DEPARTMENT OF NATURAL RESOURCES

## Great Lakes- St. Lawrence River Basin Water Resources Compact

# Water Conservation and Efficiency Program Annual Assessment

**State of Minnesota, November 1, 2019**

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Cover photo: Gary Alan Nelson

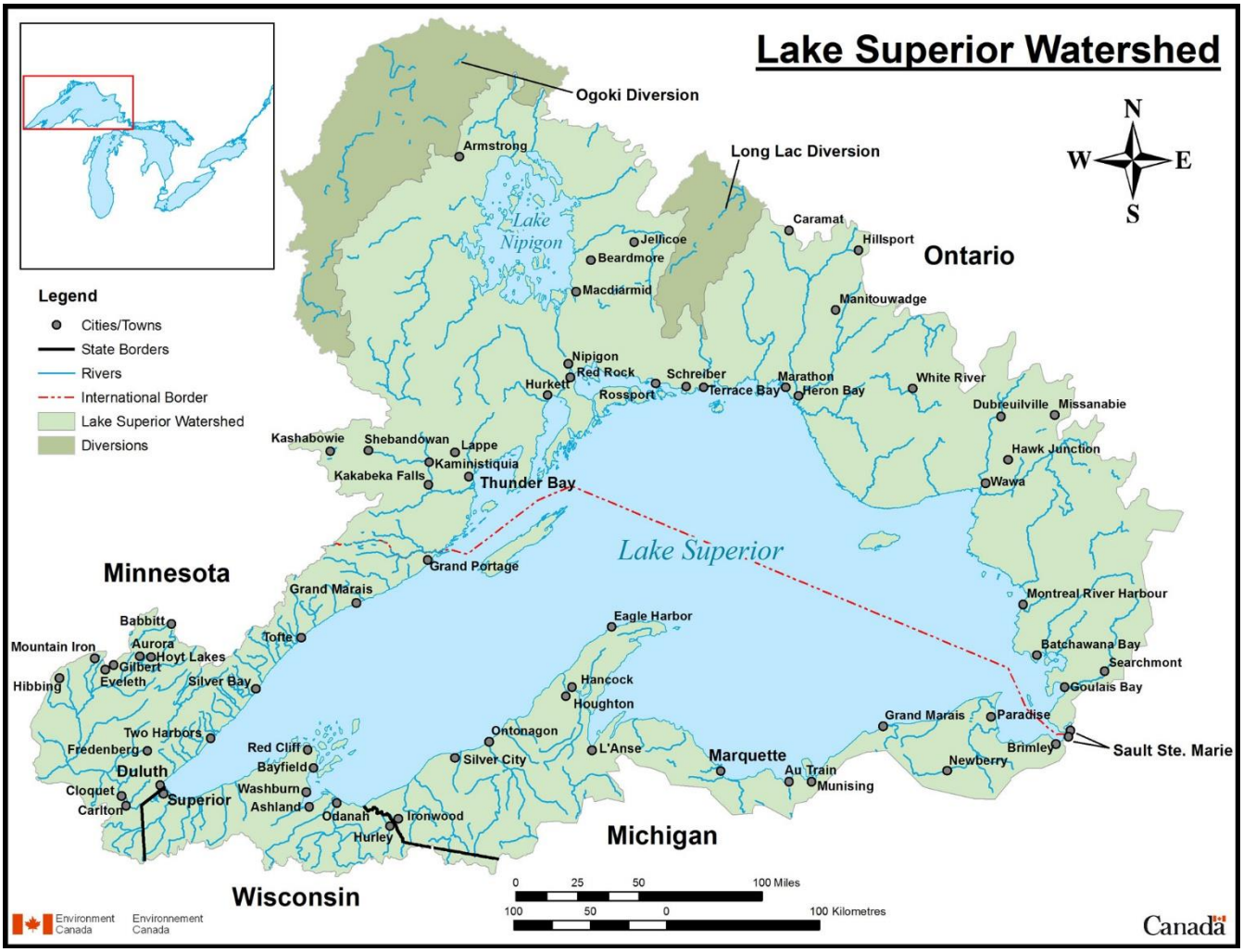


Figure 1. MN DNR has requested permission from Canada to use this map.

# 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:

Major water conservation accomplishments and innovations include: expanding the new DNR Water Conservation Reporting system, organizing the Lake Superior Collaborative, water loss training for municipalities and water conservation metrics have recently been added to the GreenSteps City program. In the past five years' water conservation has been added to the University of Minnesota Technical Assistance Program (MnTAP). For almost 35 years, MnTAP has been helping businesses find energy efficiency solutions. The recent addition of water conservation has allowed Minnesota companies to save over 515 million gallons of water.

This report includes new actions that were started or accomplished during the calendar years from 2014-2019. For previous water management, water conservation and sustainability programs please see earlier reports.

This plan is submitted by the Minnesota Department of Natural Resources (DNR). 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

# GENERAL INFORMATION

## 1. 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:

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# WATER CONSERVATION AND EFFICIENCY PROGRAM REPORT ASSESSMENT

## 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's water conservation goals and objectives are the same as the 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 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 for laws, rules and approaches that further both state and Compact goals. During the past five years there has been growing momentum in Minnesota around water conservation and efficiency, and the partnerships and innovations continue to expand. While our current laws, rules and policies address the goals and objectives identified in the Compact, Sustainable Water Resources Agreement, and of the Basin-wide Conservation and Efficiency Initiative, Minnesota is facing water resource management challenges and is developing additional management tools to enable the state to achieve a more sustainable use of its limited water resources. The laws cited and programs described below provide a framework for sustainable water management that promotes efficient use of the state's water resources. State-wide 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.

