savings opportunities available through P2 practices. The MnTAP pollution prevention recommendations made during this project yielded cost savings opportunities for long established best practices that the industry had not fully appreciated.

MnTAP also hosted two 2023 summer intern projects at metal finishing facilities. These projects focused on water conservation, which was a large area of opportunity identified during the project.

Key Learnings

- Businesses are aware of common P2 best practices but need to be reminded of the value.
- Industry has a long memory for solutions that performed poorly. This is not only a challenge to overcome for present day implementations, but an important item to consider as recommendations' performance influence future P2 work.
- P2 providers must share the full cost savings potential of P2 implementation.
    - Water conservation impacts water and energy cost savings.
    - Dragout reduction impacts chemical and wastewater cost savings.
- Checklists can be helpful to walkthrough standardized processes with businesses.

Project Success: Water, Water Everywhere!

Metal finishing is a water intensive industry. With many shops' setups including dozens of baths, best practices have an opportunity to be multiplied across the shop floor. Avtec Finishing Systems, Inc. is a metal finishing company under The Lindgren Group, which has water conservation on their mind. Lucas Clark Burnette, a master's student in Civil & Env Engineering at the University of Minnesota, set out to find them opportunities. Lucas mapped all the water usage within the facility and developed a novel tank cover design as part of his recommendation for reducing water lost both to evaporation and dragout. His proposed recommendations provided Avtec with an opportunity to save over 4 million gallons of water annually.

- Conductivity-Based Rinse Control – It was recommended that water for rinse tanks be regulated using conductivity sensors to indicate contamination levels rather than manual controls. The addition of conductivity controls has the potential to conserve 3.34 million GPY of water, 11,900 lbs of waste, and save $45,200 annually.
- Install tank covers/drain boards - This project recommended installing hinged sheets of PVC affixed to tanks to serve as hurdles and covers in the open and closed positions to assist with reducing dragout and evaporation. This solution has the potential to conserve 1.04 million gallons of water, reduce 3,850 lbs of waste, and $15,500 annually.

Wastewater Cohort Energy Efficiency Training Program

2023 Outputs

4 WWTP training cohorts completed

18 operators trained

1 site assessment performed

3 presentations

19 recommendations

2023 Outcomes

985,200 kWh conserved

$82,400 saved

Sponsors

Minnesota Department of Commerce, Division of Energy Resources

What they said...

When asked about useful aspects of the course going forward:

"...I feel I have a pretty good grasp of where we use energy and whether or not we can do anything about it."

"...learning what to look for as we get into our plant upgrade."

"...being able to see potential savings."

~ *Cohort participants*

Project Overview

MnTAP is using a previously developed cohort training curriculum to offer operator training focused on identifying and implementing low and no cost improvements that reduce energy consumption at WWTPs, without sacrificing plant effectiveness at meeting discharge limits. The target audience for this training program are lead wastewater treatment plant operators at municipal mechanical treatment WWTPs that are processing up to 10 MGD. Operators receive 16 direct wastewater contact hours by completing this MPCA accredited course. Each training consists of a cohort of participants from regionally located WWTPs attending all four modules and two conference calls. By the end of this project, MnTAP plans to complete a total of 11 training cohorts, each containing operators from 2 to 5 wastewater treatment plants.

2023 Activities

- Contacted 49 local government staff with invitations to join cohorts
- Completed a total of 16 cohort trainings for a total of 18 wastewater operators from 10 different treatment plants

Recommendations

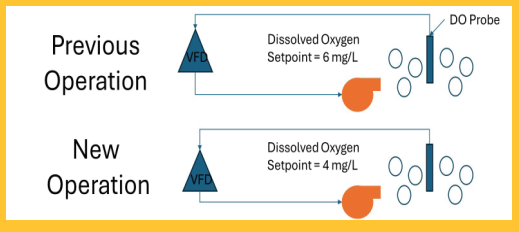
During 2023, there were 19 recommendations for energy efficiency identified across 10 participating wastewater treatment facilities. These recommendations resulted in the following energy opportunities below. Implementation of the recommendations is in progress and follow-ups with facilities will provide any needed technical support.

