INDUSTRIAL WATER CONSERVATION IN THE NORTH AND EAST METRO GROUNDWATER MANAGEMENT AREA

PROJECT FINAL REPORT

METROPOLITAN COUNCIL

February 4, 2016

A final report summarizing the 2014-2015 MCES-sponsored project focused on industrial groundwater use in the Department of Natural Resources (DNR) designated north and east metro groundwater management area (GWMA) of the Twin Cities.

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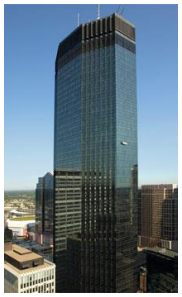
Executive Summary

The Minnesota Technical Assistance Program (MnTAP) at the University of Minnesota has enjoyed a successful, supportive relationship with the Metropolitan Council working together to address metro-area needs for industrial sector groundwater impact awareness and conservation. The launch of the industry-focused technical assistance began in 2012-2013 with MnTAP being charged with analyzing metro-area private industrial well water use, identifying industry barriers and opportunities, conducting technical water conservation site assessments, and designing and implementing summer internships focused on groundwater conservation.

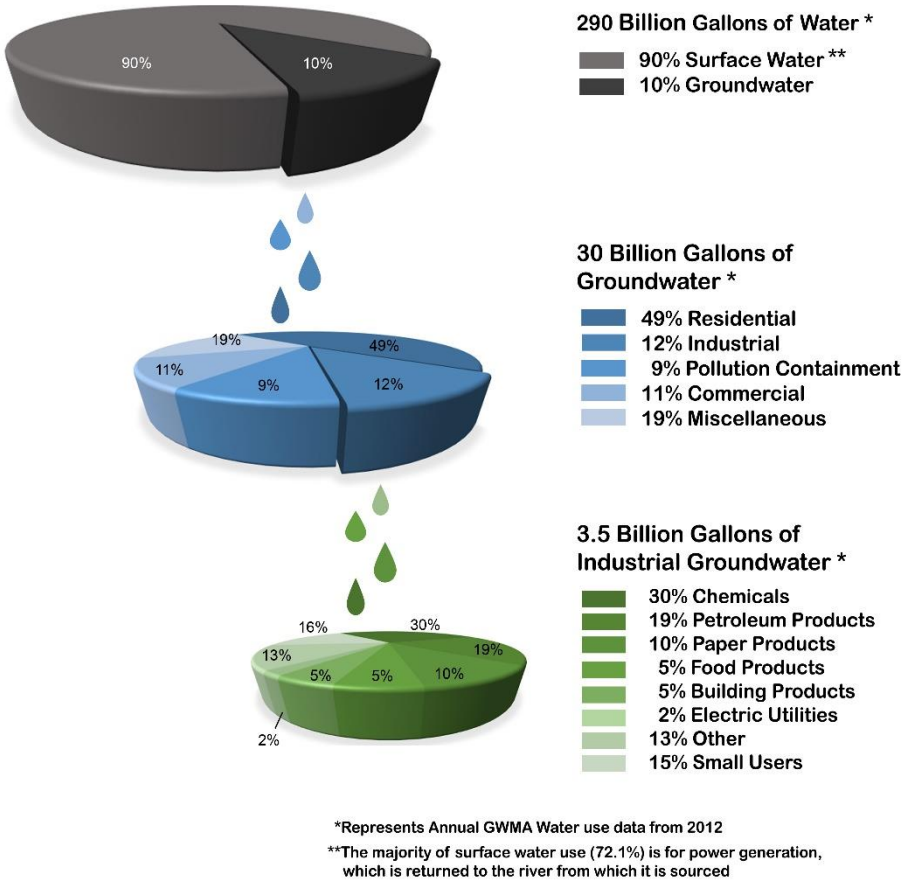


In 2014, the Minnesota Legislature allocated Clean Water Land and Legacy Amendment funds to the Metropolitan Council to support a MnTAP project focusing on analyzing groundwater use data in the north and east metro groundwater management area (GWMA) to target water conservation technical assistance to industry within this region.

The industrial water use research defined the significant amounts of surface and groundwater used throughout the GWMA in 2012 – over 290 billion gallons of water per year -- **enough water to fill the 792 foot tall IDS Center 2,420 times**! Approximately 10% (30 billion gallons) of this water is sourced from groundwater.

The research quantified the various sectors using the 30 billion gallons of groundwater per year, including industrial, commercial, residential, and other miscellaneous users (see Water Use at a Glance graphic).

