DEPARTMENT OF NATURAL RESOURCES

Great Lakes- St. Lawrence River Basin Water Resources Compact

Water Conservation and Efficiency Program Annual Assessment

State of Minnesota, November 16, 2020

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Cover photo: Gitchi-Gami State Trail along Lake Superior in Minnesota, Carmelita Nelson

Water Conservation and Efficiency Program Report Purpose

Each Party shall submit a report to the Council and the Regional Body detailing its Water Conservation and Efficiency Program to satisfy obligations included in the Great Lakes-St. Lawrence River Basin Water Resources Compact.

MINNESOTA HIGHLIGHTS:

Drought - 2020 was a dry year in much of the Lake Superior Basin in Minnesota. A new drought index portal is available online. Most of the basin saw moderate to severe drought levels for multiple weeks this summer. Abnormally dry to moderate drought conditions persisted into October, there were no significant forest fires in this highly forested area of the state. No water use permit suspensions were needed in the Lake Superior basin. The DNR did issue one suspension in the nearby Rainy River watershed that flows north to Lake Winnipeg.

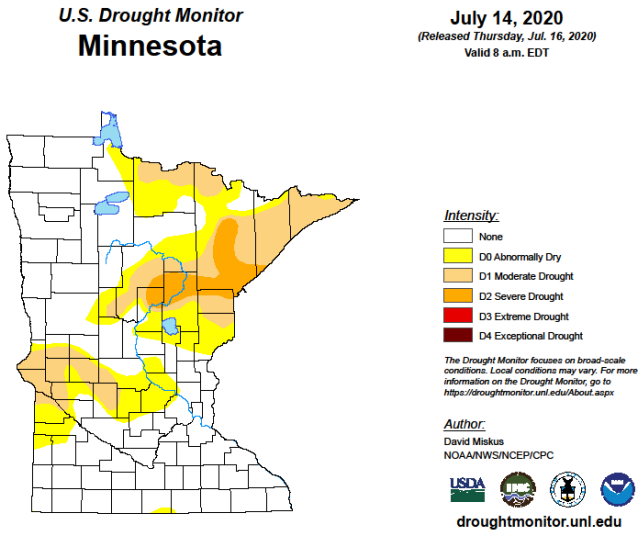

Figure 1. Minnesota Drought Map July 14, 2020 shows the Arrowhead region in moderate to severe drought.

Water Temperature - Lake Superior water temperatures were warmer. NOAA has reported that surface waters on all five of the Great Lakes are on track to surpass average temperatures from the last 25 years. Warmer water temperatures support more phytoplankton and cyanobacteria, potentially leading to harmful algae blooms that could affect food chains or become toxic. Warm summer water followed by cold, dry fall air can increase evaporation, lowering water levels, influencing lake effect snow, and producing stronger winter storms. Reduced ice cover and storms over the 2019-2020 winter caused additional coastal erosion.

Pandemic - A major event of 2020 has been the COVID-19 pandemic. The EPA announced that drinking water from the tap was safe and boiling water or buying bottled water was not necessary. Public utility employees were deemed essential and continued to work. Cities maintained essential operations and prepared for a reduced workforce. They have implemented small group work shifts, enhanced sanitation practices, prepared for sickness with cross training of staff and other measures. MnWARN united to provide contingency plans for small water providers with only one or two staff and made available 80,000 cloth facemasks shipped by FEMA. MnWARN reports that there were no major pandemic issues and masks remain available. The Department of

Health sent emergency plan guidance to all public water suppliers. All state employees began working from home March 27 or telecommuting before that. Many Department of Health water staff were reassigned to COVID-19 work, at least temporarily. Every piece of public property throughout the state has experienced a substantial increase in visitors. This has resulted in an increase in water demand on North Shore facilities, as well as an increased demand on water supply. However, this is not expected to affect water conservation efforts.

Funding - After several special sessions, the Minnesota legislature passed a $1.9 billion Bonding Bill late in 2020, including the largest clean-water appropriation in state history - $269 million for water, wastewater, and stormwater projects. Most will go to asset preservation. The city of Duluth will receive $13 million to renovate the Lake Superior seawall, including a full lakefront redesign. However, many cities anticipate their budget to be flat or declining for 2021. It is also possible to anticipate a decrease in Clean Water Funding and other water-related funds due to evolving economic conditions.

Water Conservation - Major water conservation accomplishments and innovations include expanding the new DNR Water Conservation Reporting system to include small communities; the University of Minnesota Technical Assistance Program (MnTAP) continued to work with businesses throughout the pandemic helping businesses find energy efficiency and water conservation solutions; and completion of the five-year State Water Plan.
This report includes new actions that were started or accomplished during the calendar year 2020. For previous water management, water conservation and sustainability programs please see earlier reports.
The Minnesota Department of Natural Resources (DNR) submits this report. We have captured some of the highlights from our cooperating partners including other governmental and non-governmental groups involved in managing and conserving Lake Superior and other Minnesota water resources.

Note: All underlined items are linked to the referenced Websites

Lead agency/agencies and contact person(s)

Minnesota Department of Natural Resources (DNR), Division of Ecological and Water Resources (EWR) is the lead agency responsible for Minnesota's water quantity management and water conservation and efficiency programs. Contacts are:

- Tim Walz, Governor of Minnesota
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Status of Minnesota's water conservation and efficiency goals and objectives consistent with the Basin-wide goals and objectives.

Compact § 4.2.2 calls for each state to develop goals and objectives. Minnesota has adopted Compact's goals and the Council's objectives and satisfy this aspect of Compact § 4.2.2.