# 1. 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. The DNR held workshops with these communities with training that included an emphasis on water conservation and efficiency. Some plan requirements include:
    - Loss Control Audits for public water suppliers were developed in consultation with the Minnesota Section of the American Water Works Association M36 Guidelines. The benchmarks, which include standards for unaccounted water, per capita use, rate structure and peak demand are used in reviewing water supply plans and for water appropriation permit review.
    - Before requesting approval to construct a public water supply well or to increase authorized water volumes, demand reduction measures must be employed by the public water suppliers. A demand reduction measure serves to reduce water demand, water losses, peak water demands, and nonessential water uses. Demand reduction measures must also include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. Conservation rate structures, or a uniform rate with a conservation program that achieves demand

reduction, are required for public water suppliers in the Basin which serve more than 1,000 people. These rate structures are reviewed and approved as part of the Water Supply Planning process.

- **Critical Water Deficiency Ordinance** the development of a model Critical Water Deficiency Ordinance. While this ordinance has been required for many years, the DNR realized that no city in Minnesota had yet implemented one. Working cooperatively with the League of Minnesota Cities (LMC) and the MN Rural Water Association, a model ordinance was developed by the LMC attorney that cities are now adopting and customizing for their individual circumstances.

- **Landscape irrigation systems** that operate automatically are required to have technology that inhibits or interrupts operation during periods of sufficient moisture.
- *Minnesota Statutes* establish water use priorities for the allocation of waters during periods of limited supplies. Non-essential uses are the lowest priority and are subject to restrictions prior to other higher priority uses [*Minnesota Statutes*, section 103G.261].
- **Minnesota's *Statewide Drought Plan*** provides a framework for preparing for and responding to droughts, including steps for public water suppliers to take for water conservation. DNR began the preliminary planning phases of the drought plan revision in 2018, and will continue to collaborate with numerous stakeholders in the state – including those representing the Great Lakes Basin.

- **Once-Through HVAC:** Groundwater withdrawals for large once-through HVAC systems have been prohibited since December 31, 2010 and remaining systems have been converted to water efficient systems.

- **Minnesota's buffer law** establishes new perennial vegetation buffers of up to 50 feet along rivers, streams and ditches that will help filter out phosphorus, nitrogen and sediment. While the buffer law is primarily intended to improve surface water quality in the agricultural areas of the state, there may be some improvements in the water quality of tributaries entering into Lake Superior.
- **Wastewater:** Applicants for wastewater discharge permits are required to evaluate potential reuses of the discharged wastewater [*Minnesota Statutes*, section 115.03, subdivision 1, item (e), sub. item (10)].
- **Low Flow Suspensions**: Surface water use can be and has been suspended during low flow periods in Minnesota. Published procedures lay out when surface water users will be suspended. The current standard is that when flow in streams and rivers reach or fall below a flow rate that is exceeded 90% of the time (the Q90) for that watercourse, all direct appropriation must be suspended. Ecologically-based low flow thresholds can and have been developed for some surface waters.

**Voluntary:**

- The new Water Conservation Reporting system is voluntary, with 94% of municipalities reporting their conservation efforts and 56% of commercial, industrial and institutional users reporting their efforts.

- Many public water suppliers provide water conservation information to customers. For example, the City of Cloquet has a simple, but concise water conservation webpage. The city of Woodbury has been actively reducing demand through a variety of water conservation and efficiency programs. 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 partnered 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 general 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.

## 2. 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 5 years:

1. The new statewide Water Conservation Reporting System was initiated in 2018. All water suppliers serving over 1,000 people completed water accounting data entry and reported their water conservation actions completed in 2017 and 2018. During a 4-year rollout period, all water permit holders will be reporting their water conservation and efficiency improvements.
2. Approximately 340 municipalities have submitted their Water Supply Plans to the DNR over the past 3 years. These plans have stronger water conservation goals than in past decades due to the new Demand Reduction Law.
3. Nationally, Minnesota's water conservation score improved two steps to a "B" according to the 2018 Alliance for Water Efficiency (AWE) Water Efficiency and Conservation State Scorecard: An Assessment of Laws.
4. Communities, businesses, and sporting organizations have been installing water reuse systems. To simplify and encourage stormwater reuse, the DNR determined that an appropriations permit was not needed for reusing stormwater for turf irrigation. Some of these practices have reduced the use of potable groundwater resources for lawn and landscape irrigation. As a result, there has been a significant expansion of stormwater reuse projects in Minnesota in the past 5 years. An Interagency Work Group examined opportunities and obstacles for reuse of treated wastewater, graywater, stormwater, and rainwater, as well as subsurface water discharged for dewatering purposes. The Advancing Safe and Sustainable Water Reuse in Minnesota report was published in 2018.

5. The Metropolitan Council has received four years of funding for their Water Efficiency Grant Program for communities to fund 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.

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

- **Water Supply Planning 2015-2018.** For 30 years Minnesota water suppliers have submitted 10-year water supply plans that include long-term demand forecasts, develop long-term strategies that incorporate water conservation and efficient water use. This round placed greater emphasis on reducing distribution losses by investing in ongoing infrastructure maintenance programs. Over three years, efforts focused on providing workshops to the 350 water suppliers around the state serving over 1,000 people. Water conservation training includes municipal leak detection and repairs, encouraging improved local ordinances, incentive programs, rate review, peak demand reduction and smart irrigation, and educational efforts. Water conservation goals have been set for all water suppliers. Completed water supply plans were due October 15, 2018.