The BIG Picture – 2012 GWMA Water Use at a Glance



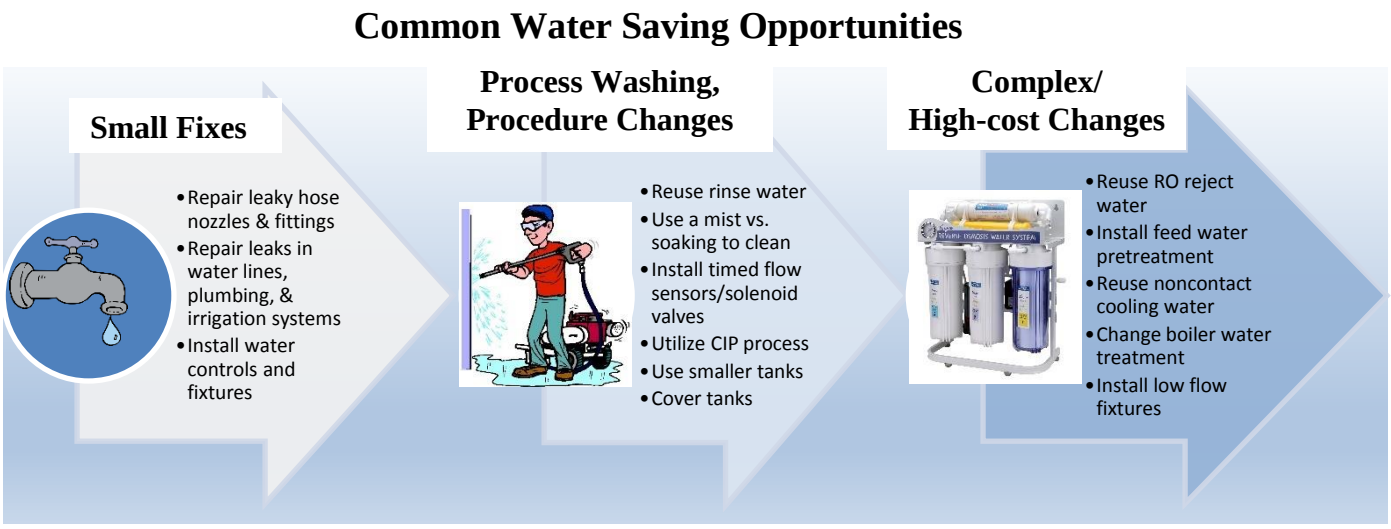
*Represents Annual GWMA Water use data from 2012

**The majority of surface water use (72.1%) is for power generation, which is returned to the river from which it is sourced

Industrial groundwater use comprises 12% of the total regional groundwater use, or 3.5 billion gallons of water per year. This category of water user in the GWMA comprises an estimated 184 facilities. The largest 18 users (10% of all GWMA industrial groundwater users) use approximately 85% of the 3.5 billion gallons of groundwater. Six target industry sectors emerged when reviewing the GWMA industrial groundwater use as shown in the bottom of the Water Use graphic.

One facet of this project was conducting technical water conservation site assessments to gauge how companies in the GWMA are using water and how they are becoming better stewards of industrial water. Results from site assessments and intern projects completed and pending suggest it is often numerous small water consuming sources that collectively made a big impact on overall water use.

Potential findings range from small, less costly fixes, to moderate procedure and process changes, to more complex, high-cost, high-return opportunities (see graphic – Common Water Saving Opportunities).



Knowing the full extent of water usage by performing a water audit and creating a water map to track use can help identify areas for conservation as well as create a benchmark that can be used to measure future improvements. MnTAP interns are an excellent resource to provide this type of detailed analysis.

> In 2015, a MnTAP intern at the Xcel Energy Riverside plant found opportunities to reduce well water discharged to the drain. One recommendation involved treating the condensate water with a deionization system allowing it to be recycled to the makeup storage tank. The intern also analyzed the reverse osmosis (RO) systems and recommended installing a control valve on the concentrate stream and decreasing the set flow rate of the concentrate to achieve improved system recovery. These changes, along with other water recovery and optimization solutions have the potential to save 6.9 million gallons of water and $10,600 annually.

Overall, the MnTAP GWMA water conservation project met the established technical objectives -- to conduct the exploratory data analysis, raise awareness and publicize the need for water conservation, engage industry in technical assistance, and initiate and complete in-depth intern projects resulting in substantial water savings recommendations. This was accomplished by: developing tools and case studies for area businesses to use on their own, providing focused technical assistance to large groundwater users through MnTAP staff assessments and MnTAP intern projects, and developing a relationship-focused follow up mechanism with companies and organizations that continues to engage and encourage them on their water conservation journey.

Summary of GWMA Report

Groundwater management areas by definition are areas where water challenges exist. This project addressed the impact of industrial operations in the north and east metro GWMA where additional clarity on the groundwater use profile, resource generation, and tailored technical assistance was effective in motivating water efficiency in the industrial sector.

We now know with greater accuracy the percentage of water use attributable to various classification categories, especially the water supply provided by municipalities. There is better definition of how and where industry is using groundwater in the GWMA. Water conservation awareness is heightened by virtue of the increasing numbers of facilities interested in the cost-effective MnTAP intern program and the successful results each project generates.

The project met the technical objectives set out to conduct the exploratory data analysis, raise awareness and publicize the need for water conservation, engage industry in technical assistance, and initiate and complete in-depth intern projects resulting in substantial water savings recommendations. Water saving potentials from site assessments and GWMA-located intern projects exceed 37.2 million gallons of water per year and cost savings of over $100,000 per year.

Although progress has been made, significant water conservation opportunity in the metro area remains. Industrial water conservation can be motivated by limitations to production increases, the capital expenditure to access additional supply, or the added cost of treatment and energy. Conversely, industry water use status quo can be attributed to low cost supply, a cost of business attitude, and competing efficiency priorities. While certain business conditions motivate investment in water conservation for some companies, the low cost of water relative to other business priorities tends toward maintaining current inefficient practices.

Having generated additional water efficiency resources and information, MnTAP continues to pursue water conservation opportunities in business and industry across Minnesota as part of our active pollution prevention assistance relationships with industry sectors. MnTAP will continue to emphasize the full cost impacts of water use by including the impact of process energy utility costs in the site total water costs. Process inputs like hot water, treated water, and water distribution energy inputs are included whenever possible to address the holistic impact of water conservation opportunities and motivate change.

MnTAP will promote access to practical and actionable water conservation-related information generated in this work by supporting water conservation web pages (http://www.mntap.umn.edu/greenbusiness/water.html). In addition, MnTAP will continue to create and publish technical examples and case studies of water conservation improvements that reflect the needs of business and industry in Minnesota. The partner relationships with MCES, DNR and others will also be maintained whenever and wherever MnTAP can add assistance value.