Water conservation goals in Compact Section 4.2.1 have been adopted in Minnesota Statutes section 103G.801. These goals include:

1. Ensuring improvement of the Waters and Water-Dependent Natural Resources;
2. Protecting and restoring the hydrologic and ecosystem integrity of the Basin;
3. Retaining the quantity of surface water and groundwater in the Basin;
4. Ensuring sustainable use of Waters of the Basin; and
5. Promoting the efficiency of use and reducing losses and waste of Water.

Water conservation objectives in Compact Section 4.2.1 have been adopted in Minnesota policy. These objectives include:

1. Guiding programs toward long-term sustainable water use;
2. Adopting and implementing supply and demand management to promote efficient use and conservation of water resources;
3. Improving monitoring and standardizing data reporting among state and provincial water conservation and efficiency programs;
4. Developing science, technology, and research; and
5. Developing educational programs and information sharing for all water users.

Minnesota is actively moving forward with an increased emphasis on water conservation, not only with current water law, rules, policies, and their implementation, but also with improvement plans that further both state and Compact goals. The laws cited and programs described below provide a framework for sustainable water management that promotes efficient use of the state's water resources. Statewide programs that monitor and protect water resources are managed by several Minnesota agencies, including the DNR, the Pollution Control Agency, the Department of Health, the Department of Agriculture, and the Board of Water and Soil Resources. Minnesota DNR applies an adaptive approach to its water management, so that expanding scientific knowledge and improvements in technology lead to improvements in natural resource use and protection.

Water Conservation and Efficiency Program Overview.

a) Citations to implementing laws, regulations and policies.

The statutes and rules listed below are available at http://www.leg.state.mn.us

Primary:

- *Minnesota Statutes*, chapter 103A. Water Policy and Information
- Minnesota Statutes, chapter 103G. Waters of the State (primary regulatory statute)
- Minnesota Statutes, chapter 103G.271 Appropriation and Use of Water
- *Minnesota Statutes*, section 103G.801, Great Lakes – St. Lawrence River Basin Water Resources Compact
- *Minnesota Rules*, parts 6115.0600 – parts 6115.0600 – 6115.0810. Water Appropriations and Use Permits and Use Management Plans

Related:

- *Minnesota Statutes*, section 103B. Water Planning and Project Implementation
- *Minnesota Statutes*, section 103F. Protection of Water Resources
- *Minnesota Statutes*, chapter 103H. Groundwater Protection
- *Minnesota Statutes*, chapter 103I. Wells, Borings and Underground Uses
- *Minnesota Statutes*, section 116B.01 Environmental Rights
- *Minnesota Statutes*, chapter 116D. Environmental Policy

b) Summary of program elements both mandatory and voluntary.

Since 2015, the DNR has had a full-time Water Conservation Consultant developing and implementing the statewide water conservation program consistent with laws, the Great Lakes Compact, policies and management objectives. Minnesota's water conservation program is integrated with permitting and planning requirements.

Mandatory:

- **Permits:** A water appropriation (use or withdrawal) permit is required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. The efficient use of water is required through the permitting process (*Minnesota Rules,* part 6115.0770). Applicants may be required to provide alternatives to proposed actions, including conservation measures to improve water use efficiencies and reduce water demand [*Minnesota Statutes*, section 103G.301, subd. 1 (b)(3).
- **Accuracy:** Water users must measure water volumes appropriated within 10% accuracy. Flow meters are required but other methods, such as timers or electrical use meters, can be approved for smaller water users.
- **Demand reduction measures**: Public water suppliers serving more than 1,000 people are required to prepare a Water Supply Plan every ten years that is approved by the DNR. In these plans, suppliers identify water demand projections, development plans, water sources, and demand reduction and conservation measures. The 2016 - 2018 plan template has a stronger emphasis on water conservation and efficiency. All Water Supply Plans for public water utilities along Lake Superior and from the inland communities within the basin were due October 15, 2018.
- **Low Flow Suspensions:** Surface water use can be and has been suspended during low flow periods in Minnesota to protect downstream water needs and resources. Published procedures lay out when surface water users will be suspended. The DNR considers suspension of surface water appropriation permits within watersheds when the average daily flow has been at or below Q90 in each of the 81 major watersheds in Minnesota for 120 hours. Decisions about suspensions consider, but are not limited to, whether the use is consumptive, the priority of the use, and the extent to which the use is contributing to the flow in the watershed. Ecologically based low flow thresholds can and have been developed for some surface waters.

Voluntary:

- The new Water Conservation Reporting system is voluntary, with all municipalities (large and small), commercial, industrial and institutional users asked to report their conservation efforts in 2020.
- Most public water suppliers provide water conservation information to customers. Cities are encouraged to become US EPA WaterSense Partners.
- *Minnesota Statutes* that require demand reduction measures for new public water supply wells or increased water volumes also provide consideration for voluntary programs to retrofit water fixtures. Some local governments have collaborated with private industry to offer water-saving fixtures and other items such as soil moisture sensors.
- *Minnesota Statutes* encourage the reuse of non-consumptive water and the evaluation of reuse options as part of applications for water discharge permits.

- All public water suppliers and the public are referred to the water conservation toolbox developed by the Metropolitan Council, in cooperation with the DNR, which contains water conservation tips and resources for individual water users and program guidance for public water suppliers.

