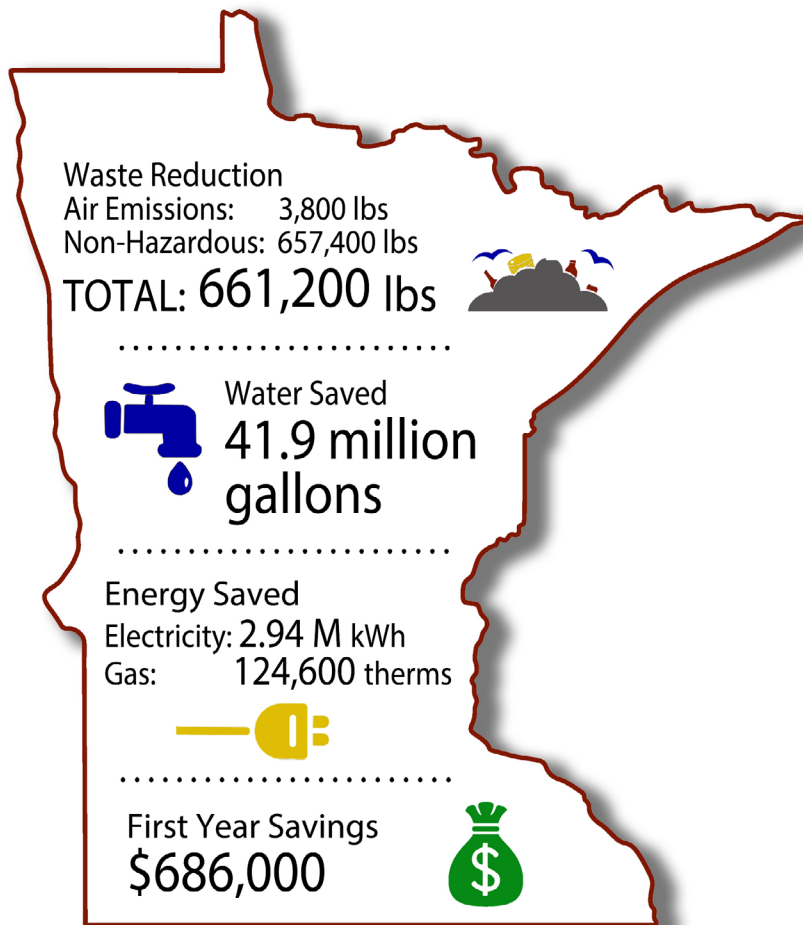


# IMPACT

## Minnesota Technical Assistance Program 2024 Annual Report



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



Minnesota Technical  
Assistance Program

UNIVERSITY OF MINNESOTA



Submitted to the Minnesota Pollution Control Agency  
Original Publication: June 2025

# About MnTAP

The Minnesota Technical Assistance Program (MnTAP) is an outreach and assistance program at the Division of Environmental Health Sciences at the University of Minnesota School of Public Health. MnTAP helps Minnesota businesses and organizations develop and implement tailored solutions that prevent pollution at the source, optimize 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” ([Minnesota Statutes 2024, section 115a.152](#)). 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 ([Minnesota Statutes 2024, section 115D.04](#)). Today, the Minnesota Pollution Control Agency (MPCA) supports this assistance by

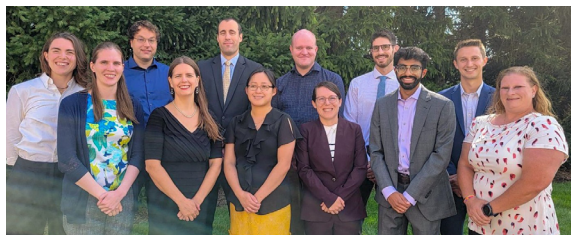
funding the University of Minnesota School of Public Health to maintain MnTAP efforts across the state. MnTAP has leveraged this funding to win additional competitive grant funding totaling 50% of the FY24 budget.

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 5,369 site visits at facilities throughout the state.
- provided solutions to save businesses \$58.7 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: Laura Sevcik, Jane Paulson, Jocelyn Leung, Kelsey Klucas, Ashwin Nambudiripad, Alaina Ryberg

Back: Gabrielle Martin, Jon Vanyo, Kevin Philpy, Jon Schroeder, Matt Donski, Logan Wikstrom

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# Technical Assistance Delivered Across Minnesota

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## Director's Note: Celebrating 40 Years of MnTAP

This year marked an exciting milestone for MnTAP as we celebrated 40 years of helping Minnesota businesses reduce waste, conserve resources, and improve efficiency. This moment is the culmination of decades of dedicated staff effort, guidance from leadership, and support from our partners and funding agencies.

Our October 2024 celebration was marked by the joys of reconnecting with MnTAP staff—past and present—and sharing memories, laughter, and stories. We heard from MnTAP champions and learned from them on how MnTAP has helped the State of Minnesota. We paid tribute to the legacies of our previous leaders. To prepare for this event, we created a presentation to share fun pictures and some of MnTAP's lifetime statistics. These include how in the past 40 years, MnTAP has assisted Minnesota organizations in identifying first-year savings in excess of:

- 914 million gallons of water
- 405 million pounds of waste
- 117 million kilowatt-hours of energy
- 6.2 million therms of energy

Many of these savings continue to be realized long after MnTAP staff members leave, so these are conservative estimates.

In 2024, we continued this strong work as the numbers, partner testimonies, and stories illustrate. As you read this year's report, you will share my admiration of our team's results and recognize how invested our team is in helping the State of Minnesota be a healthy, safe place to live. A few things to keep an eye out for include MnTAP's impacts on:

- Helping the wastewater community with energy efficiency and upstream source reduction.
- Helping businesses and communities with water conservation.
- Reducing pollutants, such as per- and polyfluoroalkyl substances (PFAS), biochemical oxygen demand or chemical oxygen demand (BOD/COD), total suspended solids (TSS), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs).
- Reducing waste to landfill and climate impacts from food waste.

If any of the above speak to you and you see an opportunity for MnTAP to assist your business, please do not hesitate to reach out! MnTAP exists to help the State of Minnesota meet the challenges of today, and we would love to hear from you and work together to identify solutions. Even though the challenges of today differ from those of yesterday and tomorrow, one constant remains: increasing efficiency through source reduction always brings savings.