Introduction

The Minnesota Technical Assistance Program (MnTAP) at the University of Minnesota, School of Public Health, Environmental Health Sciences Division in Minneapolis continues staffing its program emphasis on water conservation in the Twin Cities metropolitan region through active partnership with the Metropolitan Council. Beginning in 2012, this partnership between the Metropolitan Council and MnTAP has produced a picture of regional industrial water use barriers and opportunities in the metro through industry surveying, water conservation site assessments, and in-depth water opportunity identification and analysis utilizing the MnTAP summer intern program. Published results of these efforts are located on-line:

Assessing the Opportunity and Barriers for Water Conservation by Private Industrial Water Users http://www.metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Water-Conservation-by-Private-Well-Industries.aspx

MnTAP SOLUTIONS (2013) http://www.mntap.umn.edu/intern/pdf/2013Solutions.pdf

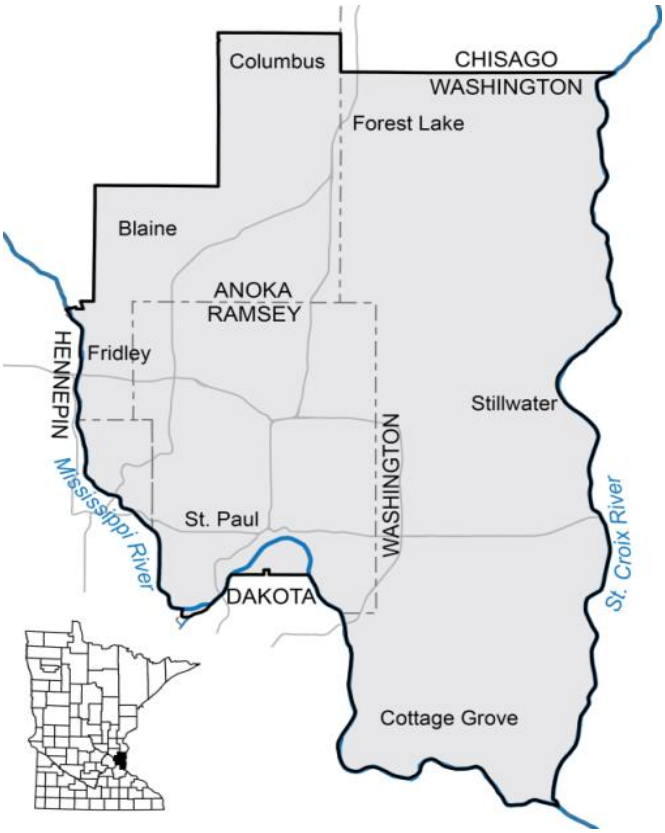
MnTAP SOLUTIONS (2014) http://www.mntap.umn.edu/intern/pdf/2014Solutions.pdf

MnTAP SOLUTIONS (2015) http://www.mntap.umn.edu/intern/pdf/2015Solutions.pdf

The current partnership project titled Industrial Water Conservation in the North and East Metro Groundwater Management Area was supported by a 2014 Legislative appropriation:

> Chapter 312, H.F.No. 3172, Article 14- Clean Water Fund, Section 1, Clean Water Fund Appropriations, Section 5, Metropolitan Council:
>
> > $50,000 in 2015 from the clean water fund is to partner with the University of Minnesota's Minnesota Technical Assistance Program (MnTAP) to identify opportunities for industrial water users to reduce or reuse their water consumption within the North and East Metro Groundwater Management Area.

The Minnesota legislature created groundwater management areas as a tool for the DNR to address difficult groundwater-related resource challenges. The North and East Metro Groundwater Management Area illustrated below, is one of three pilot planning projects across the state where the Minnesota Department of Natural Resources (DNR) is addressing groundwater management challenges.



Work by MnTAP staff members to fulfill the objectives of the project included five project tasks for the period September 24, 2014 to June 30, 2015. These tasks were outlined in consultation with Mr. Brian Davis, the Metropolitan Council designated administrative Project Manager. The five project tasks included:

Task 1. Identification of industry sector targets for water conservation outreach

Analyze DNR State Water Use Data System permit and Supplemental Use databases, Metropolitan Council data, and National Pollutant Discharge Elimination System (NPDES) data to determine the three to five industrial sectors with the largest water users in order to focus water conservation assistance efforts with companies in these sectors using site assessments and intern projects.

Task 2. Outreach and engagement strategies

Produce nine or more electronic newsletters with GWMA project update information and awareness raising, site assessment and intern assistance promotion, and technical water conservation tips. Participate in additional public outreach through a variety of presentations, handouts, and networking opportunities.

Task 3. Site assessments

Conduct four or more water conservation site assessments at industrial facilities to quantify their water use and offer recommendations on water conservation opportunities. Develop a confidential report for the facility and follow-up to assess effectiveness.

Task 4. Promote water conservation intern project opportunities in affected area

Solicit, evaluate, and approve up to three applications from facilities in the GWMA for a MnTAP summer intern focused on water conservation.

Task 5.Compile results

Produce four quarterly progress reports and one final report summary detailing the results of the efforts of Tasks 1-4. Share information in print or on-line, or in presentations and other outreach in other appropriate venues. Information amended with aggregated assessment site assessment and intern project recommendations when those results are finalized.

Project activities and results

Task 1. Identification of industry sector targets for water conservation outreach.

The project focused on industrial water and groundwater users in the north and east metro groundwater management area. The research goals were to identify, categorize, and quantify three to five industrial sectors' groundwater use by numbers of businesses, water volumes, and other criteria with the objective of providing targeted technical outreach for water conservation.

The identification of industry groundwater-only use required data analysis of three categories of water source data: groundwater from privately owned wells, mixtures of groundwater and municipal sources, and municipal sources only. To identify industrial groundwater users only, water sourced from surface water had to be differentiated from water sourced from groundwater.