Identify how the State/Provincial program is consistent with the regional objectives:

Many efforts are underway in all levels of government, educational institutions, nonprofit organizations, business and industrial sectors, and the grassroots level to guide Minnesota toward long-term sustainable water use. As shown below, Minnesota's program is consistent with the regional objectives in the promotion of environmentally sound and economically feasible water conservation measures.

Significant Water conservation accomplishments in the past year:

Compact's Water Conservation and Efficiency Objectives	Summary of Minnesota's 2020 Efforts
1. Guide programs toward long-term sustainable water use	• EQB completed the 2020 State Water Plan: Water and Climate. • Remediation and environmental restoration work continues in the St. Louis Estuary. • Stormwater Inventory and management plan. • Tribal Climate Adaptation Menu. • A new Lake Superior Lakewide Action and Management Plan (LAMP) is being developed in 2020. • Three new Agricultural Certification endorsements.
2. Adopt and implement supply and demand management to promote efficient use and conservation of water resources.	• DNR Water Availability and Assessment Report completed. • Campus Water Conservation report. • As of 2020, 92% of the 347 cities with populations over 1,000 have submitted their Water Supply Plan. • Water Efficiency grants available. • MnTAP sponsors most interns ever to assist industry with water conservation and sustainability.
3. Improve monitoring and standardize data reporting within water conservation and efficiency programs.	• The statewide Water Conservation Reporting System will collect data from all 10,000 water permit holders on their water conservation and efficiency improvements. • The small city reporting was completed in 2020. Agricultural irrigators and golf courses operators began water conservation reporting fall 2020. Livestock operations begin Jan. 2021. • MN Permitting and Reporting System (MPARS) update. • Monitoring and Surveys Unit and the Groundwater Unit started the field season late, but continued data reports.

4. Develop science, technology and research.	• 2020 Lakes of Biological Significance ranks Lake Superior as an outstanding resource. • Research on preventing algal blooms. • Research on integrating water utility planning and land use planning.
5. Develop education programs and information sharing for all water users	• After a slight delay due to the pandemic, the We Are Water traveling exhibit resumed touring the state. • New online water education materials available. • An Anishinaabe Cultural Center. • CHAOS Community of Practice presentations. • Reimagining presentations and conferences.

OBJECTIVE 1: Guide programs toward long-term sustainable water use.

2020 State Water Plan: Water and Climate

According to *Minnesota Statutes section* 103B.151, the Environmental Quality Board is to coordinate a comprehensive long-range water resources plan for the state every ten years. This year's plan focused on water and climate change. Action 3.3 specifically addresses water conservation and efficiency, including financing recommendations. Additionally, from 103A.43: The Environmental Quality Board shall consolidate the assessments required in paragraphs (b) and (c) with the policy report in section 103A.204 and submit a single report…every five years.

The purpose of the plan is to establish a framework for aligning state agencies, legislative priorities, and local government policy, programs and actions for the coming decade. EQB developed this plan to set an agenda for tackling the stubborn and complex water problems that climate change will intensify for Minnesotans. The plan also includes four important Appendices:

Download the 2020 State Water Plan (7MB PDF)

Appendix A: Five-year Assessment of Water Quality Trends and Prevention Efforts (2MB)

Appendix B: 2020 Groundwater Monitoring Status Report (1MB)

Appendix C: Water Availability Assessment Report (1MB)

Appendix D: Water Supply Planning in the Twin Cities Metropolitan Area (2005-2020) (1.8MB)

MPCA continues work to remediate and conduct environmental restoration work on St. Louis River Estuary

The Kingsbury Bay and Grassy Point restoration project in the Duluth harbor is a large habitat rehabilitation effort that removes 120 years of historic sawmill wood waste from Grassy Point and years of accumulated excess sediment deposited in Kingsbury Bay. The dredging phase will remove about 120,000 cubic yards of wood waste and 130,000 cubic yards of excess sediment from the river. The dredging crews are working 24 hours per day, 6 days a week until freeze up. Despite this intense work schedule, they will not be able to finish this fall and will complete work next year. The dredged material will be used to build and enhance habitat features, including islands that will be replanted with native vegetation. The project is part of an effort to get the St. Louis River delisted as an area of concern. Funds from the State's Outdoor Heritage Fund, the federal Great Lakes

Restoration Initiative, and the Natural Resource Damage Assessment and Recovery settlement at the St. Louis River, Interlake, and Duluth Tar Superfund Site are contributing to the restoration.

Stormwater Inventory and Management Plan

While many people assume the picturesque shores of Lake Superior on the North Shore are pristine, E. coli contamination has shuttered beaches in Two Harbors and other communities. Over the past two summers, Lake County Soil and Water Conservation District (SWCD) has investigated the cause of the water quality impairments and worked with conservation partners to implement strategies to reduce E. coli contamination. Now, the district is working with the city of Two Harbors, consultant Technical Service Area 3, and the U.S. Army Corps of Engineers to develop a storm water inventory and management plan

Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu

The Tribal Adaptation Menu was created out of a need to incorporate indigenous and traditional knowledge, culture, language, and history into climate adaptation planning processes. The Menu provides a structured list of climate adaptation strategies and is used to help tribal natural resource professionals develop climate adaptation plans and to help non-tribal organizations communicate with tribal communities. Created in concert with the Ojibwe and Menominee, original stewards of the Great Lakes Region, it is intended to be adaptable for indigenous cultures. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) led development of this tool in close collaboration with the Northern Research Station's Northern Institute of Applied Climate Science and numerous tribal, academic, inter-tribal, and government entities in Minnesota, Wisconsin, and Michigan.