Kelsey Klucas, Director, Minnesota Technical Assistance Program

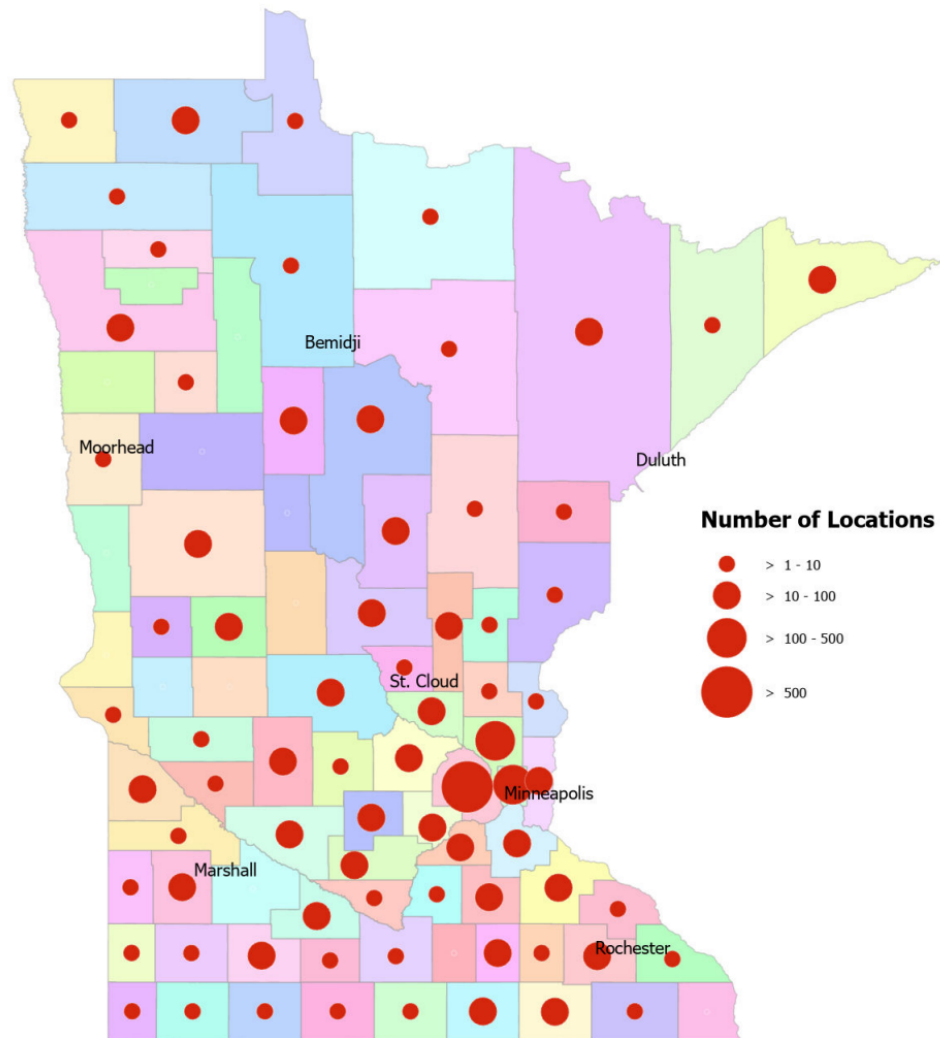
## Helping MPCA's Long Term Goals

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 2020-2024		
Number of Companies Assisted		1,431
Water Reduction (gal)	Recommended	306,476,000
	Implemented	131,194,000
Electric Energy Reduction (kWh)	Recommended	36,435,000
	Implemented	34,074,000
Waste Reduction (lbs)	Recommended	134,765,000
	Implemented	8,475,000
Gas Energy Reduction (therms)	Recommended	1,409,000
	Implemented	854,000
Cost Savings	Recommended	13,392,000
	Implemented	6,158,000







2024 Outputs			
Technical Assistance Activity	2022 Results	2023 Results	2024 Results
Contacts (calls/emails/meetings)	1,162	1,154	1,129
Requests for Assistance	68	57	50
Total Staff Site Visits (unique facilities)	104 (77)	75 (57)	177 (99)
Student Interns	16	17	14
Events and Presentations	56	48	34

2024 Outcomes							
Activity	Waste			Energy		Water	Savings
	Air Emissions (lbs)	Hazardous Waste (lbs)	Non-Hazardous/Solid Waste (lbs)	Electric (kWh)	Fuel (therms)	(Gallons)	(\$)
Site Visits	3,800	-	248,000	2,366,000	121,000	437,000	293,000
Interns	-	-	401,000	575,000	3,600	41,490,000	365,000
Materials Exchange	-	-	8,400	-	-	-	\$28,000
TOTALS	661,200			2,941,000	124,600	41,927,000	\$686,000

## On-Site Assistance

### 2024 Outputs

177 on-site visits  
99 unique facilities  
50 requests for assistance  
318 unique organization interactions

### 2024 Outcomes

661,200 lb of waste reduced  
41.9 million gal of water conserved  
2.9 million kWh of electricity conserved  
124,600 therms of fuel reduced  
\$686,000 in annual savings

### What they said...

"2024 was a big year for MnTAP! I'm excited to see the excellent results that the staff achieved and progress made with so many important projects!"

- Mark Snyder,  
Pollution Prevention Lead,  
MPCA

### 2024 Goals

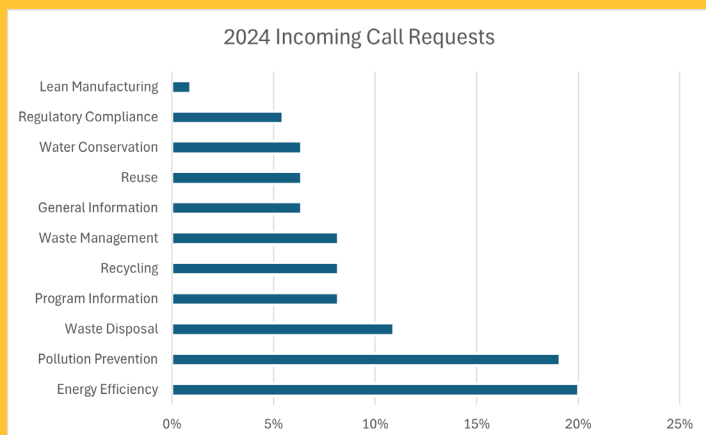
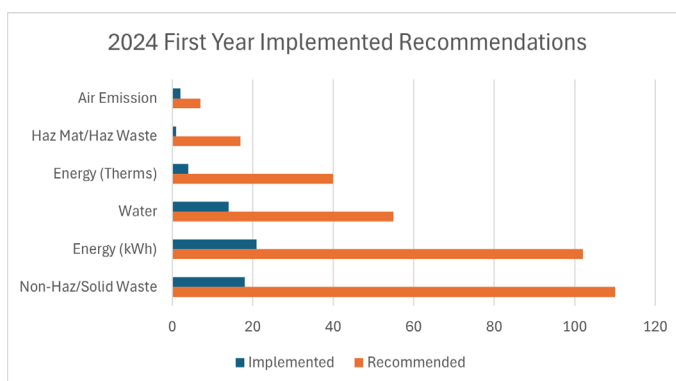
- Conduct 125 site visits at 75 different facilities to identify opportunities for companies to prevent waste and pollution as well as conserve resources including water and energy.
- Support Minnesota businesses by responding to questions on waste generation and resource utilization.