The municipalities where businesses purchased their water were used to determine if the water was from groundwater or surface water sources. MnTAP staff collected water use data from four databases to assemble and analyze the information:

- The DNR State Water Use Data System (SWUDS), which identifies permits issued for large water appropriations defined as more than 10,000 gallons per day, or one million gallons per year. Users without permits are not included in this data.
- The DNR Supplemental Use Database, which incorporates water use information from municipalities, provides a breakdown of a city's water use into commercial, industrial, residential, agricultural, or other use.
- The Metropolitan Council Environmental Services Industrial Waste Division Database containing facilities that discharge industrial wastewater to the sanitary sewer system.
- The National Pollutant Discharge Elimination System (NPDES) data containing all users with permits that allow direct discharge to surface waters.

Industries without any of these permits were identified through publicly available municipal water top ten largest user data. Additional MCES data added differentiation between water provided by private wells and city supplies.

Businesses were classified either by North American Industrial Classification System (NAICS) numbers, Standard Industrial Classification (SIC) codes or an industry description and water use. All classifications were used to sort companies into industry sectors. Sectors were defined as industrial and included in the research based on consensus with the MCES Project Manager. Once sectors were established, a combination of information was used to define the candidate facilities in the GWMA including city names, zip codes, addresses, Internet maps, and GIS attributes to ensure that the chosen sectors and businesses within those sectors and within the GWMA were included.

There were ten major industry sectors in the research that represented a total of 231 facilities reporting 4.6 billion gallons of water from surface and groundwater sources used in 2012.

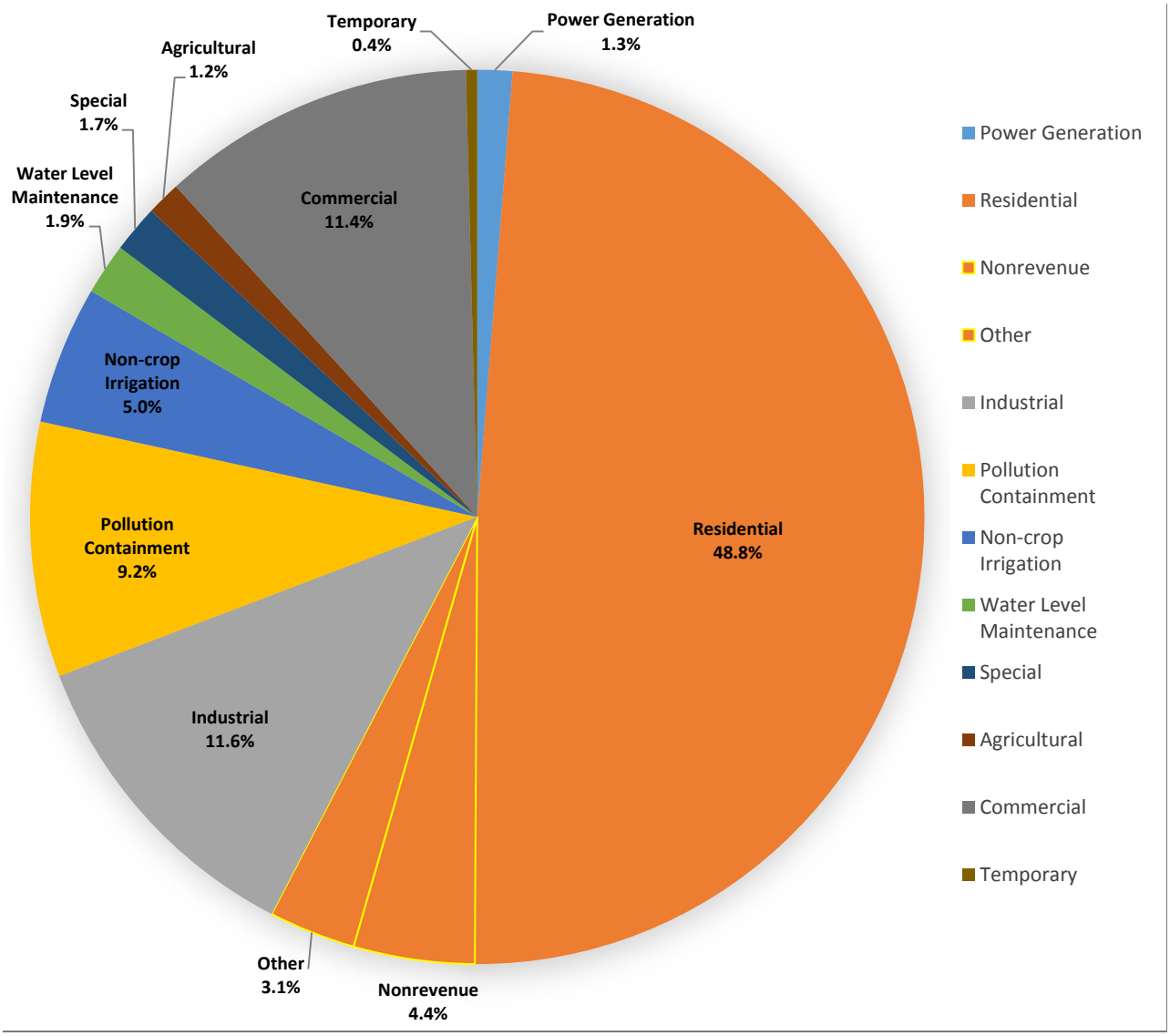
Table 1. 2012 industrial surface water and groundwater use by sector

Industry sectors	Examples	Water used (billion gallons)
Manufacturing	Chemicals, electronics, food, metal products	3.7
Mining	Sand & gravel, limestone	0.1
Other Services	Plastics	<0.01
Research and Development		0.3
Services	Dry cleaning & laundry, messenger	0.2
Support Services	Printed products	<0.01
Transportation	Ground transit, line haul railroads	<0.1
Utilities	Electric, natural gas	0.3
Waste Management and Remediation	Material recovery, waste treatment & disposal	<0.1
Wholesale	Chemicals	<0.1

Direct-access data such as permit reporting was the most straight-forward accounting of water use. Missing records, inadequate detail, as well as reporting and classification inconsistencies were problematic in accounting for the business and industrial use of municipal water supplies. Also challenging was the differentiation between municipal supplies from surface water and groundwater when different municipalities purchase water from one another.