New LAMP for 2020

A new Lake Superior Lakewide Action and Management Plan (LAMP) is being developed in 2020. The goal of the plan is protecting this incomparable resource for future generations. A draft version was available in June and MN DNR submitted comments including making it strategic and enhancing decision-making and problem solving guidance. Public comment will be taken mid-November and the plan should be completed during the first part of 2021.

MDA Expands the Agricultural Water Quality Certification

The Minnesota Agricultural Water Quality Certification Program (MAWQCP) is launching three new endorsements in addition to the 10-year certification a farmer or landowner can receive. The MAWQCP endorsements available to water quality certified producers are for soil health, integrated pest management, and wildlife. These Ag Water Quality Certification endorsements celebrate the certified producers who are going above and beyond to implement conservation on their farms. The MAWQCP collaborated with various non-profit organizations, such as Pheasants Forever and the Minnesota Soil Health Coalition, and state agencies to develop the endorsements. Certified producers who achieve an endorsement will receive an additional sign for their farm and recognition for their conservation excellence. The DNR also worked with MDA to investigate a possible water conservation certification; however, this has not been adopted yet.

OBJECTIVE 2: Adopt and implement supply and demand management to promote efficient use and conservation of water resources.

Water Availability and Assessment Report

The 2020 Water Availability and Assessment Report reported the following water use trends. Although water use in Minnesota generally increased over the last decades of the 20th century, water use in the 21st century

has been declining. In total, Minnesota's water use has decreased over the past ten years from about 1400 billion gallons in the first decade of the century to about 1060 billion gallons at the end of the second decade. This translates to approximately a 28% decline in water use while our population increased by about 7%.

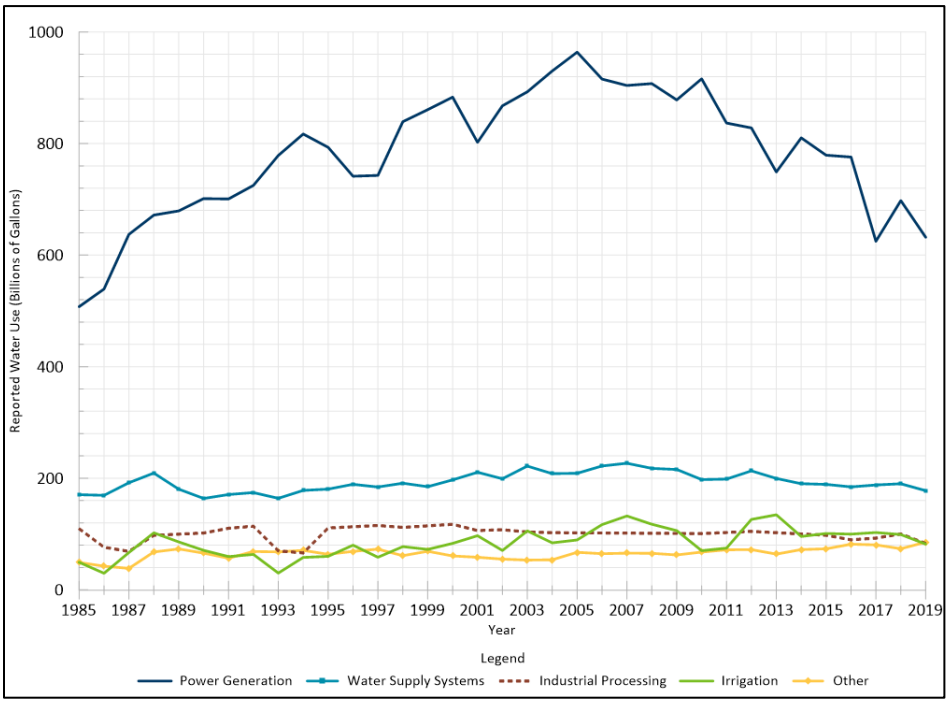

Figure 2. Reported water use by category of use

Decreasing water use for generating electricity

The largest portion of Minnesota's water use is from surface water for power generation. The majority of the decrease in the state's water use can be attributed to a decrease in water needed for power plant cooling – a use reduction of 33% from 2005 to 2019.

- This reduction occurred even as the overall demand for electricity remained constant.
- A number of large power plants converted from coal to natural gas. Natural gas plants require less cooling water. The share of the state's electricity produced by coal-fired electric plants declined from 53% to 31% over the period from 2011 to 2019.
- The amount of electrical power generated from wind and solar power has increased. These sources of electricity do not require cooling water. In 2019, the state's wind farms generated 19% of the state's total net electricity generation. Minnesota is a national leader in energy efficiency, and renewable energy has accounted for 84% of all new generation capacity since 2010.

Water use for non-power generation also declined from 2007 through 2019 (Figure 5). This decline is attributable to adopting water saving technologies, increased industrial water reuse, and implementation of irrigation best management practices. Additionally, recent wet years have likely contributed to the decline, as Minnesotans use less water for lawn and crop irrigation during times of ample precipitation.