### 2024 Accomplishments

Site visit activities increased in 2024 as MnTAP staffing levels remained stable. Companies expressed particular interest in energy efficiency, and MnTAP met this demand by increasing staff capacity and investing in professional development. While there continues to be regular turnover across MnTAP's client base, the pace has decreased and has made it easier for MnTAP to maintain strong relationships and follow up on previous MnTAP recommendations. MnTAP continues to provide a mix of focused site assessments and general assessments specific to each site rather than utilizing a standard audit protocol. This approach has allowed each technical assistance to be specially curated and every recommendation to be tailored to meet the needs and aspirations of each organization.

MnTAP staff members were able to interact with 318 unique organizations via phone, email, virtual, or in-person meetings and site visits. Of these sites, 65 were located in areas identified as having environmental justice concerns by the MPCA.

MnTAP staff made 339 recommendations with a value of \$7.4 million for resource conservation at Minnesota businesses in 2024 from all onsite services. Of the recommendations made during 2024 engagements, 59 (17%) have been implemented so far.



## Project Success: MnTAP a Resource for Minnesota

MnTAP received 50 unsolicited requests for assistance in 2024. Each year brings new challenges and opportunities to the State of Minnesota, and so follows the types of requests MnTAP receives. This year, the most commonly asked questions were related to energy efficiency and followed closely by questions around pollution prevention.

## Intern Program

### 2024 Outputs

14 intern projects  
17 company applications processed  
167 student applications received

### Funding Partners

Minnesota Pollution Control Agency  
Metropolitan Council Environmental Services  
US EPA, Region 5  
Xcel Energy  
Environment and Natural Resources Trust Fund



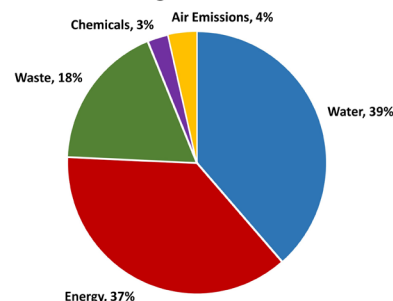
### 2024 Goal

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

### 2024 Accomplishments

MnTAP interns come from a variety of disciplines. Our 2024 interns studied chemical, mechanical, bioproducts, and biosystems engineering as well as sustainable systems management and computer science. While students from other universities have typically participated, all interns in the 2024 cohort attended the University of Minnesota with 11 coming from the Twin Cities campus and three coming from the Duluth campus. This summer's projects focused on water conservation, energy efficiency, waste reduction, sustainable chemistry, and greenhouse gas emissions reduction.

#### 2024 Intern Program Recommendations



Read more about MnTAP's intern projects in our annual program summary, [Solutions](#).

### 2024 Outcomes - Intern Program Implementation\*

Project Year	Waste (lbs)			Energy		Water (gallons)	Savings
	Air Emissions (lb)	Hazardous Waste (lb)	Non-Haz/Solid Waste (lb)	Electricity (kWh)	Gas (therms)		
2020	--	121,250	738,900	1.1 million	23,400	7.9 million	\$1,029,000
2021	--	2,100	153,000	9.7 million	67,200	38.2 million	\$941,000
2022	--	5,200	216,700	2.5 million	136,100	8.3 million	\$515,000
2023	--	0	54,000	12.4 million	505,000	10.4 million	\$1,905,000
2024	--	0	401,000	575,000	3,600	41.5 million	365,000

\*Implementation identified in target year from any program year.



### Highlight: A Summer Spent as a MnTAP Intern

*"I am grateful to MnTAP and PURIS for the opportunity to work together and be exposed to advanced and lean operations within the food industry, contributing to the ongoing efforts to enhance the efficiency of processes and complex equipment. Through this experience, I gained valuable insight into sustainability practices."*

~ Roman Lidyaev, MnTAP Intern at Puris

## General Outreach & Communications

### 2024 Outputs

9 Source newsletters  
5 P2 Week mini-webinars  
2023 Impact  
2024 Solutions  
59 presentations, booths,  
and training events

### 2024 Outcomes

4,881 Source newsletter  
subscribers  
15,612 active website users  
34,965 website page views

### 2024 Goals

Develop and disseminate technical information for Minnesota businesses to help them implement pollution prevention (P2) and energy efficiency practices and technologies.

Promote MnTAP services and results through publications and presentations.

### 2024 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:
  - P2 Week Mini-Webinars had high click through rates from the sent emails.
  - The MnTAP Intern pages continue to draw users to the program and application process.
- Completed the fourth series of [P2 Week Mini-Webinars](#) to highlight pollution prevention and other source reduction projects.
- Completed outreach materials for the MnTAP 40th Anniversary Celebration.
- Continued posting on LinkedIn and Instagram accounts.



## Minnesota Materials Exchange

### 2024 Outputs

5 published newsletters  
2,350 newsletter subscribers  
206 new accounts created  
93 listings from 42  
organizations  
416 successful exchanges

### 2024 Outcomes

8,380 lb of material claimed  
for reuse  
\$27,745 estimated savings  
through reuse

### 2024 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.

### 2024 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.

MnTAP focused on newsletters highlighting listings in 2024. This has helped:

- bring more visibility to the platform and engage more active users.
- increase the number of exchanges on a monthly basis.

We continue focusing on scoping strategic partnerships with organizations that believe in reuse, can help popularize the platform, and be ambassadors for potential reuse clients.