Figure 1 summarizes comprehensive groundwater use in the GWMA including industries with separate DNR appropriation permits and the complete categorization of municipal water pumped.

Figure 1. 2012 groundwater use of 30 billion gallons including industries with separate DNR appropriations permits and the complete categorization of municipal water pumped.



Source:

Chart reproduction of Figure 4 from Industrial Water Conservation in the North and East Metro Groundwater Management Area Data Research Report.
DNR SWUDS groundwater appropriations permits and DNR Supplemental Use Database.
Total groundwater represented is 30 billion gallons.
Chart allocates Municipal use into Residential, Commercial, Industrial, Agricultural, Nonrevenue and Other categories.
Nonrevenue category is approximately 1.2 billion gallons of water.
Other category is approximately 0.84 billion gallons of water.

Industrial groundwater use comprises 11.6% of total regional groundwater use, or 3.5 billion gallons of water. This category of water user in the GWMA comprises an estimated 184 facilities. The largest 18 users (or 10% of industrial groundwater users) use approximately 85% of the 3.5 billion gallons of groundwater.

Six target industry sectors shown below identified with [♦] and highlighted in yellow emerged when reviewing the GWMA industrial groundwater use:

Table 2. Target industry sector groundwater users for 2013

	2013 industrial groundwater use	
	Number of companies	**Industrial groundwater used (%)**
Manufacturing		
♦Building Materials	1	4.4
♦Chemicals	1	29.7
Electronics	1	2.2
♦Food Products	2	5.4
Metal Products	3	3.3
♦Paper Products	1	10.2
♦Petroleum Products	1	19.0
Primary Metals	1	2.1
Mining		
Sand & Gravel	2	1.7
R&D		
Aquaculture	1	1.1
Multisector	1	0.8
Services		
Laundry & Dry cleaning	1	2.1
Utilities		
♦Electric	2	2.3
TOTAL	**18**	**84.3**

Source:
Excerpt of Table 4 from Industrial Water Conservation in the North and East Metro Groundwater Management Area Data Research Report.

The target eight facilities in six industry sectors in 2013 represent a selection of consistently high groundwater users that would likely have substantial water conservation opportunities appropriate for in-depth assistance focus.

The research report draft "*Industrial Water Conservation in the North and East Metro Groundwater Management Area- Data Research Report"* was submitted to the Metropolitan Council on May 21, 2015. The delivery timeframe was substantially extended beyond the anticipated four months needed to produce the report due to data and analysis complexities.

Task 2. Outreach and engagement strategies

MnTAP researched and assembled reference information and immediately applicable tips on both general water conservation strategies and content specific to targeted industry sectors for the assistance outreach and engagement task. This outreach took the form of ten electronic newsletters. Introductory paragraphs outlined the project progress and objectives and the remaining paragraphs titled 'Did You Know…" provided details on a number of water conservation topics as shown in Table 3.

Early email newsletters were successfully sent to an average of 480 addresses, later newsletters sent to 690 addresses (average of 616). The average email open record was 374 for tracked newsletters. Newsletter content was also posted to the MnTAP website for general access for agencies, organizations and other businesses looking for water conservation information around the state.

MnTAP promoted this project and the assessment opportunities with regional entities such as cities, towns, agencies, civic and business organizations. This regional support helped to identify companies ready to capitalize on the assessment opportunities and provided regional recognition and support for the businesses.

Table 3. Project electronic newsletter topic outlines

Date	Title	Technical topic
October 27, 2014	MnTAP Launches Water Conservation Project in North and East Metro	Direct and indirect costs of water
November 6, 2014	Do your water conservation challenges need a second set of eyes?	Leaks
December 23, 2014	Start 2015 with resources to tackle water conservation opportunities	Boilers and steam traps
January 26, 2015	2015 New Year Resolutions	Cooling systems
March 5, 2015	N&E Metro GWMA update - Intern projects filled, but site assessments always available	Non-contact cooling
May 8, 2015	No cost water conservation site assessments can net big cost savings	Process washing and rinsing
May 14, 2015	North & East Metro Groundwater Management Area (GWMA) project update	Domestic fixturing
June 8, 2015	North & East Metro Groundwater Management Area (GWMA) project update	Irrigation
June 16, 2015	North & East Metro Groundwater Management Area (GWMA) project update	Examples in the food industry
June 30, 2015	GWMA water project final update and invitation	Water treatment

Each of the newsletters have been posted on the MnTAP website at http://www.mntap.umn.edu/greenbusiness/water/water_projects.html and found in the full page print version in ***Appendix A.***

The MnTAP webpages associated with water include topics on contaminants, technologies, process efficiency, projects, and links to the EPA WaterSense program. Page views of all water-related topic resources totaled 3,198 between September 24, 2014 and June 14, 2015. This total was 21% higher than the same period for the previous year, with January and February views higher than the average trend.

A project status meeting on December 15, 2014 resulted in approval of an outreach strategy for municipal water suppliers interested in addressing community-scale water conservation issues with a MnTAP internship. A special email newsletter (***Appendix B***) offering that opportunity was sent on January 14, 2015 to 219 contacts in municipalities, including city council members, public works, and city administration personnel.