Program Year	Identified (kWh)	Identified Cost Savings ($)	Implemented (kWh)	Implemented Cost Savings ($)
2023	1,958,000	$139,300	985,200	$82,400
All Years	7,308,200	$570,450	3,480,000	$270,400

Several common recommendations have been identified as opportunities for energy use reduction at facilities participating in the training program. The first is to reduce aeration operations to match system requirements. Over-aeration does not improve treatment and uses a lot of energy. The second is to reduce mixing to match system requirements. For wastewater facilities looking for energy savings, optimizing these two areas is a great place to start.

Project Success: Process Improvements in New Ulm

The New Ulm wastewater plant activated sludge process uses centrifugal blowers controlled by a VFD to provide sufficient air to meet a setpoint set by the operators. The operators from New Ulm adjusted their dissolved oxygen setpoint from 6 mg/L to 4 mg/L and so far, have not observed any negative process impacts. This has resulted in the average power consumption of the blowers decreasing by 90,000 kWh/yr of energy for an estimated savings of $8,000 per year!



Industrial Water Conservation in Greater Minnesota

2023 Outputs

2 intern projects

2 new organizations engaged

6 site assessments

2 educational workshops

1 webinar

2023 Outcomes

3.5 million gal of water savings

$24,300 of cost savings

Project Partner

Minnesota Rural Water Association (MRWA)

Sponsor

Legislative-Citizen Commission on Minnesota Resources

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

Project Overview

The primary goal of this project is to identify and engage MN communities with water supply and/or water quality challenges. MnTAP, in collaboration with MRWA, is offering water conservation training, outreach and assessments to engage Minnesota communities with water supply and/or water quality challenges. These services will be focused on identifying and implementing actionable industrial water conservation and efficiency measures. Eligible participants include towns, cities and other local government units, as well as businesses with high water consumption.

2023 Activities

Conduct water efficiency assessments at businesses:

- Conducted 6 site assessments to identify water savings opportunities or scope intern projects
- Held 2 intern projects
- Proposed 48,187,200 gal/yr water reduction with potential savings of $639,900/yr (this includes cost savings from energy, hazardous waste, and chemical reductions)
- Implemented 3,543,750 gal/yr water reduction and $24,300 savings

Share water efficiency strategies in workshops:

- Presented two water efficiency trainings

Share results broadly to promote project activities and support replication at other sites:

- Published two intern executive summaries – one for the Grede - Saint Cloud project and one for the All Flex Solutions project.
- Presented intern project results at MnTAP's Intern Symposium
- Hosted webinar covering common water reduction strategies and highlighting the Grede - Saint Cloud intern project

Project Success: Grede - Saint Cloud Tackles Water Conservation

Grede - Saint Cloud specializes in ferrous metal including gray iron, ductile iron, and steel castings and consumed approximately 39 million gallons of water each year. Single pass cooling their core machine and impactor was identified as an opportunity for water conservation. intern recommended installing air-cooling units on these processes which were estimated reduce approximately 2.9 million gallons of water and save $23,000 per year. Overall, Henry Vo, the MnTAP intern identified over 25 million gallons of water conservation opportunity onsite.

Some other recommendations included:

- Turn off core machine on non-production days
- Reuse water from south sand chiller in sand room
- Install additional air-cooled heat exchangers for cooling

"This internship has given me a better understanding of the industry, a foundation and confidence for my future career."

~ Henry Vo, 2023 MnTAP Intern

Wastewater Pond Nutrient Optimization Implementation

2023 Outputs

102 communities engaged

94 site assessments

1 presentation

2023 Outcomes

650 lbs/yr phosphorus

11 sites newly implemented method in 2023

21 previously implemented operational method

2 Sites no longer chemically treating for phosphorus

Project Partners

Minnesota Rural Water Association (MRWA)

Minnesota Pollution Control Agency (MPCA)

Sponsor

Legislative-Citizen Commission on Minnesota Resources

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

Project Background

Previous work identified a new operational strategy called the Steady State Primary Method (SSPM) that wastewater pond operators can use to achieve better treatment for nitrogen and phosphorus. The purpose of this project is to share that strategy and other best practices with 200 wastewater pond site operators through one-on-one site assessments to encourage implementation to achieve cleaner water across Minnesota.