From January through the end of December, 416 exchanges were recorded. These exchanges resulted in 8,380 pounds of reusable material diverted from landfills or ending up as waste. A wide variety of goods were exchanged including office equipment and supplies, kitchen wares, custom equipment, cubicle walls, safety shields, a voice amplifier, and commercial gardening supplies from a greenhouse.

## 2024 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
<b>Expanding Protection of Minnesota Water Through Industrial Conservation</b>  Legislative-Citizen Commission on Minnesota Resources	This project supported water efficiency training and technical assistance outreach to businesses in communities experiencing water stress. This project ended in June of 2024.	10
<b>Wastewater Pond Optimization Implementation</b>  Legislative-Citizen Commission on Minnesota Resources	This project shared operational strategies found to improve nutrient removal with 240 municipal wastewater pond sites. Work will also promote a competitive grant funding opportunity targeting repair of broken wastewater pond infrastructure. This project ended in June of 2024.	11
<b>Wastewater Cohort Energy Efficiency Training Program</b>  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.	14
<b>PFAS Pollution Prevention for Minnesota Manufacturing Industries</b>  Environmental Protection Agency, Region 5 and Minnesota Pollution Control Agency	This project seeks to reduce the use and release of PFAS and the pollution they create. Utilizing 5 PFAS source reduction tools created by MnTAP staff, industrial facilities can take the lead in identifying and implementing safer alternatives with MnTAP assistance as needed.	15
<b>Pollution Prevention for Minnesota Food and Beverage</b>  Environmental Protection Agency, Region 5 and Minnesota Pollution Control Agency	This project provides 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.	16
<b>Water Conservation Intern Projects</b>  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.	17
<b>School Recycling Program Assistance</b>  Hennepin County and Hennepin University Partnership	This project connects with Hennepin County schools and universities to provide waste and recycling technical assistance.	18
<b>Healthy Air for Environmental Justice Communities: Pollution Prevention through Boiler Tuning</b>  Environmental Protection Agency and Minnesota Pollution Control Agency	This project offers no-cost boiler control optimizations to facilities to improve air quality (i.e., reducing PM2.5 and nitrogen oxides) in environmental justice areas in Minnesota.	20
<b>Breaking the PFAS Cycle with a Full-Scale Demonstration</b>  Legislative-Citizen Commission on Minnesota Resources	This full-scale pilot will evaluate supercritical water oxidation (SCWO) for managing PFAS in biosolids and water treatment residuals. SCWO can destroy PFAS in a variety of wastes and recover energy.	21



## Expanding Protection of Minnesota Water Through Industrial Conservation

### Project Outputs

- 3 intern projects
- 2 site assessments
- 29 proposed actions

### Project Outcomes

- 11.8 million gal of water conserved
- 247,000 kWh of electricity conserved
- \$67,400 in cost savings

### Project Partners

Minnesota Rural Water Association

### Sponsors

Legislative-Citizen Commission on Minnesota Resources



### Project Overview

The primary goal of this project was to identify and engage Minnesota communities with water supply and/or water quality challenges. MnTAP, in collaboration with Minnesota Rural Water Association, offered water conservation training, outreach, and site assessments to engage Minnesota communities. These services were focused on identifying and implementing actionable industrial water conservation measures. Eligible participants included towns, cities, and other local government units as well as businesses with high water consumption.

### Project Activities

Over the course of the project, MnTAP reached out to Minnesota communities and businesses about water conservation workshops, site assessments, and intern projects. Cumulative activities since the project started in 2021 include:

- 12 site assessments to evaluate water conservation opportunities and scope intern projects
- 6 intern projects
- 3 educational workshops on water conservation
- A water assessment tool for facilities to evaluate water use onsite and identify opportunities
- A webinar on water conservation strategies
- 24.1 million gallons of water conserved annually

Water conservation recommendations from the project included irrigation system optimizations, various water reuse opportunities, and installation of low flow nozzles or fixtures. MnTAP continues to work with businesses around the state on water conservation.

### What They Said

"We're proud to support MnTAP's efforts to protect water resources through targeted collaboration and workforce development. MnTAP's consistent and tangible impacts are a great example of how Environmental & Natural Resources Trust Fund can directly benefit Minnesotans and the waters that make our state so special." ~ LCCMR Team

## Project Success: Paper Recycler Recycles Water

Liberty Paper is a recycled liner paper manufacturing mill in Becker, Minnesota. MnTAP Intern Jannatul Adnin Eshita investigated ways to reduce freshwater consumption, with a focus on water reuse. Jannatul identified opportunities to reuse seal water from various pumps for cooling and filter cleaning. She also recommended reusing cooling tower blowdown water for coagulant mixing and optimizing an oversized heat exchanger for additional water savings. In total, over 49 million gallons of annual water saving opportunities onsite were identified, including 11 million gallons that have already been implemented.

*"Working at Liberty Paper was one of the best times in my life. The Liberty Paper staff were not only supportive but also valued my input, quickly making me an integral part of the team. Throughout this internship, I had the opportunity to apply my engineering knowledge in a real-world setting."*

~ Jannatul Adnin Eshita





## Wastewater Pond Optimization Implementation (page 1)

### Project Outputs

16 site visits  
1 conference booth  
21 sites are planning implementation in 2024

### Project Outcomes

16 implemented actions

### Project Partners

Minnesota Pollution Control Agency

Minnesota Rural Water Association

### Sponsors

Legislative-Citizen Commission on Minnesota Resources



### What they said...

“The Wastewater Pond Optimization Implementation was a collaboration between MnTAP, MRWA, and MPCA with funding from the LCCMR through the Environment & Natural Resources Trust Fund. Among its goals was to spread the word on a pond-management method that has potential to reduce phosphorus at little to no cost. The team was able to connect with 240 municipal wastewater pond sites and calculate 668 pounds of phosphorus reductions. The opportunity exists to not only achieve better nutrient removal but also create opportunities for UMN students to work towards long-term environmental solutions with three outstanding organizations.”

~ Joel Peck, Municipal Liaison, Municipal Wastewater Division, MPCA

### Project Overview

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 and achieve cleaner water across Minnesota.

### Project Goals

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

### Cumulative Results

This project was completed in 2024. The project team reached out to most of the wastewater pond sites in Minnesota and helped sites to implement changes which saved substantial amounts of phosphorus.