- **Water Availability and Climate.** DNR Climatologist have evaluated the climate's impact on water availability and also provide information on drought, floods and other climate data.
- **St. Louis River Area of Concern Program**. The St. Louis River Area of Concern (AOC) is one of 43 AOCs across the Great Lakes under the Great Lakes Water Quality Agreement in 1987. AOCs represent the most severely impacted areas around the Great Lakes Basin and are required to develop remedial action plans. The process incorporates a systematic and comprehensive ecosystem approach and has shown much progress along the way. Today, through the hard work of partners and stakeholders in the St. Louis River estuary, a well-defined list of management actions, cost estimates, and timeline for restoring habitat and removing contaminates leading to delisting the AOC by 2025 (2013 RAP Update) is in place. The Minnesota Pollution Control Agency and the Wisconsin Department of Natural Resources are the lead regulatory agencies designated by the U.S. Environmental Protection Agency to address this AOC. This is an exciting time for the AOC partners to implement projects that will remediate contaminated sediments and restore aquatic habitat as funding is available through the U. S. EPA Great Lakes Restoration Initiative and Minnesota's Clean Water and Outdoor Heritage Funds.

- A complex mix of funding supports cooperative projects with restoration site teams and partner agencies. Several projects of focus in 2018-2019:

    - **Kingsbury Bay/Grassy Point Habitat Restoration Project** - This project is estimated $15 million dollars for the construction contract that will complete habitat restoration at those two locations. Scheduled for completion 2020. WDIO Kingsbury Bay/Grassy Point and KBJR 6 Kingsbury Bay/Grassy Point

    - **Kingsbury Creek Watershed** – reduce sediments from hillside in Duluth often from big storm events, at the watershed scale.

- **Wild Rice Restoration in SLR Estuary** – manage restoration condition suitable for wild rice habitat, which has been significantly reduced and seed stands to restore 275 acres. The team is working with the 1854 Treaty Authority, Fond du Lac Natural Resources Department and other partners.
- **Implementation of the Lower St. Louis River Habitat Plan** – including habitat restoration at 11 sites, three of which have been completed to date.
- **Sediment Remediation sites –** ongoing work includes cleanup of highly contaminated sediment at ten sites in the MN portion of the estuary, three of which have been remediated.

- **Invasive Species Management**. Minnesota has an active and aggressive Aquatic Invasive Species Management Program. Invasive species have the potential for serious economic, environmental and recreational impacts in Minnesota.

  - Since 2014 the MN DNR has significantly ramped up efforts to prevent the spread of aquatic invasive species and manage invasive aquatic plants and wild animals. All DNR staff have made a commitment to include invasive species prevention measures in their work under Operation Order 113.

  - A new invasive species organism was recently reported in Superior Ore Docks Harbor, Bloody Red Shrimp (*Hemimysis anomala*). Up until now the Bloody Red Shrimp has not been found in Lake Superior. The federal government biologists have the specialized equipment for early detection and monitoring. The 1854 Treaty biologists are also involved in sampling.

  - Non-native Phragmites effort on the MN side of the St. Louis River are underway. Control efforts are sponsored by the St. Louis River Alliance and include mechanical knock down and herbicide application.

  - Lake Superior, the St. Louis River estuary and other Superior tributaries are listed as infested with Viral Hemorrhagic Septicemia (VHS), round goby, ruffe and white perch. Viral hemorrhagic septicemia (VHS) affects 34 species of fish, including walleye and bass. Its emergence has resulted in large-scale mass mortality events throughout the eastern Great Lakes and cost millions of dollars in management efforts. The virus is considered to be the most significant freshwater fish health threat in the world and has a history of large-scale fish kills. It is transmitted fish-to-fish from close contact of contaminated water or reproduction.

- **Great Lakes Restoration Initiative (GLRI) Action Plan.** Updates to the plan are currently in process. The plan is being developed openly and collaboratively, including with local stakeholders, Tribes, governments and the public. Following engagement with stakeholders throughout the Great Lakes Basin and consultation with Great Lakes states and tribes, EPA and its federal partners developed a draft Action Plan III and sought public input on the draft Plan. EPA and its partners are now considering the input provided by over 1,300 individuals and organizations. EPA and its federal partners used this input to influence development of a GLRI Action Plan III. The final GLRI Action Plan was released in October 2019.

- **Western Lake Superior Sanitary District Success Story.** In 2018 the Western Lake Superior Sanitary District (WLSSD) celebrated 40 years of improving water quality in the St. Louis River and Lake Superior. In 2018 they held an open house event to celebrate their success. In the past, industries in and around Duluth and Cloquet — from lumber and paper mills to slaughterhouses and steel mills, food processing plants and much more —discharged their minimally treated wastewater directly to the St. Louis River. Once the WLSSD went on line the results were stunning and quick. The St. Louis River, free from most paper-mill waste and other pollution, transformed almost immediately. Over the years the WLSSD brought on more areas like the near North Shore, Pike Lake, Oliver, Rice Lake Township, and the Fond du Lac Reservation. There have been continual technology upgrades and they have improved their sludge disposal process. Now the district is working to build systems to capture heat and otherwise wasted energy from the sewage treatment process to heat and power their facility.
- **Drinking Water Protection** - In partnership with MDH and with support from the Citizens League, the Environmental Initiative staff are exploring needs and perspectives to inform the development of a statewide partnership to protect sources of drinking water in Minnesota.