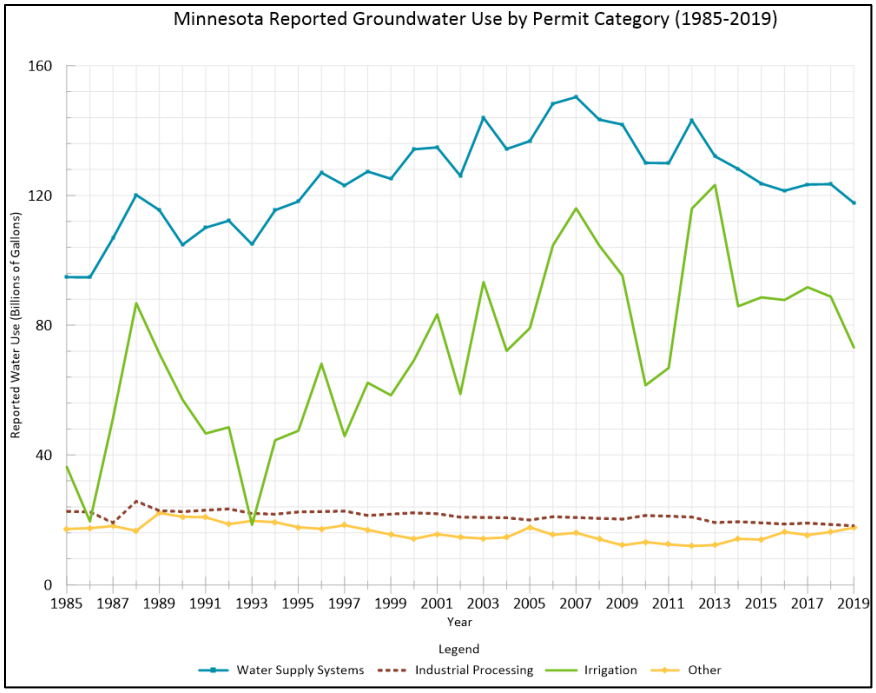

Figure 3. Reported water use by category of use, for non-power generation uses

Leadership in per capita water use

Minnesota has been making important strides in conservation, and individuals, businesses, and communities have all contributed to Minnesota's water conservation excellence. In 2018, 92% of water suppliers achieved the DNR residential water conservation goal of using less than 75 gallons per capita daily (GPCD). The statewide average residential GPCD is 52.

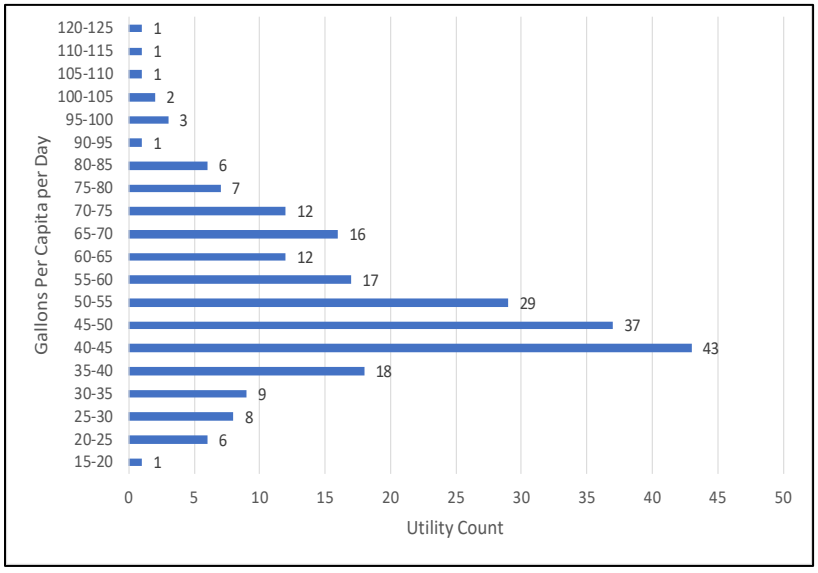

Figure 4. The number of water utilities in each category of residential gallons per capita (GPCD) of water supply used in 2018. The most common range for Minnesota water utilities reporting this information was 40 – 45 RGPCD.

Campus Groundwater Conservation Planning

The Metro Conservation Districts have nearly completed the campus water conservation research and a report on the best management practices for outdoor water conservation on campuses. Duluth has three major college campus facilities and many other technical and K-12 campuses that could benefit from this metro report. Research indicates that installation of 45 projects would reduce annual water use by 326,800 gallons, a 40% reduction in annual water use. Over 30 projects have a payback period of less than five years. This special TSA 4 program is developing protocols for implementation on large-acreage, public campuses (e.g. public schools, hospitals, and government facilities). These areas are targeted due to their educational benefits, likelihood of stakeholder buy in and implementation, magnitude of potential impact, and opportunity for school district-wide implementation.

Municipal Water Supply Plans

The DNR works directly with cities and towns throughout greater Minnesota to ensure their water supply plans emphasize water conservation and efficient use. Minnesota has 16 water suppliers in the Lake Superior Watershed that are required to complete a Water Supply Plans. Statewide, the DNR has approved 60% of the submitted plans and in the Lake Superior basin, 63% have been approved. Staff continue to work with cities to make final edits, since an approved Water Supply Plan is needed for MDH funding or prior to modifications to a DNR water appropriation permit.

Twelve cities have approved water supply plans, including Duluth, the largest city. Only one community has not submitted a water supply plan yet. The remaining communities are in the final editing phase.