- 240 total sites contacted
- 668 pounds per year of phosphorus reduced due to implementation
- 12 sites implemented the method with documented results
- 21 sites have planned implementation in 2024

### Overall Project Activities

Over the course of this project, the project team conducted outreach and site visits to roughly 5 wastewater pond sites every 2 weeks to share the SSPM operational strategy and other best practices to achieve better treatment of nutrients. As the project concludes, MnTAP staff contacted a total of 240 sites for an assessment. These included:

- 23 sites that were already implementing this method prior to a site visit from MnTAP staff.
- 37 sites that are now implementing the SSPM as a result of this project.
- 8 sites that are planning to implement SSPM.
- 13 sites that are interested and are considering implementation.
- 108 sites that are not interested.
- 30 sites (e.g., have 2-pond systems instead of 3-pond systems) that cannot implement SSPM.
- 21 sites that were not available for a site visit.

## Wastewater Pond Optimization Implementation (page 2)

### Project Activities (con't)

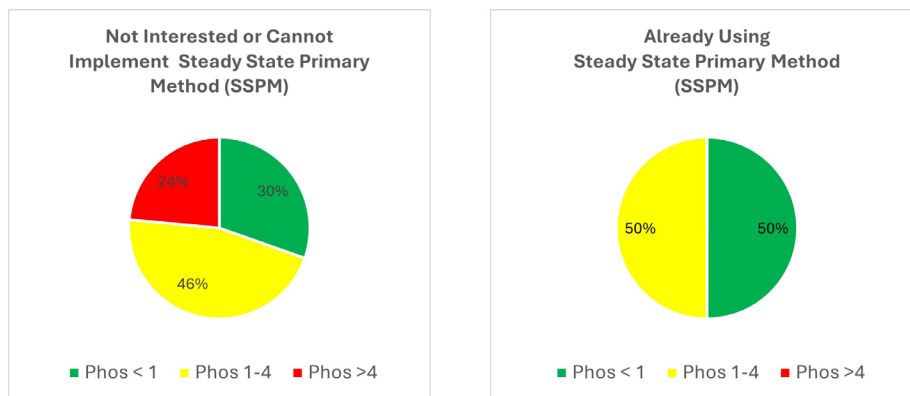
As a result of this project, an annual phosphorous load reduction of 688 pounds was achieved across the 12 sites that implemented SSPM prior to 2024. There are 21 additional sites that are planning and considering implementation of the SSPM in 2024, which would also lead to additional phosphorus savings.

Pond discharge monitoring report data was then compared between pond sites using the SSPM to a baseline of pond sites that had responded as 'not interested' or 'not available' for assessment. This comparison revealed that ponds undergoing SSPM seemed to have achieved the intended impact of reducing effluent phosphorus.

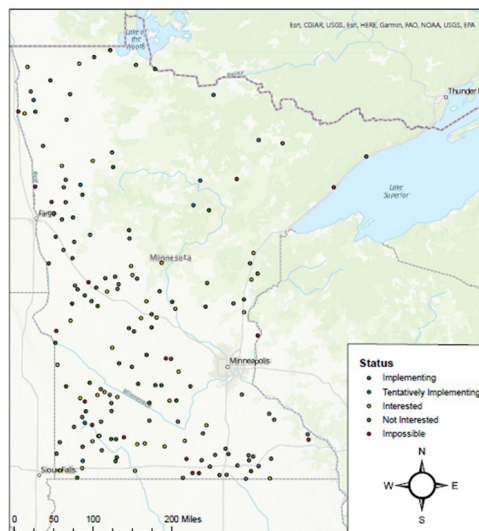
The figures below were shared in the 2024 presentation on the project and highlight the phosphorus savings achieved by sites utilizing this method.

- The red slice represents sites with effluent phosphorus concentrations greater than 4 mg/L.
- The yellow slices represent sites with effluent phosphorus concentrations between 1 and 4 mg/L.
- The green slices represent sites with effluent phosphorus concentrations less than 1 mg/L.

**Figure 1: Phosphorus treatment comparison, baseline versus previous SSPM implementation (mg/L)**



**Figure 2: Pond locations in Minnesota**



## Wastewater Pond Optimization Implementation (page 3)

### Project Success: Lynd Nutrient Reduction

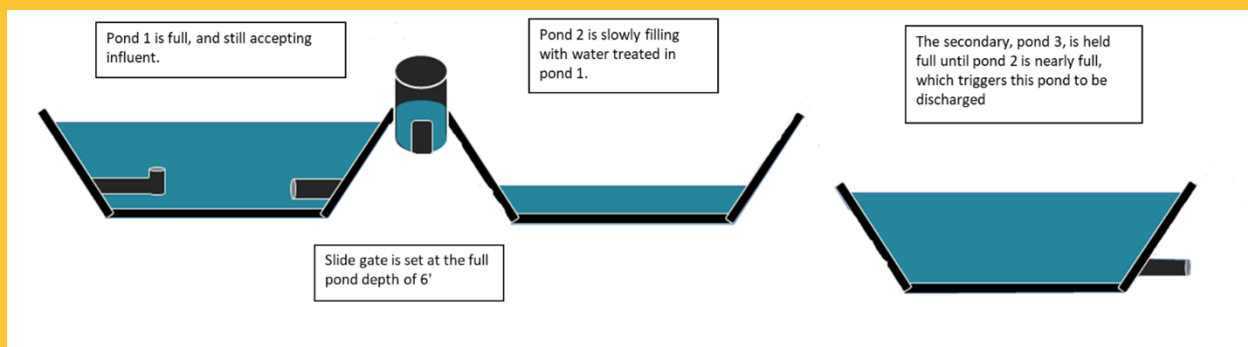
Prior to this project, the Lynd pond system had been struggling with high levels of both phosphorous and sludge buildup.

The project at Lynd involved three parts. First, the Lynd team used Team Lab's T195 microbes for bioaugmentation to lower the sludge levels and create additional hydraulic retention time. Next, the Lynd team installed a Solar Bee aerator to add oxygen to the top of the pond, which helped to eliminate odors. Finally, the team at Lynd chose to utilize the SSPM to maximize hydraulic retention times.

For a three-pond system, SSPM involves starting with ponds one and three being full, and pond two being filled. Pond one is designated to receive new influent, and pond two is filled by leaving the slide gate between pond one and pond two open at a 6-foot depth. This creates a steady flow of influent water high in biochemical oxygen demand (BOD) into pond one and maximizes detention time in pond three. Once full, the slide gates are closed, pond three is discharged, and the water from pond two is transferred to pond three. The cycle then repeats.