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

### *Municipal Water Efficiency*

State government and partner organizations encourage municipalities to maximize water use efficiency and minimize waste of water. Minnesota has 19water suppliers in the Lake Superior Watershed that are required to complete a Water Supply Plans. Ten cities have approved water supply plans, including Duluth, the largest city. Only two communities have not submitted a water supply plan yet, Chisholm and Lutsen. 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 |
|---|---|---|
| Grand Marais, City Of | Y | 6/14/17 |
| Silver Bay, City Of | N | Edits sent back 8/22/19 |
| Two Harbors, City Of | Y | 12/19/16 |
| Duluth, City Of - Public Works Dept. | Y | 1/30/17 |
| Lutsen Mountains Corporation | N | Nothing received yet. Reminder sent 8/8/19 |

| | | |
|---|---|---|
| Superior Water Light & Power Co. | N | Draft received 1/22/19 and review pending |
| Cloquet, City Of | Y | 6/22/18 |
| Carlton, City Of | Y | 12/19/16 |
| Aurora, City Of | N | Edits sent back 9/18/2019 |
| Babbitt, City of | N | Edits sent back 10/15/2019 |
| Biwabik Public Utilities | Y | Exempt |
| Chisholm, City Of | N | Nothing received yet. Reminder sent 8/8/19 |
| Eveleth, City of | N | 2nd draft received 10/2/19 |
| Gilbert, City Of | N | 2nd draft received 11/14/18 |
| Buhl, City of | Y | Exempt |
| Virginia Public Utilities | Y | 5/22/19 |
| Hibbing Public Utilities | N | Edits sent July 2018 |
| Hoyt Lakes, City of | Y | 8/20/19 |
| Mountain Iron, City Of | Y | 10/15/19 |

As part of monitoring implementation of Water Supply Plan water conservation objectives, municipalities serving over 1,000 people began reporting their conservation efforts in 2018 through the Minnesota Water Conservation Reporting System (see Objective 3 below for more detail on this new water accounting system). Duluth is the largest municipality in the watershed. Historically, Duluth has had significant water loss due to aging infrastructure, frigid weather, and pressure problems below the cliffs. The highest unaccounted water loss was in 2008 with a 27.24% loss, and the city averages 140

water main breaks per year. After several years of focused efforts, the City has reduced their water loss tremendously. Below is a summary of Duluth's Water Conservation and Efficiency efforts:

***Summary of Duluth's 2017-2018 Water Conservation Report***

| | **2017 Data** | **2018 Data** | **Statewide Goal** |
|---|---|---|---|
| Total water pumped | 4,901,210,000 gallons | 4,662,150,000 | |
| Population | 103,541 (this includes the adjacent communities of Hermantown, Proctor and Rice Lake) | 103,541(this includes the adjacent communities of Hermantown, Proctor and Rice Lake) | |
| Residential GPCD | 36.6 | 36.7 | < 75 |
| Total Peaking Factor | 1.81 | 1.8 | <2.6 |
| Water Loss | 13% | 9.3% | < 10% |
| Annual % Reduction - nonresidential | n/a | 2.08% | >=1.0% |
| | | | |
| Residential vs. Non-Res. Use | 1,381,792,368 gallons vs. 2,869,929,392 gallons | 1,389.8 million gal. vs. 2,814.2 million gal. | |
| # of Residential connections | 26,221 | 26,304 | |
| # of Non-Res. connections | 2,022 | 2,041 | |

In the next ten years Duluth is committed to the following actions:

a. The City will develop and implement tracking mechanisms to document water loss through Department uses, water main breaks, and municipal uses.

b. The City will conduct water audits on a more regular basis.

c. The City will develop and propose regulations to the City Council in regards to water conservation, water use and emergency operations.

d. The Department will increase educational efforts.

### Water Loss Training

To conserve and manage existing water supplies, a free Water Loss Control Workshop was provided in 2019 in collaboration with the Water Research Foundation, the MN AWWA and the DNR. Over 75 municipal staff attended the event to learn how to design efficient and sustainable leakage control programs. The presentations showed how the DNR Water Conservation Reporting system and the AWWA Water Audits and Loss Control Program (M36) provide utilities with the tools to better understand their real water losses and analyze their economic intervention strategies.

### Water Conservation Rates

The Metropolitan Council has completed innovative research and publications to assist municipalities with setting effective water conservation rates and other water supply tools. The Bill Assessment Tool and the Twin Cities Regional Water Billing Analysis build upon existing conservation rate efforts and consider practices and examples from various municipalities to learn what works and is most effective.

### Resilience Planning and Adaptation Training

In 2019, MN Rural Water Association in collaboration with MDH, EPA, and PCA provided Resilience Planning and Adaptation Training for 50 Water and Wastewater Utilities. The purpose was to help cities build resilience for extreme weather events such as floods, droughts and tornadoes in Minnesota.

### State Government Buildings Water Conservation Initiative

In 2016 the Office of Enterprise Sustainability (OES) was established to help state agencies make choices that will improve outcomes through the implementation of best practices in their agency. Enterprise Sustainability methods have been identified to achieve a 15% goal of water conservation for all state government buildings (i.e., irrigation, leak detection, efficient appliances).

### Water Efficiency Grant Program

The Metropolitan Council's Water Efficiency Grant Program provides incentives to encourage efficient water use and conservation. From 2015-2017 the Metropolitan Council was awarded $500,000 from Minnesota Clean Water, Land and Legacy Amendment funds for a Water Efficiency Grant Program. Nineteen communities participated in this program, with the Council grants covering 75% of the program cost and each participating municipality providing the remaining 25% as a match. Through this grant 4,514 devices were replaced, including 2,380 toilets, 1,190 irrigation controllers, 940 clothes washers, and 4 irrigation system audits. Approximately 52,000,000 gallons per year will be saved each year by these replacements. 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.

## Water Reuse

Water reuse will be an increasingly important part of managing water resources as demands on water supplies continue to grow due to population increases, urbanization, climate change, and changes in water use. The DNR participated in an interagency workgroup led by the Minnesota Department of Health (MDH) to consider methods to reuse water and identify barriers and opportunities for implementation. The workgroup researched a variety of topics and published a comprehensive MDH Water Reuse Report. The report summarizes existing policies, guidance and regulations from states and municipalities throughout the nation as well as internationally. The workgroup examined opportunities and obstacles for reuse of treated wastewater, graywater, stormwater, and rainwater, as well as subsurface water discharged for dewatering purposes. The Report was published in 2018. The MDH continues to work with national health agencies to research the cause and prevention of Legionella. DNR and MDH are working with hospitals to determine which types of water conservation and reuse efforts are safe for vulnerable populations.

