This report fulfills the State of Minnesota’s obligation under 3.4 of the Great Lakes- St. Lawrence River Basin Water Resources Compact and under Agreement Article 300 of the Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement.
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Cover photo by:  Gary Alan Nelson
Figure 1. Detailed Minnesota portion of the Lake Superior Watershed.
Pursuant to Compact Section 3.4. Program Review and Findings.

Each Party shall submit a report to the Council and the Regional Body detailing its Water Management Program and Water Conservation and Efficiency Program to satisfy obligations included in the Great Lakes-St. Lawrence River Basin Water Resources Compact. The report shall set out the manner in which water withdrawals are managed by sector, water source, quantity or any other means, and how the provisions of the standard of review and decision and conservation and efficiency programs are implemented. The first report shall be provided by each Party one year from the effective date of this Compact and thereafter every five years.

Minnesota Highlights:

The report format requires a listing of laws, regulations and policies. During 2014-2019 there were two major legislative changes that impacted water management and water conservation: a new Demand Reduction Law and the Riparian Buffer Law.

Major water management and water conservation accomplishments and innovations include: the new DNR Water Conservation Reporting system, improving the Minnesota Water Permitting and Reporting System, completing the Ecological and Water Resources Strategic Plan, forming and organizing the Lake Superior Collaborative, securing major funding and implementing projects to improve the St. Louis River, creating and hiring two new positions in the DNR, the Water Conservation Consultant and the Water Policy Consultant, launching the initial phases of an update and revision of the statewide drought response and mitigation plan, and completing the Minnesota Water Reuse Report. Water conservation metrics have recently been added to the GreenSteps City voluntary challenge, assistance and recognition program. In the past five years, the Minnesota Technical Assistance Program (MnTAP) at the University of Minnesota has increased focus on industrial water conservation. With the increased focus on industrial water efficiency technical assistance, Minnesota companies have implemented 800 million gallons of water efficiency measures recorded as first year savings.

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.
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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2. Water management program implementing laws, regulations and policies.

Minnesota ratified the Compact in February 2007 via legislation codified at Minn. Stat. § 103G.801, which enacts the terms of the Compact verbatim. Minnesota’s Department of Natural Resources (MDNR) is tasked with administering the use, allocation and control of waters of the state. In 2014, Minnesota submitted its Water Management Program Five-Year Report and its 2014 Water Conservation and Efficiency Program Review, pursuant to Compact § 3.4.1. Following review of the report pursuant to Compact § 3.4.2, the Compact Council and Regional Body issued Resolution No. 2015-4 finding that, based on the report submitted by the State, the Minnesota water management and water conservation and efficiency programs meet or exceed the current requirements of the Compact.

The laws, statutes, rules, regulations or similarly enforcible documents that establish or implement programs to meet the requirement of the Compact are listed below. The primary and related statutes and rules are available at: www.leg.state.mn.us.

Primary:

*Minnesota Statutes, sections 103A.001-103A.301 Water policy*

*Minnesota Statutes, sections 103G. 001-103G.101 Water law, definitions, develop water conservation program*
3. Major Law Changes from Minnesota’s 2014 Five-Year Program Review Report

During 2014-2019 there were several major legislative changes that impacted water management and water conservation.

NEW 2015 Minnesota Statutes, section 103G.291, Subd. 4 Demand Reduction & Rates

To encourage water conservation, a new Demand Reduction Law went into effect January 1, 2015 requiring every public water supplier serving more than 1,000 people to implement demand reduction measures. Demand reduction measures must include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction.

NEW 2015 Minnesota Statutes, Chap.4, Article 3, sec.143 Negative Surface Water Impacts

The Negative Surface Water Impacts legislation directed the DNR to consult with interested stakeholders and develop recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters.

NEW 2017 Minnesota Statutes, Chap.103G, Subd.1 Appropriation or use of storm water that is used to reduce runoff volume, treat storm water or sustain groundwater supplies is exempt from a DNR appropriations permit.

NEW 2018 Minnesota Statutes, chapter 103E.021 Planting Ditches with Perennial Vegetation
The Riparian Buffer Law (103F.48), or “Riparian Protection and Water Quality Practices” law, states: “it is the policy of the state to established riparian buffers and water quality practices”. The law requires perennial vegetative buffers of up to 50 feet along public water lakes, rivers, and streams, and buffers of 16.5 feet along public ditches. These buffers help filter out phosphorous, nitrogen, and sediment. The deadline for implementation for buffers on public waters was November 1, 2017 and November 1, 2018 for public ditches.

AMENDED Minnesota Statutes, section 103.G287, Subd. 4 Groundwater management areas The Groundwater Appropriations law has existed for some time, however, there have been several revisions between 2014-2019. The DNR has significantly expanded monitoring, planning, and management in the state’s designated groundwater management areas where there are concerns with sustainability or water conflict.

WATER MANAGEMENT PROGRAM REPORT

1. Water management program scope and thresholds.

The Great Lakes basin in Minnesota consists of approximately 6,200 square miles of the Lake Superior basin in the northeastern portion of the state. Minnesota 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. The Minnesota DNR is the primary state agency responsible for water quantity management. 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.