Project Goals

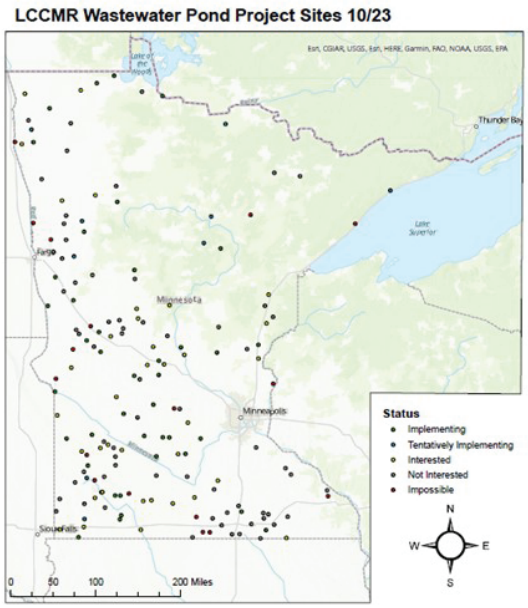
- Assess 60-80 wastewater ponds with city population less than 1,000
- Assess 50-60 wastewater ponds with city population 1,000-3,000
- Assess 55-60 wastewater ponds with city population 3,000-5,000
- Quantify success using Discharge Monitoring Report (DMR) data
- Assist MPCA by gathering applications for transfer structure repair funding.

2023 Activities

The project continued in 2023 through scheduling five wastewater pond site assessments every two weeks to discuss the Steady State Primary Method and other general best practices with pond operators throughout the state of Minnesota. The assessments involved walking through a survey on best practices with the operator, and then providing guidance information, best practices, and case studies highlighting the benefits of using this new operational method.

The Steady State Primary Method, for a three-pond system, involves keeping the primary pond one and the secondary pond three as full as possible during the year. This serves to maximize hydraulic retention time in these ponds, resulting in better treatment. A slide gate is set at 6' between ponds one and two, allowing influent into pond one as treated water moves over the slide gate to fill pond two.

This process and other best practices are summarized in an information packet which is provided to each operator during the assessment. On a two-week cycle, the project team meets to discuss the completed assessments and plan the assessments for the next cycle. Assessed sites are assigned an implementation status: implemented, planning implementation, interested, not interested, or unable to implement method. Once every few months, additional follow up is completed to sites that are interested and/or implementing the method. This follow up helps to reveal how well the nutrient optimization process is working and allows for additional guidance to be provided as requested during the implementation process.



This year also involved completing the final grant objective of assisting the MPCA in gathering applications for their transfer structure repair funding. A total of 8 transfer structure grants were awarded by the MPCA, for a total award of $200,000 towards helping pond sites repair and upgrade their pond systems.

PFAS Pollution Prevention Best Management Practices

2023 Outputs

Literature reviews

2 site assessments

5 informational interviews

1 PFAS mapping tool developed

2 presentations

Sponsors

U.S. EPA, Region 5

Minnesota Pollution Control Agency

Project Overview

As described in the state of Minnesota's PFAS Blueprint, there are currently over 5,000 per- and polyfluoroalkyl substances (PFAS) structures included in the U.S. Environmental Protection Agency's (EPA) master list of structurally defined PFAS and over 9,000 PFAS chemistries. New PFAS are being invented, used in industry, incorporated into commercial products and released to the environment every day. The breadth and diversity of PFAS pollution, coupled with a lack of research on health impacts, complicates the development of regulatory and non-regulatory approaches to manage PFAS.

This project seeks to reduce or eliminate the use and release of PFAS and the pollution they create through identification and implementation of safer alternatives. This project will use literature reviews, data analysis and incorporate successful technical assistance activities to identify areas for source reduction.

2023 Activities

The project team dove into learning about PFAS and how it is used in industry. One of the main challenges with PFAS is that it is a contaminant of emerging concern and has been largely unregulated. This has led to an increased importance, scope, and duration of the literature review portion of the project. New studies, policies, and events require the team to continue to learn and update information as the project progresses. Some of the main activities that occurred in 2023 are:

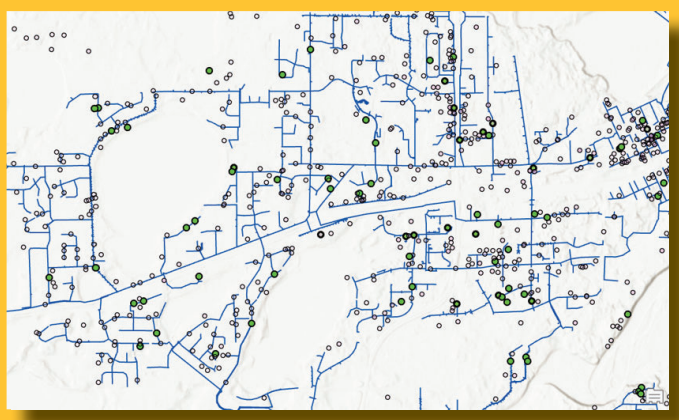
- Identified resource developed by ChemSec that identifies potential functions and uses of PFAS according to sector.
    - Leveraged dataset to develop method for site visits.
- Conducted 2 site assessments for PFAS source identification and reduction.
    - Conducted literature review to research and support findings.
- Presented to EPA Region V Biosolids Task Force and MPCA Collection System and Wastewater Operator Annual Conference

Project Success: Leveraging Existing Datasets to Explore PFAS

One of the main challenges associated with PFAS is its ubiquitousness within industry. This has made it difficult for wastewater facilities to know where to start when it comes to source reduction. To assist communities with this effort, MnTAP developed a method for mapping potential sources of PFAS utilizing the following components:

- List of businesses within Minnesota communities
- North American Industry Classification System (NAICS) code. flagged 50 NAICS codes associated with potential PFAS use.
- Geolocation coordinates
- Wastewater collection system maps

With these maps, communities can organize potential sources and develop a prioritized plan for where and when to sample for PFAS.



Best Management Practices for Minnesota Food Processing

2023 Outputs

2 intern projects

24 manufacturing facilities contacted for support

7 facility assessments conducted (all in areas of environmental justice concern)

2 public presentations delivered

2023 Outcomes

5.1 million gal of water savings

$176,000 of cost savings

Sponsors

U.S. EPA, Region 5

Minnesota Pollution Control Agency

What they said...

"Our operation is complex, and Sean was thorough and detail-oriented when learning our operation and creating solutions to fight our biggest battles in the war on waste."

~ Tony Gorman, Production Manager, Kemps

Project Overview

The food processing industry is an essential component of Minnesota's economy, accounting for almost 25% of the total shipments by Minnesota manufacturers in 2020. Within the food and beverage industry, almost 600 Minnesotan businesses specialize in dairy manufacturing, animal and meat processing and beverage manufacturing.

This project focuses on providing direct technical assistance for food processing industries in Minnesota to prevent pollution and optimize wastewater quality, water conservation, and energy use; reduce industry environmental impacts; and maintain strong businesses within the state.

2023 Activities

- Completed internships focusing on waste minimization at Kemps in Minneapolis and on energy efficiency at Ventura Foods in Albert Lea.
  - Proposed reductions of 168,000 lbs of high-strength waste, 5.1 million gallons of water, and $378,000 of annual post-implementation savings.
  - Published project summaries for both internships in the 2023 Solutions on the MnTAP website.
- Delivered webinar during P2 Week on pollution prevention in dairy manufacturers (https://vimeo.com/866434925).
- Delivered presentation in November 2023 on waste minimization and water conservation in food manufacturing for annual convention of the Midwest Food Products Association.
- Continued to cultivate relationships with businesses, trade organizations, and nonprofits across food processing.

Project Success: Milking Every Opportunity

Kemps is a dairy company that was founded in 1914 in Minneapolis by William Kemps and Walter Lathrop. The company started as just an ice cream company but expanded to produce multiple dairy products. Kemps' Minneapolis facility opened in 1979 and produces packaged milk and cream. Through regular operations, Kemps discharges approximately 1,200,000 gallons of milk annually to the wastewater drains, and 233,000 gallons of milk to human food by-product at a cost of over $500,000 a year. Sean Sticha, a mechanical engineering student from the University of St. Thomas set out to reduce those figures. After a summer of observing, interviewing, and collecting data, he provided recommendations with the potential to save over 350,000 gallons of milk! Three of those recommendations were:

- Implement Best Practice for Filler Shutdown
- Install Conductivity Probe Prior to Filler Bowl
- Implement Tag System to Improve Oversight of Reworkable Product

"Over the course of the summer, working as a MnTAP intern was a very rewarding experience. I enjoyed working with industry professionals and learning more about the manufacturing industry. I am grateful for the opportunity MnTAP and Kemps Minneapolis have given me and the chance to lead a project and see the positive impacts my work has made."

~ Sean Sticha, 2023 MnTAP Intern