## Agricultural Sector Water Efficiency

The University of Minnesota Extension Service has an Irrigation Specialist position that provides direct support to irrigators on irrigation scheduling and soil water monitoring. The specialist also conducts applied research on irrigation technology, develops BMPs, and provides educational programs and publications to improve water use efficiency, sustain agricultural production, and enhance protection of water resources.


Figure 2. MN Dept. of Agriculture has a voluntary Water Quality Certification Program.

The Minnesota Department of Agriculture (MDA) has established a Water Quality Certification Program. The program is a voluntary opportunity for farmers and agricultural landowners to take the lead in implementing conservation practices that protect our water. In 2019 over 540,000 acres of Minnesota farmland are now enrolled. Since its statewide launch in 2016, over 800 farms have been certified. Conservation practices have kept over 36,000 tons of sediment out of Minnesota rivers while saving nearly 102,000 tons of soil and 45,000 pounds of phosphorous on farms each year. The conservation

practices have also reduced nitrogen loss up to 49% and cut greenhouse gas emissions by more than 36,000 tons per year. MDA is currently working with DNR, the Irrigators Association of Minnesota, BWSR, SWCDs and other farm organizations to develop and implement a Water Efficiency Endorsement as part of the Certification Program. A Wildlife Habitat Endorsement is also being developed.


Figure 3. The University of Minnesota Technical Assistance Program helps businesses conserve water and energy.

## 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 Minnesota 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. Through this program, Minnesota businesses have conserved over 600 million gallons of water. Established in 1984, MnTAP is funded in part by a pass-through grant from the Minnesota Pollution Control Agency. Other grants come from partners including Minnesota Department of Commerce, Division of Energy Resources, Metropolitan Council, counties and other local units of government, EPA Region 5, and energy utilities.

The Minnesota Sustainable Growth Coalition is a business-led partnership of 33 businesses and

organizations working to promote a circular economy in the state. The organizations include Cargill, DuPont, 3M, Ecolab, Medtronic, Target, Xcel Energy, General Mills and others. The coalition focuses on energy, water and waste issues to optimize use of resources, minimize waste and conserve resources. In the water area, the coalition is working on "greening grey infrastructure" or promoting infrastructure and practices designed to mimic the natural water cycle. Individually and together they have the opportunity to substantially impact Minnesota's water resources to ensure a thriving economy, and healthy, equitable communities across the state.

## 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. This system is similar to the existing Minnesota energy conservation reporting program. The system is cloud-based for easy data entry and record management.

The DNR, in January 2018, launched a new Water Conservation Reporting System for water appropriation permit holders. The reporting system is goal-based, accountable and measurable. Public water suppliers were the first group of permittees to use this web-based reporting system. The goal of this effort is multi-pronged and will inform the state of water efficiency and conservation efforts at a statewide level. This new web-based tool is designed to:

- Provide an annual report and a quick dashboard of information for each utility to understand their performance for achieving water efficiency and conservation;
- Identify trends in water use efficiency and conservation efforts over time;
- Allow utilities to learn from their peers about effective water efficiency and conservation strategies and minimize water loss;
- Over the course of four years all water use sectors will be included in this voluntary reporting system as a supplement to the annual MPARS water use report.

2018 was the first year for Commercial, Industrial and Institutional (CII) permittees to voluntarily report their water conservation efforts and the second year for water suppliers serving over 1,000 customers. In just one year, there have been some remarkable voluntary improvements with municipal water conservation efforts.

Some of the 2018 Water Conservation Report findings include:

- 94% of the 348 invited water suppliers participated in submitting data.
- **Improvement in Water Loss** - In total utilities have a water loss of 8.4%, a .48% improvement from last year number of 8.88% and meeting the DNR conservation goal of 10%.
- **Improved Residential GPCD** – In 2018, 92% of the utilities met the goal of 75 GPCD. This is an improvement from 2017, when 90% of the utilities met the goal of 75 GPCD.

- **Improved peaking factor** – In 2018, 80% of utilities met the peaking factor goal of 2.6. This is an improvement from 2017, when 75% of utilities met the peaking factor goal.
- **Over 1.5 billion gallons** of water were saved by leak repairs. Billions of gallons were also saved by meter repair and replacement, hydrant repair, increasing treatment efficiency, meter testing and reducing unauthorized water use and installing non-irrigation meters.
- There was a fairly substantial drop in the number of utilities reporting customer water conservation projects, this is likely due to the end of the Metropolitan Council Water Efficiency Grant program. In 2018 there were 7,679 customer water conservation projects around the state for a water savings of over 52 million gallons. Last year there were 8,773 projects saving over 70 million gallons of water. The grant program was renewed for 2019-20121.
- Over 40% of the CII water appropriation permittees completed the Water Conservation Report.
- 26% reported having a formal water conservation plan and 11% reported having one in development.
- The #1 reason for conserving water was to reduce operation costs for water and wastewater. Other reason for conserving water were for regulatory compliance and to reduce energy costs.
- 58% of CII reported that the main factor limiting water conservation water was operation necessity.
- Only 65 (27%) of CII reported completing a water audit. And 11 businesses reported participating in the University of Minnesota MnTAP audits.

### Water Monitoring and Surveys Data

The DNR Water Monitoring and Surveys Unit collects data and provides 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 than 70 stream flow network gauges and more than 2,000 groundwater observation wells. The Water Monitoring and Surveys Unit uses a unique database and processing software known as HYDSTRA for storage and management of the data from the network of stream gages.

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 and 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 2,000 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. Shapefiles and metadata for the monitoring wells are available through the Minnesota Geospatial Commons and the DNR CGM website. Additional data is available on request.