Status of review and approval of 10-Year Water Supply Plans for the Lake Superior Watershed

City	Approved Y/N	Date of last action or approval
Aurora, City Of	N	Second draft received
Babbitt, City of	N	Edits sent back 10/15/2019
Carlton, City Of	Y	12/19/16
Chisholm, City Of	N	Nothing received yet. Reminder sent 8/8/19
Cloquet, City Of	Y	6/22/18
Duluth, City Of - Public Works Dept.	Y	1/30/17
Eveleth, City of	Y	03/06/20
Gilbert, City Of	Y	1/8/2020
Grand Marais, City Of	Y	6/14/17
Hibbing Public Utilities	Y	7/8/2020
Hoyt Lakes, City of	Y	8/20/19
Mountain Iron, City Of	Y	10/15/19
Silver Bay, City Of	N	2/28/20 second draft received
Superior Water Light & Power Co.	Y	12/31/2019
Two Harbors, City Of	Y	12/19/16
Virginia Public Utilities	Y	5/22/19

Water Efficiency Grant Program

The Metropolitan Council was awarded a second water efficiency grant of $375,000 for 2020-2022. Cities have responded enthusiastically and have submitted over $790,000 in requests. The funding is used for the Water

Efficiency Grant Program for communities to implement water efficiency rebate programs. Results from the first two years show approximately 52,000,000 gallons of water per year will be saved by these improvements. The Metropolitan Council's Water Efficiency Grant Program provides incentives to encourage efficient water use and conservation. Funding is provided by the Minnesota Clean Water, Land and Legacy Amendment funds.

Efficiency in the Commercial, Industrial and Institutional Sector

The Minnesota Technical Assistance Program (MnTAP) is an outreach program at the University of Minnesota that helps businesses develop and implement industry-tailored solutions that reduce water use, prevent pollution, and reduce energy use and cost to improve public health and the environment.

Figure 5. Safety protocols allowed students industrial experience.

The 2020 MnTAP Intern Program student cohort, their advisors and host companies showed exceptional resilience as they re-invented the program due to the COVID -19 pandemic. From virtual interviews and training sessions, and hybrid work arrangements the 2020 program was designed to provide safe work options for the largest number of interns and student researchers MnTAP has ever supported.

Figure 6. In 2020, MnTAP safely hosted the largest group of sustainability interns ever.

The Minnesota Technical Assistance Program hosted an online 2020 MnTAP Intern Symposium on August 19, 2020. The event featured presentations on the work of 21 interns and student researchers. The companies who hosted the MnTAP Interns represent a wide range of industries including food and beverage, foundry and metal fabrication, a variety of manufacturing sites, facility management, coatings and paper production as well as municipal wastewater treatment and water supply facilities. Geographically these projects affect communities from the far northwestern part of the state in Warroad, Breckenridge, Karlstad and Roseau to the south central

communities of Owatonna and New Ulm. A preliminary compilation of the impact of the 87 recommendations when implemented includes:

- 148 million gallons of water savings
- 1.9 million pounds of solid waste and hazardous material reduction
- 27 million kilowatt hours of electric energy saved
- 190,000 therms of gas energy saved
- $4.25 million in potential first year savings

To date 32% of the recommendations are implemented or in the process of being implemented.

OBJECTIVE 3: Improve monitoring and standardize data reporting among State and Provincial water conservation and efficiency programs.

New Water Conservation Reporting System

The Minnesota DNR has significantly improved the measurement and evaluation of water conservation and water use efficiency through a contract with Energy Systems Platform (ESP) to develop a new Water Conservation Reporting System. To our knowledge, it is the first and only statewide water conservation reporting system in the nation. The system is cloud-based for easy data entry and record management. The Minnesota Water Conservation Reporting System's annual reports help various sectors to learn more efficient and cost-effective ways to conserve our water resources. The data will continue to guide water use decisions in the future. As our population grows and climate changes, we may experience increased use and seasonal intensity of use in some parts of the state. Our efforts to strive for water efficiency and conservation in all sectors will help protect Minnesota's water supplies, industry, economies and natural resources well into the future.

Due to the pandemic, the 2020 closing deadline for reporting their accomplishments was extended by two weeks and several communities requested additional extensions.

The third year of large municipal water supply reporting (cities serving more than 1,000 people) gives us a solid picture of water supplier measurement and evaluation of water conservation efforts in the state. 2020 was the first year of reporting for small cities serving under 1,000 customers. Preliminary results show that statewide, water suppliers as a group met and exceeded water conservation goals. Key measures include:

- Water distribution loss is 9% (goal less than 10%)
- Statewide, cities achieved 49 GPCD Residential (goal less than 75 GPCD)
- Statewide, the total daily peaking factor in 2019 was 1.92 (goal less than 2.6)

Minnesota Permitting And Reporting System (MPARS)

Minnesota tracks water use through a web-based database, known as MPARS. DNR staff use this information to communicate to a variety of audiences about annual water use volumes, trends over time, and changes among various water use types. The DNR is pursuing an effort to improve the way we communicate about water use, conservation and types of water users. This new data visualization strategy will help all Minnesotans understand how the DNR manages water resources throughout the state and how different types of activities use the state's water.

Water Monitoring and Surveys Data

After a late start in fieldwork, the DNR Water Monitoring and Surveys Unit continued to collect data and provide information about stream flows and groundwater levels in Minnesota. This information helps the DNR and others carry out statutory responsibilities and water management strategies and programs. The team accesses and interprets data from more approximate 270 stream flow network gauges and more than 1,100 groundwater observation wells.

Products related to the stream flow monitoring work include:

- Production and distribution of weekly statewide stream flow conditions reports during the open water season (typically April through October)
- Production of stream discharge and elevation hydrographs
- Technical reports analyzing hydrology for special projects
- Technical guidance materials explaining stream flow measurement techniques
- Production and distribution of daily stream flow conditions reports during severe drought or flood events

Several gaging stations in the Great Lakes Basin have been improved. Live readings from these gaging stations can be seen on DNR's Cooperative Stream Gaging website.