Lynd recorded a 58% reduction in fall phosphorous levels after implementing SSPM during the summer of 2022.

*Figure 3: Steady State Primary Method*



*Image 1: Lynd pond system*



## Wastewater Cohort Energy Efficiency Training Program

### Project Outputs

- 2 WWTP training cohorts completed
- 10 operators trained
- 1 site assessment performed
- 7 implemented actions
- 12 total proposed actions

### Project Outcomes

- 2.32 million kWh of electricity conserved
- \$187,700 in cost savings

### Sponsors

Minnesota Department of Commerce, Division of Energy Resources



### What they said...

"With nearly four million kilowatt hours of energy savings realized, the MnTAP Wastewater Cohort Energy Efficiency Training Program is an enormous success.

As a bonus, the project provides valuable training to wastewater treatment professionals, instilling an energy sustainability mindset with them throughout their careers."

~ MN Department of Commerce

### Project Overview

MnTAP is using a previously developed cohort training curriculum to offer operator training focused on identifying and implementing low- to no-cost improvements that reduce energy consumption at wastewater treatment plants (WWTPs) without sacrificing plant effectiveness at meeting discharge limits. The target audience for this training program are lead WWTP operators at municipal mechanical treatment WWTPs that are processing up to 10 million gallons per day (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 9 training cohorts, each containing operators from 2 to 5 WWTPs, in addition to 3 to 5 standalone WWTP assessments for sites whose operators were unable to join for the cohort training.

### Cumulative Results

Since the project began in 2021, wastewater plants that participated in the program have:

- Conserved 3,900,000 kWh per year of electricity.
- Saved \$322,000 per year.
- Completed training for 9 WWTP cohorts.
- Trained 50 operators.
- Performed 2 site assessments.
- Made 63 recommendations.

### Overall Project Activities

- Contacted 306 local government staff members with invitations to join cohorts.
- Completed a total of 9 cohorts with 50 operators from 31 treatment plants.

### Recommendations

During 2024, there were 12 recommendations for energy efficiency improvements identified across 8 participating WWTPs. These recommendations resulted in the energy opportunities displayed in the table below. The implementation of the recommendations is in progress, and follow ups with facilities will provide any technical support needed.

**Table 1. Recommendations for energy efficiency improvements**

Program Year	Identified (kWh)	Identified Cost Savings (\$)	Implemented (kWh)	Implemented Cost Savings (\$)
2024	1,742,000	184,600	2,318,000	187,700
All Years	9,043,000	\$754,350	3,935,000	\$322,100

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 WWTPs looking for energy savings, optimizing these two areas would be a great place to start.

### Key Learnings

- WWTP operators are focused on meeting permit limits first and are open to saving energy if it does not impact treatment.
- Tuning secondary aeration airflow and digester mixing speeds often result in large energy savings for low capital cost without impacting treatment.
- Smaller plant operations with 1 to 2 operators are often unable to commit an operator to 4 days of energy training.
- Checklists can be helpful to walk through standardized processes with businesses.

# PFAS Pollution Prevention for Minnesota Manufacturing Industries

## Project Outputs

- 7 new industrial companies engaged (10 total)
- 6 new wastewater treatment facilities engaged (7 total)
- 1 company switched to a PFAS-free alternative
- 5 presentations + over 130 interested parties reached
- 2 reports to sponsors
- 3 articles in MnTAP's Source Newsletter
- 5 PFAS source reduction tools developed

## Project Outcomes

- 18,400 lb of PFAS containing material reduced
- 0.00276 lb per year of PFAS reduced

## 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. EPA's 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 into 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 technical assistance activities to identify areas for source reduction.

## 2024 Activities

Some of the main activities that occurred in 2024 include:

- Creating 5 PFAS source reduction tools
  - Created a customized Excel tool (adapted from the ChemSec PFAS guide) to help industrial facilities identify potential sources of PFAS. This includes both industry specific products and more ubiquitous products, such as floor wax, that are often overlooked due to not being part of the facility's core functions.
  - Developed a Supplier Communications Template that provides definitions and information about Minnesota regulatory requirements, so businesses can ensure they receive the accurate information they need from their suppliers.
  - Developed a Sample PFAS Management Framework for small businesses to use when identifying, documenting, and substituting sources of PFAS in their operations.
  - Developed a Chemical List Prioritization Process for prioritizing chemical lists based on common PFAS functions, such as lubrication or water repellency.
  - Developed step-by-step resource letters featuring relevant tools created by MnTAP and other credible sources to meet the needs of industrial and wastewater customers.
- Conducting 2 site assessments for PFAS source identification and reduction.
- Presenting at the Northeast Waste Management Officials' Association PFAS Conference, Metropolitan Council Environmental Services Industrial Wastewater Workshops, MPCA Remediation Division, and the Minnesota Rural Water Association.

## What They Said

"MnTAP is making a real impact by helping businesses and wastewater facilities identify and reduce PFAS at the source. With targeted tools, industry outreach, and leadership in PFAS education, they're driving progress toward a cleaner, safer Minnesota."

- Dana Vanderbosch, Assistant Commissioner, MPCA



Image reprinted from Minnesota's PFAS Blueprint  
with permission from the MPCA

## Pollution Prevention for Minnesota Food and Beverage

### Cumulative Project Outputs

4 interns  
14 facility assessments conducted (12 in environmental justice areas)  
33 manufacturing facilities contacted for support  
4 public presentations delivered

### Cumulative Project Outcomes

5.1 million gal of water conserved  
170 lb of chemical oxygen demand reduced  
1,200 lb of organic waste reduced  
6,100 kWh of electricity conserved  
\$178,000 in cost annual savings

### Sponsors

U.S. EPA Region 5  
Minnesota Pollution Control Agency

### Project Background

The food processing industry is an essential component of Minnesota's economy and accounts for almost 25% of the total shipments by Minnesota manufacturers in 2020. Within the food and beverage industry, almost 600 Minnesota 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; to promote water and/or energy conservation; to reduce industry environmental impacts; and to maintain strong businesses within the state.