Table 4 below outlines additional MnTAP outreach activities.

Table 4. Additional MnTAP water conservation outreach

Activity	Location	Date(s)	Approximate number of participants
Project outline presentation and handout information	Hennepin County hazardous waste generator training-Ridgedale Library	September 18, 2014 October 21, 2014 November 13, 2014	120
Networking with attendees of Washington County Water Consortium field trip to water conservation projects	17th Ave Residence Hall UMN East Bank campus	November 5, 2014	20
Networking and handouts made available at event registration	Environmental Initiative's Water Stewardship forum-Target Field, Minneapolis	November 18, 2014	100
Project outline presentation and handout information	Anoka County hazardous waste large quantity generator training-Connexus Energy, Anoka	December 9, 2014	35
Distribution of MnTAP SOURCE newsletter 2014 Issue 2 outlining two pages of water conservation information	Statewide	January 2015	2,900
Networking at two Department of Natural Resources GWMA public forums	Eagle Valley Golf, Woodbury Blaine Public Works	February 9, 2015 February 26, 2015	40 40
Project handouts provided	2015 Paint and Powder Coating Expo, Century College, White Bear Lake	March 19, 2015	250
Networking and poster presentation	Minnesota Ground Water Association spring conference	April 22, 2015	250
Project outline presentation and handout information	Hennepin County hazardous waste generator training-Ridgedale Library	April 2, 2015 April 30, 2015 May 28, 2015	180
Distribution of MnTAP SOURCE newsletter 2015 Issue 1 outlining two water weblinks	Statewide	June 2015	2,850
Public seminar participation on Smart Irrigation panel and discussion	Anoka County Water Resources Task Force seminar at Bunker Hills Activity Center, Andover	July 16, 2015	28

External outreach included a project announcement in the November 2014 **GREEN NOTES** publication of Hennepin County, and also MCES **OPEN CHANNEL** *News* in November 2014.

A reasonable association can be made between the outreach mechanisms employed and the resulting requests for assistance services shown in Table 5 below. Project outreach newsletters resulted in eight companies contacting MnTAP for additional program/project information. The specific newsletter for municipalities resulted in four additional contacts from cities/townships for a total of twelve respondents to the outreach newsletters. General awareness and knowledge of the long-standing MnTAP intern program resulted in five companies contacting MnTAP about water conservation options. MnTAP staff referred one company and an energy utility referred one company. A combination of the project outreach e-mailings and promotion, offers of water conservation assistance, and coinciding intern program outreach resulted in 19 metro-wide companies or municipalities contacting MnTAP about the program. Twelve of these contacts were in the GWMA and seven in the greater metro.

From the 19 metro-wide contacts, MnTAP staff members visited 12 of the sites, eight of which are located in the GWMA. The visits were initiated to talk about the groundwater project and gauge interest in either an intern or a water conservation assessment.

Intern Applications

Sixteen facilities were interested in more information on the Intern Program. MnTAP made intern project scoping visits to 12 of these sites and received 10 intern applications. Five of these facilities were awarded MnTAP intern projects for summer 2015. Two facilities were primary water conservation projects within GWMA funded at 100% by the Water Conservation Intern Project 2015 MCES ID 14I007. Two had significant water components to the projects just outside GWMA territory and were funded at 50% from the Water Conservation Intern Project 2015 MCES ID 14I007. One project within GWMA had a different focus but some water conservation potential and was funded from different program support. Of the remaining five sites that submitted applications for the 2015 intern program, two were found to not be suitable for the program, and three were unable to commit to the program.

Site Visits

Three of the 19 companies were interested in site-based assessments. Two of these had site assessments as part of Task 3. The third company is considering their future partnership options for water conservation assistance from MnTAP. Site assessments were offered to the two companies in GWMA that applied for a 2015 intern and were not awarded, or declined participation.

MnTAP will continue to follow up with additional businesses who had visits about the intern program but chose not to apply, and the municipalities that expressed interest.

Table 5. Company/municipality outreach results

Sector	Type	GWMA	Metro	Outreach outcome	MnTAP action	Facility action	Result
Manufacturing	Plating	X		Intern interest	Visit	Intern application	2015 intern project*
Administration	Municipality	X		Intern interest	Visit	Intern application	2015 intern project**
Utility	Electric energy	X		Intern interest	Visit	Intern application	2015 intern project**
Manufacturing	Food products	X		Assistance request			Site assessment
Agriculture	Horticulture	X		Assistance request			Site assessment
Manufacturing	Electronics	X		Intern interest	Visit	No response	Continue followup
Manufacturing	Plating	X		Intern interest	Visit	No response	Continue followup
Metal products	Metal	X		Intern interest	Visit Followup	Intern application	Project not awarded
R&D	Chemicals	X		Intern interest	Visit	Intern application	Project withdrawn
Administration	Municipality	X		Intern interest	Followup	No response	Continue followup
Administration	Municipality	X		Intern interest	Followup	No response	Continue followup
Manufacturing	Paper/ packaging	X		Project discussion	Visit	Other intern project commitments	Continue followup
Manufacturing	Food products		X	Intern interest	Visits	Intern application	2015 intern project***
Manufacturing	Food products		X	Intern interest	Visit	Intern application	2015 intern project***
Manufacturing	Electronics		X	Intern interest	Visits		Site assessment
Administration	Municipality		X	Intern interest	Followup	No response	Continue followup
Manufacturing	Chemicals		X	Intern interest	Visit On-going followup	Intern application	Project not awarded
Manufacturing	Electronics		X	Intern interest	On-going followup	Intern application	Unable to commit
Primary metals	Foundry		X	Intern interest	On- going followup	Intern application	Unable to commit

*Funding from non-MCES source

**Funding from MCES (Water Conservation Intern Project 2015, MCES ID 14I007) at 100%

***Funding from MCES (Water Conservation Intern Project 2015, MCES ID 14I007) at 50%

Table 5 activities resulted in 16 organizations interested in MnTAP interns. Twelve visits to those organizations resulted in two technical site assessments and three intern projects in the GWMA.