Cooperative Groundwater Monitoring Program

The Cooperative Groundwater Monitoring (CGM) Program is a DNR network of over 1,100 water-level observation wells (obwell) across the state. The DNR is working to increase the number of continuously monitored wells with hourly measurements, with the goal of addressing all active wells in the state. The DNR obwell network collects static groundwater-level data to assess groundwater resources, determine long term trends, interpret impacts of pumping and climate, plan for water conservation, and evaluate water use conflicts.

OBJECTIVE 4: Develop science, technology and research.

Lakes of Biological Significance

In 2020, DNR staff identified 1,760 lakes in Minnesota meeting criteria for Lakes of Biological Significance (LBS). Lakes were identified and classified by DNR subject matter experts on objective criteria for four community types (aquatic plants, fish, amphibians, and birds).

Lake Superior received the highest designation of 'Outstanding' biological significance. The lake received number one ranks for fish and bird biological significance. The goal of this list was to identify lakes that exhibit the highest quality features within any of the four assessed biological communities (as opposed to identification of lakes that exhibit diversity across communities). Therefore, a lake needed to meet criteria for only one of the community types (aquatic plants, fish, birds, and amphibians) to be identified as a Lake of Biological Significance. The data was then mapped and is now a GIS layer in the Minnesota Geospatial Commons.

Preventing Algal Blooms

Despite the lake's predominantly clear, cold waters, algal blooms have unexpectedly emerged along parts of western Lake Superior's south shore in recent years. To date, all blooms have been dominated by a filamentous species of cyanobacteria known as *Dolichospermum lemmermannii*. In addition to affecting beach aesthetics and recreational use, blooms of this species are concerning because it is a potential toxin producer. To date, samples of blooms and nearshore waters have not contained harmful levels of known toxins. Partners from the

University of Minnesota-Duluth, the National Park Service, U.S. Geological Survey, Wisconsin Department of Natural Resources, University of Wisconsin-Milwaukee, Northland College and the National Estuarine Research Reserve are collaborating to enhance monitoring of nearshore conditions and understand bloom drivers in this unique environment, with special attention to the role of unprecedented flooding events and warming waters.

Water Utility Planning and Land Use Planning Research

Minnesota was one of six states chosen for in-depth interviews on integrating water utility planning and land use planning. The Alliance for Water Efficiency (AWE), the Environmental Law Institute, and American Planning Association (APA) are working with the Babbitt Center on a report that will document how each of the 50 states is handling connections between water utility planning and land use planning. The report will look at statutory requirements, mandate adoption, other legal requirements that support land and water integration, how the requirements work in practice, local coordination, and education and outreach efforts.

OBJECTIVE 5: Develop education programs and information sharing for all water users.

There are numerous educational programs dedicated to water conservation education and outreach for all water users in Minnesota.

We Are Water MN Traveling Exhibit

Like many museums, the traveling We Are Water MN exhibit was impacted by COVID-19, with the first two sites being postponed until 2021. However, demand and enthusiasm for the exhibit remains high and cities are willing to make accommodations to make the exhibit available. Exhibit space has been modified to allow room to space the exhibit for effective social distancing. Many events have moved online or are self-guided outdoors. The online story collection remains popular and educator resources have been expanded. A virtual training session and special COVID Handbook were created for docents and educators, including social distancing activities. The host sites are responsible for enacting social distancing guidelines.

Figure 7. Shelley Harrison, curator/archivist with the Blue Earth County Historical Society.

The exhibit will go on a revised tour across Minnesota in six locations.

- Now – October 19 – University of Minnesota Morrison Gallery in Morris
- Oct. 22 – Dec. 21, 2020 - Blue Earth County Historical Society in Mankato
- Jan. 7 – March 8, 2021 - Hmong Museum in St. Paul (location TBD)
- March 11 – May 10, 2021 –Rochester Art Center
- May 13 – July 12, 2021- Minnesota Discovery Center in Chisholm
- July 15 – Sept. 13, 2021 - Meinders Community Library in Pipestone

The popular We Are Water MN traveling exhibit and community engagement project invites visitors to reflect on the experiences of local community members and come to a deeper understanding of what taking care of water means to people. Science and history are also included via a 1,000-square foot, hands-on exhibit created by the Minnesota Humanities Center, MPCA, Minnesota Historical Society, and Departments of Health, Agriculture, and Natural Resources.

New Online Water Educational Resources

New Online Water Guardians Program - Water Guardians is a new educational program developed by H2O for Life. Water Guardians is a free web-based curriculum consisting of five lesson plans that will takes students on a journey from the start of the Mississippi River, down to the Gulf of Mexico, and off to other parts of the world. Water Guardians teaches students about the global water crisis and how together, we can create change locally. The program culminates in a service-learning component that will help engage students to become global citizens. You will find this program to be fun, engaging, and educational! Check out the Water Guardians introductory video.