### Additional DNR Monitoring & Reporting

Minnesota tracks water use and the effectiveness of water conservation measures through two web-based databases, MPARS and the Water Conservation Reporting System. 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. Other DNR water monitoring programs include: fish population and habitat surveys, fish contaminant monitoring program, exotic species, rare and endangered species monitoring; precipitation monitoring; Mississippi River and stream and river flow, lake levels and other lake attributes.

### Pollution Control Agency Water Monitoring

The MPCA works closely with the DNR on many monitoring efforts and monitors and assesses ambient groundwater and stream water quality and stream biological integrity, mercury in fish, toxics in streams, and specific lakes and streams. They also coordinate the Citizens Lake and Streams Monitoring Program, Lake Assessments Program, and Lake Studies Program

### Department of Health Water Monitoring

The MDH conducts research and analyzes results to determine health risk limits and health based values for drinking water and ground water contaminants. They are national leaders in investigating contaminants of emerging concern, especially in the area of developing health risk guidance for contaminants for where there is not a federal drinking water standard.

### Department of Agriculture Water Monitoring

The MDA monitors agricultural chemical incidents as well as pesticide and nutrients in groundwater and surface water.

### Environmental Quality Board Water Monitoring

The EQB works with PCA, MDA, and DNR to coordinate a biennial assessment and analysis of water quality and quantity, groundwater degradation trends, and efforts to reduce, prevent,

minimize, and eliminate degradation of water; including an analysis of relevant monitoring data.

## OBJECTIVE 4: Develop science, technology and research.

### METERING TECHNOLOGY

The DNR encourages the identification and sharing of innovative management practices and state of the art technologies. According to the 2018 Water Conservation Report, 77% of the Minnesota water suppliers report using Mobil Read Meters (also called Automatic Meter Reading/AMR). This allows utility workers to automatically read meters from the safety of their vehicle and transfer the data to a central database for billing and analysis. Over 13% of water suppliers' use Networked meters (also called Advanced Metering Infrastructure/AMI). Although there are expenses associated with changing meters, there are good reasons for a utility to upgrade to networked meters: fast alerts to problems, behavioral feedback to consumers, and Real-time diagnostics for customer service. Some cities are now notifying customers when they suspect there is a toilet leak or other unusual water loss. Only 5% of Minnesota communities serving over 1,000 customers use manual read meters.

### INVASIVE AQUATIC SPECIES RESEARCH

The DNR works with the Minnesota Aquatic Invasive Species Research Center (MAISRC) at the University of Minnesota. In partnership with MAISRC, the DNR, UMN Extension agents, many counties and local partners search water for infested waters.

### TURF IRRIGATION EFFICIENCY RESEARCH

The University of Minnesota Turfgrass Science Center has been conducting extensive research with the Golf Course Superintendents Association and the Minnesota Department of Transportation to develop turf best management practices including improving drought tolerant species and reducing the need for irrigation. They also work with the Metropolitan Council to improve lawn irrigation standards. Staff conduct extensive public outreach and have a popular exhibit at the Minnesota State Fair.

### ENERGY SECTOR AIDING WATER CONSERVATION TECHNOLOGY

The DNR assists with and encourages research, development and implementation of water use and efficiency and water conservation technologies. In Minnesota, the energy sector is the largest water user, however, most of the use is once-through cooling where water is taken from the river and returned to the environment. At the same time, Municipal water and wastewater treatment facilities are often the largest energy user in a city. In the past five years there has been greater collaboration on finding new ways to decrease energy and water demand.

In 2019 the Minnesota Department of Commerce contracted with MnTAP engineers to research and provide recommendations on how energy companies can help water utilities to conserve energy. The report is not yet available.

Minnesota Energy Resources, Xcel Energy, and other Minnesota energy suppliers are offering residential customers free water conservation kits. The kits typically include low-flow showerheads, kitchen and bathroom faucet aerators, and pipe insulation. These items are easy to install and conserve water, energy, and water heating costs.
Xcel Energy voluntarily reports to the DNR Water Conservation Report and posts additional water use

reports on their webpage.

*2018 Water Use by Source at Xcel Energy Owned Thermal Plants (Billions of Gallons)*

| Source | Withdrawn | Consumed | Returned |
|---|---|---|---|
| St. Croix River | 112.31 | 0.0 | 112.31 |
| Lake Superior | 9.83 | 0.0 | 9.83 |
| Mississippi River | 459.87 | 7.18 | 452.69 |
| Minnesota River | 36.47 | 0.0 | 36.47 |
| **Upper Midwest Total** | ****618.48** | **7.18** | **611.30** |

***Does not include groundwater*

### COOPERATIVE ENVIRONMENTAL RESEARCH

The Lands and Minerals Cooperative Environmental Research Program performs objective research studies that evaluate the environmental effects of mining in Minnesota. The DNR is working collaboratively with others to improve mineland reclamation and mitigation techniques to improve water quality. Based on this research, new reclamation procedures have been developed to successfully reclaim coarse taconite tailings. Mitigation techniques include methods to prevent mine drainage problems as well as treatment methods for water impacted by mining operations. The DNR Division of Lands and Minerals has also studied passive systems including wetland treatment, sulfate reducing bioreactors, alkaline treatment beds and the use of covers and liners to control the quantity of water entering or leaving mine waste facilities.

### TRIBAL SCIENCE, TECHNOLOGY AND RESEARCH

- Minnesota continues to seek a greater understanding of traditional knowledge and practices of Basin First Nations and Tribes. The DNR Water Policy Consultant is actively exploring

collaborating with tribal partners on water policy issues. Minnesota PCA maintains a water permit contact list for the 12 federally recognized tribes in Minnesota and 11 reservations.