Documentation of the three intern projects will be reported in detail in Water Conservation Intern Project 2015, MCES ID 14I007 project final report.

Task 3. Site assessments

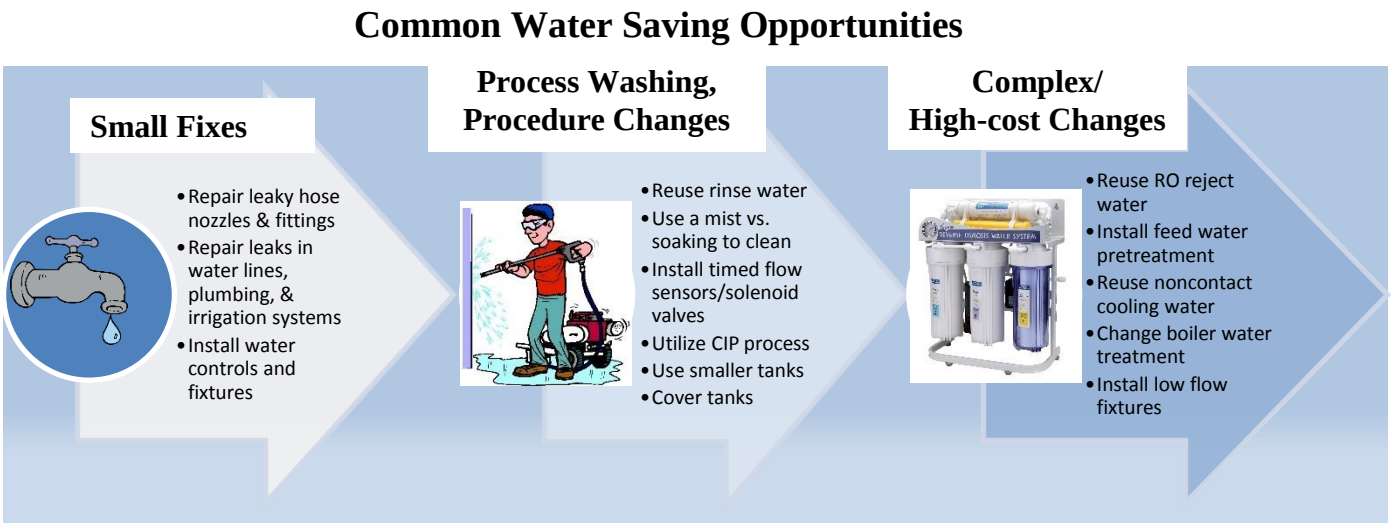
MnTAP worked with identified companies from Task 2 and others to conduct technical onsite industrial water conservation assessments to achieve the site assessment goals of the project. Assessments continue to be conducted under agreement between the companies and the University of Minnesota to maintain company confidential information. The assessments include evaluations of processes and water use for various process operations utilizing the expertise of experienced MnTAP personnel. Confidential reports summarizing assessment findings and recommendations were provided to the companies. MnTAP staff will follow up with the companies periodically over the course of two years to determine how many of the recommendations were implemented and what ultimate savings were realized.

Water conservation site assessments were performed and are continuing to be scheduled in the GWMA by MnTAP staff as shown in Table 6. Table 6 also includes recent water conservation work in the metro outside the GWMA. MnTAP will continue to interact with any facilities or municipalities in the GWMA to continue to conduct additional assessments in support of the growing interest in water conservation.

Table 6. Technical site assessments

Sector	Type	GWMA	Metro	Annual proposed savings based on assessment recommendations
Manufacturing	Food products	X		830,000 to 3,100,000 gallons
Agriculture	Horticulture	X		6,100,000 gallons
Manufacturing	Equipment	X		1,010,000 gallons
Manufacturing	Building materials	X		Assessment potential under advisement
Manufacturing	Food products	X		Assessment approval and schedule pending
Administration	County	X		Anticipate 2016 water conservation-focused intern application
Manufacturing	Food products	X		Assessment anticipated late winter or early spring 2016
Services	Healthcare		X	2016 water conservation-focused intern project awarded
Administration	Schools		X	Anticipate 2016 water conservation-focused intern application
TOTAL		7	2	

Results from the seven site assessments completed and pending suggest numerous small water sources can collectively make a big impact on water use. Potential findings range from small, easy fixes, to moderate procedure and process changes, to more complex, high-cost, high-return opportunities (see graphic – water saving opportunities).



Knowing the full extent of water usage by performing a water audit and creating a water map to track use can help identify areas for conservation as well as create a benchmark that can be used to measure future improvements. MnTAP interns are an excellent resource to provide this type of detailed analysis:

> In 2015, a MnTAP intern at the Xcel Energy Riverside plant found opportunities to reduce well water discharged to the drain. One recommendation involved treating the condensate water with a deionization system allowing it to be recycled to the makeup storage tank. The intern also analyzed the reverse osmosis (RO) systems and recommended installing a control valve on the concentrate stream and decreasing the set flow rate of the concentrate to achieve improved system recovery. These changes, along with other water recovery and optimization solutions have the potential to save 6.9 million gallons of water and $10,600 annually.

Outreach activities did not seem to motivate companies to request stand-alone site assessments as it appeared to do with the intern projects. Two companies out of the estimated 600 recipients of ten newsletters approached MnTAP for site-based water conservation assessments.