### 2024 Activities

- Completed internships focusing on water conservation at Michael Foods in Chaska and on waste reduction at Lakeside Foods in Owatonna.
  - Proposed reductions of 93,000 pounds of edible waste, 12.2 million gallons of water, 54,000 kilowatt-hours (kWh) of energy, and \$111,000 of annual post-implementation savings.
  - Published project summaries of both internships in the [2024 MnTAP Solutions Magazine](#).
- Delivered webinar on pollution prevention in dairy manufacturers for the National Pollution Prevention Roundtable in March 2024.
- Delivered presentation on high-strength waste minimization and water conservation in food manufacturing for the annual Minnesota Wastewater Operator's Conference in October 2024.
- Continued to cultivate relationships with businesses, trade organizations, and nonprofits across food processing.

### What They Said

"We have implemented a very successful internship program that has a great track record of generating solid contributions during the internship. This is our second consecutive year of hiring a MNTAP intern and we couldn't be more pleased with the results so far."

~ Joe Peter, Director of Environmental Affairs, Michael Foods, Inc.

## Project Success: Slicing Water Use in Potato Processing

Padon Kinzley is a bioproducts and biosystems engineering student from the University of Minnesota, and he was a MnTAP summer intern at Michael Foods in 2024. He worked with facility staff to identify large water users in the potato processing lines and developed solutions to reduce water use while maintaining product quality. Padon's work resulted in a thorough understanding of water flow at the site as well as several water conservation opportunities of almost 9,000,000 gallons of water annually. Three of his recommendations include:

- Installing Flow Restrictors on Peel Starch Separators
- Automating Raw Receiving Conveyor and Sprayer Shut Off
- Installing Actuators in the Food Service Mash Line

"I was able to get firsthand experience in the industrial sector while making a positive impact on the environment and our state's public health. Over the summer I learned a lot about industrial food processing and the efforts that are made to optimize the use of our natural resources. I'm thankful for the support from MnTAP and Michael Foods and the opportunity to grow as an Engineer."

~ Padon Kinzley, 2024 MnTAP Intern





## Water Conservation Intern Projects

### Project Outputs

5 metro-area intern projects  
 35 proposed recommendations  
 11 implemented actions  
 40 total proposed actions

### Project Outcomes\*

29.7 million gal of implemented water conserved  
 2,050 lb of implemented water pollution reduced  
 145,000 kWh of implemented electricity conserved  
 3,600 therms of implemented natural gas energy reduced  
 \$208,000 in implemented cost savings

*\*Implemented 2024 from all recommendation years*

### Sponsors

Water Supply Planning Team, Metropolitan Council Environmental Services

### Project Overview

With support and direction from the Metropolitan Council Environmental Services (MCES) Water Supply Planning Team, MnTAP continued assisting industrial facilities in the Twin Cities Metro with water conservation in 2024.

### Cumulative Results

2024 marks the 12th summer that MCES has supported MnTAP intern projects with a focus on water conservation. Since 2013, project results include:

- 49 MnTAP facilitated intern projects in the Seven-County Twin Cities Metro Area
- 327 recommended actions with 585 million gallons of annual water conservation potential
- 130 implemented recommendations to date (40% of total proposed actions)
- 190 million gallons saved annually from implemented water conservation recommendations (32% of total recommendations)
- \$2.6 million in expenditures eliminated annually from implemented water conservation recommendations

### 2024 Activities

In 2024, 7 metro interns collectively produced 39 recommendations that could save up to 138 million gallons of water and \$612,000 per year. Additionally, 11 recommendations from various project years were implemented by the end of 2024, and this has led to saving a total of 29.7 million gallons of water and \$208,000.

### What They Said

"MnTAP's internship program identifies and implements significant water saving improvements for industries to preserve the region's critical water resources while reducing costs for industries and their customers. MnTAP's efforts at optimizing resource use to improve public health and the environment closely align with Met Council's goals and objectives, and our partnership has been successful and beneficial to the entire metro region."

~ Greg Johnson, Principal Engineer, Metropolitan Council Environmental Services

## Project Success: The Power of Maintenance

PTC Steel has been operating in Minneapolis for 101 years. Manufacturing mechanical steel tubing can require milling, which generates significant heat. The coolant water for this process must be softened and sent through a reverse osmosis system to maintain quality. Julie Van, a sustainable systems management student from the University of Minnesota Twin Cities, discovered a piston was broken in the softening system and was constantly discharging water. During the summer, she scheduled for a service provider to repair the system and thus reduce water usage by 4,500,000 gallons and costs by \$56,000 per year. She also proposed the following recommendations:

- Change Rinse Tank Flow Rate to 0.5 GPM (Implemented)
- Turn Off Rinse Tank of Off Days (Implemented)
- Turn Off Cleaning Line Burners on Off Days (Implemented)

"Working with Julie was great! She is very motivated and did a wonderful job! Not only did she identify places we were using too much water, but she also educated our team... It's amazing the amount of money that can be saved if you are looking. A great experience, and we can't wait to work with MnTAP again."

~ Tony Bolz, Plant Manager, PTC Steel



## School Recycling Program Assistance (page 1)

### Project Outputs

18 new schools engaged with technical assistance inquiries  
10 site visits  
4 educational presentations  
428 physical mailers sent to school and district contacts  
100 students and staff educated  
22 total proposed actions

### Project Outcomes

153,000 lb of recommended waste diverted  
19,000 lb of recommended waste reduced  
464,000 kWh of recommended electricity conserved  
\$37,860 in recommended cost savings for electricity conserved

### Project Partners

Schools in Hennepin County

### Sponsors

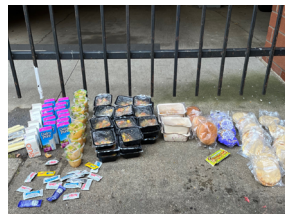
Hennepin County  
Hennepin University Partnership

### Project Overview

The primary goal of this project is to identify and engage Hennepin County pre-kindergarten through grade 12 schools, 2- and 4-year colleges, and universities in waste and recycling technical assistance. MnTAP, as part of Hennepin University Partnership, has provided no-cost waste audits; guidance to green teams; presentations to staff and students; and walk-throughs of physical spaces to identify opportunities to improve solid waste reduction, reuse, and diversion. Emphasis was placed on carrying out cafeteria waste audits, helping students and staff understand how they can substitute single-use utensils and kitchenware for reusables, and reducing and diverting front-of-house and back-of-house food waste.