New Videos Highlight Groundwater and Nitrate Movement - In a new educational video series, the movement of groundwater is explored and brought to life using a unique approach that combines realistic graphics, animation, and aerial footage of the region's geology. By understanding how groundwater moves through the soil and various layers of rock, viewers can better understand how water-soluble contaminants like nitrate-nitrogen can enter drinking water wells and streams.
These educational materials are the result of a collaborative effort among partners including the Root River Field to Stream Partnership, Minnesota Geological Survey, county and state agencies, University of Minnesota Extension, and input from local well drillers, farmers, and rural homeowners. The Clean Water, Land and Legacy Fund and a grant from the Minnesota Corn Research and Promotion Council, provided funding for this project. The five short videos and three graphics can be found at www.mda.state.mn.us/segwresources, or view each video using the links below:

- How Groundwater Moves in Southeast Minnesota [Part 1]
- How Contaminants (Like Nitrate) Move in Southeast Minnesota [Part 2]
- How Groundwater Moves in the Glacial Till Landscape (short animation)
- How Groundwater Moves in the Karst Landscape (short animation)
- How Groundwater Moves in the Bluffland Karst Landscape (short animation)

An Anishinaabe (Native) Cultural Center

A group of Northeast Minnesotans hopes a Great Lakes Cultural Interpretive Center in the Duluth area would provide education on the indigenous peoples who have lived in the region and encourage stewardship of the environment consistent with indigenous values. Team members include Fond du Lac Band members, students

from the UMD Master of Tribal Resources and Environmental Stewardship program, and city of Duluth Parks and Recreation. They are grappling with complex questions around how such a center might be governed, managed and financed, and where it would be located. Team members have met with a variety of city of Duluth, county and state government officials in early 2020.

Coastal Hazards of Lake Superior (CHAOS)

The Coastal Hazards of Superior (CHAOS) is a new community of practice that focuses on western Lake Superior hazards. Minnesota Sea Grant and the Minnesota and Wisconsin Coastal programs host presentations. Interested public may also attend the quarterly zoom meetings that discuss coastal hazards, mitigation, and impacts. It provides an opportunity for local community leaders, managers, researchers and communicators to engage over concerns about coastal hazards across western Lake Superior. Recent storms, flooding and shoreline erosion have strained local communities, making CHAOS' goal of building collaborations among groups impacted by these hazards even more important. The group hosted its first event in April 2020 with 80 people attending remotely. Following the presentations, webinar participants had the opportunity to network in small breakout groups to discuss actions they will take in response to the information shared.

Presentations and Conferences

The Minnesota Rural Water Association Conference in early March 2020 was the last in-person water event of the year. Remarkably, with over 1,400 attendees, there were no COVID-19 cases reported. All other conferences since then have been postponed or moved online. The Minnesota chapter of American Water Works Association hosted free Virtual Water Breaks throughout the year to keep utilities connected and updated. These events consisted of one-hour seminars on current and relevant water utility-related content. All state employees have been instructed to maximize telecommuting until June 2021 and will continue to give presentations on various online platforms.

Description of Minnesota's conservation and efficiency program implementation timeline

Minnesota continues to explore opportunities to expand our water conservation efforts, empower and inspire people to save water, and seek new ways to conserve water in all sectors of society. Water conservation in Minnesota is built on a holistic foundation of knowledge about comprehensive water use. The DNR partners with other organizations to promote sustainable water use and provide clear information about how much water we have, how much water is used, and thresholds.

The state has water conservation measures that are currently in place and integrated with the water appropriations permit program. Water supply plans, for public water suppliers serving over 1,000 people, have been updated and include new and improved water conservation, monitoring and management standards. State law requires water conservation rate structures for public water suppliers within the Basin or a water conservation plan.

Ecological and Water Resources Division Strategic Plan 2018-2028

The Division's recently completed 10-year plan has a **water resources goal** of "Minnesota water resources will be managed and used sustainably and the water quality will be improved and protect."

Relevant strategies to accomplish our water resources goal include:

- Collect, analyze and share important data on the status and trends of Minnesota's waters and their use to support decision-making, permitting and awareness.
- Engage water users and other stakeholders to address challenges and opportunities in water use, watershed function and impaired waters.
- Use a systems-based approach for water management and conservation.
- Ensure our permitting responsibilities are carried out efficiently, effectively, and consistently with regulatory authority.

Minnesota Water Conservation and Efficiency Program Strategies

Timeline is until 2025 unless noted otherwise.

Strategies for Municipal Water Suppliers serving over 1,000 people

- Expand Water Loss Control education and outreach
- Encourage improved metering and advanced metering infrastructure (AMI)
- Investigate time-based rates during peak demand periods
- Support additional building codes and irrigation ordinances that promote demand reduction
- Promote education and behavioral water efficiency strategies

Strategies for Commercial, Industrial, and Institutional Sector

- Advocate for advance metering and additional sub-metering
- Encourage technology upgrades to most water efficient technology – greening the grey infrastructure
- Support building and water management improvements to capture water efficiency opportunities.
- Encourage adoption of commercial building water BMPs and benchmarking
- Work with partners to expand and improve water efficiency and water reuse options
- Encourage CII to integrate water storage and demand response where practical

Strategies for Smaller public water suppliers

- Participate in the Water Conservation Reporting System
- Expand Water Loss Control education and outreach
- Provide water conservation educational resources

Strategies for Agriculture, Irrigation, and Other Sectors

- Participate in the Water Conservation Reporting System in 2020-2021
- Promote agricultural water efficiency best practices
- Promote golf course, sod production, and other irrigation efficiency practices and reuse
- Encourage technology upgrades to most water efficient technology

Strategies for Local Planning, Collaboration and Action

- Coordinate and promote water efficiency – showcase best practices
- Continue to define local thresholds for surface and groundwater resources
- Leverage sources of funding for implementation
- Resilience Planning, Adaptation Training, and increased understanding of the implications of the Water-Energy Nexus and climate change
- Advance local water conservation planning and implementation
- Pursue near-term actions at the local level – rebate programs, etc.