Passive outreach engagement was not an effective means to solicit assessment sites and motivate facilities for water conservation assistance. The value of the newsletters was to get facility managers thinking about water conservation and options they might have. However the newsletters alone appeared to be insufficient to motivate them to contact MnTAP for water conservation assessment assistance.

Direct follow-up with facilities through either personal contact by MnTAP staff, and/or municipality or service provider referrals was implemented to engage organizations to consider a water conservation site assessment. A direct approach benefits from the considerable resources developed over the course of this project period to utilize the information gained from the GWMA water use research report to approach municipalities as well as directly call facilities identified during the report research to improve actionable engagements. The newsletter resources provide tools that can be recommended to companies during the assessments. Other resources such as case studies from intern projects and previous assessment activities are useful examples for assessors and companies to follow when identifying and implementing water conservation improvements.

Task 4. Promote water conservation intern project opportunities in affected area

Intern projects were focused on water conservation improvements at industrial facilities located in the GWMA. As part of the annual MnTAP intern project solicitation effort, companies with significant water conservation opportunities that were interested and engaged due to the outreach and assessment activities from Task 2 and 3 were approached to determine interest in additional technical support through the MnTAP intern program.

MnTAP intern project selection routinely includes a site visit evaluation by MnTAP staff to scope the anticipated project objectives, to better understand the facility priorities and objectives, and understand the circumstances under which the student will be working. Contact from nine GWMA facilities interested in a water conservation-focused intern project resulted in visits to eight facilities for scoping visits and facility tours.

Five water conservation intern project applications were submitted from facilities in the GWMA and three projects were selected. The City of Woodbury project focused on commercial property irrigation improvements, and Xcel Energy Riverside power generating plant project focused on process water improvements. Prior to the program start in late May 2015, the third major project was withdrawn by the company because of difficulties agreeing to terms of administrative details. The fourth application did not merit enough consideration initially within the overall pool of candidate projects that MnTAP was able to support in 2015. The fifth project within GWMA was awarded to ECO-Finishing in Fridley. This project had water conservation potential, but had a different primary focus and was supported with different program support. The remaining four organizations in the GWMA originally interested in the MnTAP intern program did not subsequently submit applications.

Two additional water conservation intern projects in the metro included Sanimax in South St. Paul and Lloyds BBQ in Mendota Heights. Both facilities are near, but not located within the boundary of the GWMA. These projects had multiple priorities including water conservation and were funded at 50% each by the MCES grant Water Conservation Intern Project 2015 MCES ID 14I007.

The projects started in late May/early June, 2015. Interns worked full time at each facility and reported their activities, findings, and questions weekly. A final report to the company was completed, and the projects concluded with a public presentation symposium and poster session of the project findings on August 20, 2015 at the McNamara Alumni Center at the University of Minnesota east bank campus.

The intern project results were reported before the end of December 2015 under the MCES grant Water Conservation Intern Project 2015 MCES ID 14I007.

Task 5. Compile results

Quarterly reports have been submitted within the month following the end of the quarter throughout the project in an agreed upon report template (***Appendix C***). Report dates were October 28, 2014, January 22, 2015, April 29, 2015, and June 30, 2015.

The project summary report for the project period August 24, 2014 to June 30, 2015 is complete with this submission. The date of this report was extended in order to fulfill accomplishing the site assessment objective(s).

Results of the intern projects specified in Task 4 were reported under Metropolitan Council contract Water Conservation Intern Project 2015, MCES ID 14I007 on or before the end of that contract on December 31, 2015.

Summary

Groundwater management areas by definition are areas where water challenges exist. This project addressed the impact of industrial operations in the north and east metro GWMA where additional clarity on the groundwater use profile, resource generation, and tailored technical assistance were effective in motivating water efficiency in the industrial sector.

We now know with greater accuracy the percentage of water use attributable to various classification categories, especially the water supply provided by municipalities. There is better definition of how and where industry is using groundwater in the GWMA. Water conservation awareness is heightened by virtue of the increasing numbers of facilities interested in the cost-effective MnTAP intern program and the successful results each project generates.

The project met the technical objectives set out to conduct the exploratory data analysis, raise awareness and publicize the need for water conservation, engage industry in technical assistance, and initiate and complete in-depth intern projects resulting in substantial water savings recommendations. Water saving potentials from site assessments and GWMA-located intern projects exceed 37.2 million gallons of water per year and cost savings of over $100,000 annually.

Although progress has been made, significant water conservation opportunity in the metro area remains. Industrial water conservation can be motivated by limitations to production increases, the capital expenditure to access additional supply, or the added cost of treatment and energy. Conversely, industry water use status quo can be attributed to low cost supply, a cost of business attitude, and competing efficiency priorities. While certain business conditions motivate investment in water conservation for some companies, the low cost of water relative to other business priorities tends toward maintaining current inefficient practices.

Having generated additional water efficiency resources and information, MnTAP continues to pursue water conservation opportunities in business and industry across Minnesota as part of our active pollution prevention assistance relationships with industry sectors. MnTAP will continue to emphasize the full cost impacts of water use by including the impact of process energy utility costs in the site total water costs. Process inputs like hot water, treated water, and water distribution energy inputs are included whenever possible to address the holistic impact of water conservation opportunities and motivate change.

MnTAP will promote access to practical and actionable water conservation-related information generated in this work by supporting water conservation focused web pages. In addition, MnTAP will continue to create and publish technical examples and case studies of water conservation improvements that reflect the needs of business and industry in Minnesota. The partner relationships with MCES, DNR and others will also be maintained whenever and wherever MnTAP can add assistance value.

Appendices

Appendix A – Project e-newsletters

Appendix B – Special edition e-newsletter to municipality contacts

Appendix C – Quarterly report template