### 2024 Activities

- Co-designed and co-marketed MnTAP no-cost waste audit services to 428 contacts, including roughly 350 schools in Hennepin County.
- Conducted 4 site assessments to identify waste and recycling opportunities, 1 energy audit, and 3 waste audits.
- Presented recycling concepts to more than 100 students and staff in cafeterias.
- 6 energy recommendations and 16 waste recommendations are being considered for implementation.



### What They Said

"The thing about waste is that everyone produces it, even if we don't often talk about it. The MnTAP team does a great job of facilitating conversations with staff, students, and volunteers of all ages to empower them to practice environmental leadership and stewardship through waste sorting and management at school."

~ Fernanda Acosta, Zero Waste Specialist, Hennepin County

## School Recycling Program Assistance (page 2)

### Key Learnings

- Reaching schools through parent referrals is especially effective as environmentally conscious parents have a vested interest in their children's schools prioritizing sustainability.
- Reducing waste from back-of-house preparation; motivating students to compost; switching to reusables (e.g., stainless steel trays and bulk milk dispensers); and encouraging compostable ware to be consistently discarded in the organics bins are effective in reducing and diverting waste.
- Having proper signage; color coding bins for recycling, composting, and trash; and ensuring that all bags' colors matched their bins improved students and staff members' accuracy in sorting their waste correctly and helped staff members throw bags into the correct dumpsters rather than directing all bags to the landfill.
- Implementing strategies— such as performing waste audits; diverting waste to recycling, composting, or share tables; and switching to reusables— have reduced 80% to 90% of materials that would otherwise end up in the landfill and saved schools more than \$10,000.
- Transitioning to LED bulbs created immediate wins for schools in terms of energy savings.

### Project Success: Oxbow Creek Elementary School in Champlin Tackles Waste and Recycling

Oxbow Creek Elementary School educates more than 1,000 students in Champlin. They invited MnTAP to assess their cafeteria waste streams from lunch. While MnTAP staff members worked through the waste audit from lunch, 80 fourth graders joined the audit to witness how items were being diverted from trash bags and into recycling, compost, share table, liquids, and “true trash.” About 6 to 8 teachers and aides witnessed the audit as well, and a 30-minute interactive dialogue followed about the importance of organics diversion for food scraps in the cafeteria.

While the economics savings is still being finalized, the following calculations have been made for these recommendations:

- Swapping all light bulbs from fluorescent to LED will save 464,000 kilowatt-hours and \$37,860 per year.
- Reducing or donating excess food prep from lunch and breakfast will save 19,000 pounds of waste per year.
- Diverting food waste in the lunchroom to compost will save 36,000 pounds of waste per year.
- Collecting unopened packaged food items and uneaten skinned fruit on a sharing table will save 19,000 pounds of waste per year.



# Healthy Air for Environmental Justice Communities: Pollution Prevention through Boiler Tuning

## Project Outputs

2 boiler optimizations completed  
8 facilities contacted  
educational presentations

## Project Outcomes

6 lb of implemented air pollution reduced  
3,800 lb of implemented CO<sub>2</sub>e reduced

## Project Partners

Center for Energy and Environment  
Lake Street Council

## Sponsors

U.S. EPA  
Minnesota Pollution Control Agency

## Project Overview

Air pollution is estimated to contribute to [10% of all deaths in the Twin Cities Metro Area](#) and according to the [Life and Breath: Metro \(updated 2022\)](#), “the highest estimated rates of air pollution-related death and disease are found in neighborhoods with the largest percentage of Black, Indigenous and People of Color (BIPOC), low-income and uninsured residents, and people who live with a disability.” This project seeks to reduce air pollution by reducing emissions from boilers.

MnTAP is partnering with the Center for Energy and Environment (CEE) to offer no-cost boiler control optimizations to facilities to improve air quality in [environmental justice areas in Minnesota](#). This project will reduce particulate matter equal to or less than 2.5 microns (PM<sub>2.5</sub>) and nitrogen oxides (NO<sub>x</sub>) in environmental justice communities by burning less fuel through increased boiler efficiency. In addition, the facilities will save money on their heating bills. This project will also develop a toolkit and offer training sessions about boiler optimization methods and lessons learned to allow these activities to be replicated.

## 2024 Activities

To spread the word about the project, we created a [website](#) to share information and published a newsletter article to advertise [boiler optimizations](#) near the start of the heating season. Eight facilities received direct outreach about the boiler optimizations, and 2 boiler optimizations were completed.



## What They Said

“MnTAP’s success is a powerful reflection of their team’s collaborative approach, including deep connections with local partners like Lake Street Council. While any new program to promote energy efficiency and cut greenhouse gases may face challenges, MnTAP’s partnerships and expertise have been instrumental to what our joint boiler optimization project has achieved in such a short time.”

~ Communications Team, CEE

## Breaking the PFAS Cycle with a Full-Scale Demonstration

### Project Outputs

1 presentation  
1 article

### Project Partners

Barr Engineering  
City of St. Cloud  
University of St. Thomas

### Sponsors

Legislative-Citizen  
Commission on Minnesota  
Resources



### Project Overview

This full-scale pilot will evaluate supercritical water oxidation (SCWO) for managing per- and polyfluoroalkyl substances (PFAS) in biosolids and water treatment residuals. SCWO can destroy PFAS in a variety of wastes and recover energy.

Project outcomes will demonstrate the potential benefits of implementing SCWO for PFAS waste management in Minnesota. Implementing PFAS destruction reduces the potential load of PFAS that could be routed back to the environment, and thus, will preserve the state's natural resources, improve water quality, and reduce potential for human exposure.

As a project partner, MnTAP will be leading outreach efforts and providing a student worker to help assist in the pilot study and characterize the resource efficiency opportunities associated with the SCWO technology.

### Project Goals

The overall goals for the full project team include:

- Evaluate the operability of SCWO and ongoing maintenance costs.
- Evaluate the efficiency of PFAS mineralization.
- Evaluate the efficiency of energy recovery and viable use options.
- Evaluate the potential value of the nutrient content of residual solids and potential for beneficial reuse as a soil amendment.
- Evaluate the quality of the condensate water and identify options for beneficial reuse.

### 2024 Activities

This year marks the beginning of the following outreach activities:

- 1 presentation to Minnesota wastewater and drinking water operators to educate about PFAS and associated MnTAP work.
- 1 article in MnTAP's Source Newsletter to share the project with the MnTAP audience.



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