- The Shakopee Mdewakaton Sioux Community (SMSC) follows the tradition of planning seven generations ahead. The SMSC has a state-of-the-art Water Reclamation Facility, their own water supply system that uses reverse osmosis and is available as a backup source for neighboring communities. The Community has also installed several recycled water systems for irrigating the golf course and other green space on the reservation. The Community has also collaborated with the City of Prior Lake to develop a joint water treatment plant.
- Wild rice and its harvesting are fundamental to Minnesota's tribal nations. Minnesota has more acres of natural wild rice than any other state in the country. The Fond du Lac Band of Lake Superior Chippewa Natural Resources Program is responsible for management and restoration of five primary wild rice lakes on the Reservation and partners with the St. Louis River restoration work. Their work includes research on environmental contaminants such as mercury., lead, and PCBs. Statewide, more than 2,000 lakes and rivers in 64 Minnesota counties contain wild rice. The DNR, tribal communities, Ducks Unlimited, and others work cooperatively to manage wild rice resources. Tribes and others are concerned about the impact of climate change on wild rice.
- The DNR can enter into agreements with tribal and local governments that are interested in implementing an aquatic invasive species (AIS) prevention program that includes watercraft inspectors at water accesses. The DNR provides training, testing, and authorizations to inspectors working for tribal governments. Tribal inspectors authorized by the DNR have the authority to require watercraft inspections and can deny launching of watercraft that do not comply with AIS laws.

### Innovative Water Science and Management Practices

DNR encourages innovative management practices by promoting aquifer water use management planning. This concept involves the definition of a management area and the involvement of a wide range of interests in the development of these plans. Funding has been provided to ramp up efforts associated with nonpoint and point source implementation, including Great Lakes restoration.

Minnesota continues to strengthen scientific understanding of the linkages between water conservation practices and ecological responses. The DNR provides GIS data for watershed health scores, and spatial source data via the Watershed Health Assessment Framework (WHAF). The WHAF provides an organized approach for understanding natural resource conditions and challenges, and for identifying opportunities to improve the health and resilience of Minnesota's watersheds The goal is to advance improved ways to display existing conservation plan priorities in a GIS format and to link data to an outcome-optimizing tool that can lead to land management choices that best optimize multiple conservation objectives. Those choices are specific to the given landscape location and are fine-tuned to reflect priorities among multiple conservation needs (e.g., habitat protection, water quality restoration, etc.).

## 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.

## Promoting Water Conservation Partnership

Since 2015, the DNR water conservation consultant has convened an interdisciplinary Promoting Water Conservation Partnership to share educational resources, plan events, and develop a statewide communication plan based on community-based social marketing. The Partnership seeks to ensure equitable public access to water conservation and efficiency tools and information. Inform, educate and increase awareness regarding water use, conservation and efficiency and the importance of water. Promote the cost-saving aspect of water conservation and efficiency for both short-term and long-term economic sustainability. The members share conservation and efficiency experiences, including successes and lessons learned across the Basin. To aid in the development and dissemination of sector-based best management practices, most information is contained within the Water Conservation Reporting System.


Figure 4. We Are Water MN Guides are published in Native languages, Spanish, Hmong and English.


Figure 5. We Are Water MN is a traveling water education exhibit

## We Are Water MN Traveling Exhibit

The most successful way that Minnesota has found opportunities for the sharing of traditional knowledge and practices of Basin First Nations and Tribes is with the We Are Water MN program. We Are Water MN is a popular statewide traveling exhibition and community engagement project that invites visitors to come to a deeper understanding of what taking care of water means. Science and history are also included via this 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. Each local host community uses this traveling exhibit to help tell their local water stories: the history; sacredness to Minnesota's first people, the Dakota and Ojibwe; current stresses on water; and how water affects every element of life. The partnership was initially formed to support Minnesota hosting of the Smithsonian Institution's Water/Ways exhibit, a national initiative of the Museum on Main Street program. The Humanities Center and its partners built a companion exhibit, We Are Water MN, that shares information and stories about water in Minnesota. After the Smithsonian exhibit left, feedback showed that the Minnesota exhibit was the most interesting for visitors. The exhibit was updated and has been hosted by 14 Minnesota communities, from 2016 to 2019. Much of the exhibit changes for each site. The exhibit and

programming reach over 1,200 people per site The program encourages new partnerships, for example, Fond du Lac Band of Lake Superior Chippewa and the Great Lakes Aquarium co-hosted March and April 2019. They had never worked together, but feel that lasting relationships were built between their organizations. Four out of five visitors said they were more knowledgeable about water issues after attending the exhibit and were more likely to take action after attending the exhibit.

### Minnesota Project Wet

Minnesota Project WET trains classroom and other educators in hands-on, interactive lessons that are focused on water and encourage critical thinking. By providing training, materials, and support to these educators, MN Project WET works to improve Minnesotans' understanding of our water resources. There is a specific unit on water conservation and educators from the Basin have participated in these lessons.

### Presentations and Conferences

Minnesota DNR and our partners are continually providing training opportunities in order to increase water conservation and efficiency practices, technological applications, water loss control, and water accounting. The DNR, Minnesota Rural Water Association, the Metropolitan Council, the University of Minnesota Water Resources Center, the Minnesota chapter of American Water Works and other organizations help promote conservation with dozens of presentations at annual conferences, workshops, forums, and other events.

### Water Educational Resources

To ensure that conservation programs are transparent, most information is readily available on public websites. Sources of water conservation information are available through DNR's website. DNR's website devotes a page for Great Lakes Compact information and links. The Minnesota DNR is a Promotional Partner in EPA's WaterSense Program, which seeks to promote water efficiency and water efficient products. The Metropolitan Council, Minnesota Pollution Control Agency and Minnesota Rural Water also have webpages dedicated to water conservation. Minnesota Rural Water provides free water conservation ads and bill stuffers that can be customized for water suppliers.

### Other DNR Water Education and Outreach

- **Public Handouts** -The DNR distributes free water conservation materials to cities, at the state fair, and at various conferences. Over 10,000 educational pieces were distributed in 2018-2019 including free toilet leak detection kits and Saving Water coloring and activity books.
- **Aquatic Quest** - Minnesota State Parks have Aquatic Quest geocaching programs and events in all 75 state parks. Visitors are invited on a geocaching quest from April 22, 2018 to October 31, 2020. They may check out or use their own GPS unit to find hidden caches while discovering the fascinating plants and animals that live in our waters.

- **Staff Training** - Staff training on water conservation has been provided to the MN DNR Information Center staff. The Info Center receives more than 100,000 calls and emails annually. Water Conservation training to DNR field staff has been provided through the Water Appropriation staff meetings and the Field Hydrologist monthly meetings. Additional training

has been provided to the Department of Health staff.

- **Imagine a Day Without Water and Fix a Leak Week** – DNR, PCA, and MDH participate in a variety of national water conservation campaigns primarily through social media.

### Water Works! A Drinking Water Institute for Educators

The Minnesota Department of Health and Minnesota Section of the American Water Works Association have been conducting a series of "Drinking Water Institutes" for Minnesota teachers since 2001. The overall goal of this program is to have an ongoing group of middle-school and high-school graduates in the state who are well versed on the drinking water. The agenda covers three days of instruction on both drinking water and ways to teach it as well as a follow-up session for teachers to report on what they have done with education on drinking water in their classrooms. DNR staff are frequent instructors. This project is done in conjunction with the Hamline University Center for Global Environmental Education.

### Freshwater Society Water Conservation Advisors

The Minnesota Freshwater Society has long had a volunteer water quality education program known as the Master Water Steward program. In 2018 they developed a new Water Conservation Advisor program to train volunteers who want a deeper understanding of Minnesota's groundwater issues and water conservation best practices. Water Conservation Advisors will be equipped to engage landowners and businesses in water conservation best practices and implement projects to lower water use. Examples include conducting home water audits for residents, developing water conservation plans for small businesses, and providing guidance on plantings and irrigation best practices for landowners. In 2019 the first 30 Water Conservation Advisor candidates shared the results of independent research and decided on actions to address them.

### Great Lakes Aquarium

The mission of Great Lakes Aquarium is to inspire people to explore their connection with Lake Superior and the waters of the world. Minnesota is fortunate to have this 501 (c) 3 non-profit organization that provides nationally acclaimed exhibits, professional development, a teacher resource center and outreach materials. They partner with the DNR to offer Project WET training and partner with NOAA for water research opportunities.

### H2O for Life

In Minnesota, 144 schools participate in the national program H2O For Life. The program seeks to educate, engage, and encourage children to take action to help solve the global water crisis. H2O for Life teaches students that there are nearly 1 billion people without access to clean water. The unique school-to-school approach allows students to work together to complete one water project in a developing country.


Figure 6. Water Education is required in 4th and 8th grade. H2O for Life is becoming increasing popular.


Figure 7. Race 2 Reduce is a Minnesota-based K-12 water education curriculum.

### Race2Reduce K-12 Curriculum Development

One metro community, White Bear Lake, has supplemented H2O for Life with a Minnesota-specific water sustainability curriculum. Race 2 Reduce is a community-wide education and action effort focused on preserving our water resources now and into the future. They are partnering with the Minnesota Department of Education and others to complete k-12 curriculum that can be used statewide.

### Fix-A-Leak Week and Water Week School Poster Contest

The Minnesota Rural Water Association (MRWA) Poster Contest is held annually for 4th grade students to showcase their artwork through a poster drawing of water conservation practices. MRWA partners with the MN Department of Health MN Department of Health and H2O for Life. In collaboration with the EPA WaterSense program, the DNR, Department of Health, the Minnesota Rural Water Association and many local communities participate in the annual Fix-A- Leak Week campaign.

### Local Community Water Conservation Efforts

Many Minnesota communities have their own water conservation programs and educational efforts.

- The City of Shoreview was the first city in Minnesota to adopt the WaterSmart Home Water Reporting program that helps residents analyze how water is used within their home. Customers receive paper or e-mail reports three times a year and have access to monthly portal updates and customized water-saving recommendations.
- The City of Eden Prairie has built an Environmental Learning Center within the City's Water Treatment Plant. Hundreds of students, scouts, and other groups learn about water conservation and safe drinking water through the interactive exhibits and tours of the treatment plant water.
- The City of Rochester and the Rochester Public Utility have one of the longest running and most successful water rebate programs in the state. Since it is a world medical center with plans to expand, these efforts will continue into the future. The City also has developed their own Water Cycle and Conservation Primers for 4th grade teachers.

### Lake Superior Coastal Program

Minnesota's Lake Superior Coastal Program is a voluntary federal-state partnership dedicated to the

comprehensive management of our coastal resources. The Program provides technical and financial resources for local communities in the Lake Superior coastal area.

# 3. Description of Minnesota's conservation and efficiency program implementation timeline

Minnesota continues to explore opportunities to expand our water conservation efforts, empower 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 appropriation permit program. Water supply plans for public water suppliers serving over 1,000 people have just been updated and include new and improved water conservation, monitoring and management standards. Water conservation rate structures for public water suppliers within the Basin are required by state law.

## 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
- Adopt 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
- Improve building and water management operations to capture water efficiency opportunities.
- Increase adoption of commercial building water BMPs and benchmarking
- Expand and improve water efficiency and water reuse options
- Integrate water storage and demand response where practical

### Strategies for Smaller public water suppliers

- Participate in the Water Conservation Reporting System in 2019-2020
- 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.