Figure 2. Several agencies manage water resources in Minnesota. BWSR, not depicted here, provides indirect benefits for both groundwater quality and quantity.
Tribes are sovereign nations and some reservations are located within the Lake Superior basin in Minnesota. Bands also have reserved treaty rights to hunt, fish, and gather. The Bois Forte, Fond du Lac, and Grand Portage bands continue to exercise treaty rights in the 1854 Ceded Territory encompassing present-day northeastern Minnesota. Bands manage resources within reservation boundaries. The DNR works collaboratively with the bands in managing resources within ceded territories. Natural resources are cultural resources to the bands, and the availability and health of these resources continue to be of high importance.

Minnesota maintains a water resources inventory including withdrawals, diversions, and consumptive uses in the Lake Superior basin as required by Compact § 4.1.1. Minnesota accomplishes this inventory of location of type and quantity of withdrawals, diversions and consumptive uses through required annual water use reporting by all water appropriation permittees via the Minnesota DNR Permitting and Reporting System (MPARS). When reporting water use, the source of water, use of water, and location of appropriation are all recorded statewide, including the Lake Superior Basin. Minnesota has been maintaining a statewide inventory of “public water resources” since about 1970. This inventory has been codified as a requirement in Minn. Stat. § 103G.201.

A water appropriation permit from the DNR is required for groundwater and surface water withdrawals, diversions and consumptive uses that exceed 10,000 gallons per day or one million gallons per year. This permit applies to all users, not just new or increased withdrawals or diversions. Minnesota’s threshold level for permitting withdrawals and consumptive uses is considerably lower than the Compact’s default threshold of 100,000 gpd per 90-day period.

New, since 2014, is the DNR preliminary well construction assessment process. Those proposing to use groundwater, in excess of permitting thresholds, are required to submit a request to the DNR before well construction. Proposed water users must submit a request so that DNR staff can evaluate the proposed project while taking into consideration aquifer water levels, other water users, and groundwater dependent natural resources. DNR staff communicate to the requestor the likelihood of having to invest additional resources and money after submitting an application in order for permitting staff to make an informed decision (i.e., aquifer test, monitoring wells, etc.). By Minnesota Statute, “appropriating” is defined as “withdrawal, removal, or transfer of water from its source regardless of how the water is used,” (Minn. Stat. § 103G.005(4)). The term includes consumptive uses and diversions, as well as withdrawals.

A permit to appropriate or transport any amount of infested water is required to take and transport water from a designated infested water, even if the amount of water to be taken is less than the amount that triggers a water use permit. Permit requirements apply statewide to all water use sectors. Permit holders annually report monthly water use volumes to the DNR.

There are several exemptions to DNR water appropriation permit requirements:

- domestic uses serving less than 25 persons for general residential purposes,
- test pumping of a ground water source,
• reuse of water already authorized by a permit (e.g., water purchased from a municipal water system), or
• certain agricultural drainage systems

Although the Minnesota Department of Health (MDH) and the DNR have different missions, both agencies are committed to good water supply management and public health protection. The DNR permitting system (similar to a registration) captures all diversions over 10,000 gal./day or 1 million gal./year in the Lake Superior basin as required by Compact § 4.1.3.

Minnesota Department of Health (MDH) assures the proper construction of all new wells and borings, and the proper sealing of unused wells and borings. The MDH Well Management Program oversees special well and boring construction areas, (such as flowing well areas or areas of contaminant concern), water quality testing, well disinfection and property transfers. The MDH webpage also has links to laws and rules that apply to their department and a Rules Handbook.

**Critical Ecological Thresholds**

Beyond gallons per day or gallons per year, the Minnesota DNR is monitoring, researching, and setting guidelines for critical ecological thresholds. In 2015 the DNR initiated a project with a number of stakeholders and published the [Groundwater Threshold Project](#) to examine the effects of groundwater use on streams, lakes, and wetlands. In 2016 a project report was submitted to the Minnesota legislature that includes recommendations for statutory definitions, as well as recommendations for thresholds for negative impacts to surface waters from groundwater use. Groundwater plays a critical role for rivers, lakes, and wetlands and the fish and wildlife that depend on those cool waters for survival.

**Related Statutes**

• MS 103G.287 - Groundwater appropriations that will have negative impacts to surface water are subject to provisions of MS 103G.285
• MS 103G.285 - Quantity threshold – ½ acre foot per acre of surface area; Establish Protection Elevation below which appropriation is not allowed; Aquatic plant habitat; Surface water recreational uses; Changes in basin shape
• MS 103G.261 - Discourage appropriation and use in lakes < 500 acres in size.

**2. Management of Water Withdrawals in the State**

  a. **Sector (public water supply, commercial, industrial, institutional, agricultural, and other)**

All water use sectors are subject to water use permitting and annual reporting requirements. Water appropriation permits specify the authorized source of water, withdrawal rates, annual water volumes, allowable uses, and withdrawal exclusion dates. Permit applications are evaluated to determine adequacy of water supplies, natural resource impacts, impacts on other
users, water conservation practices, and consistency with Minnesota Rules and Statutes. At the time the permit application is evaluated, all restrictions are considered, such as requirements of the Decision-Making Standard of the Compact, Section 4.11. Water appropriation permits in Minnesota do not relieve the permittee of local, regional or state regulatory obligations.

Permits are permissive only and subject to modification, suspension or termination for violation of permit terms or to protect public interests and natural resources. Self-supply domestic uses for less than 25 persons for general residential purposes and agricultural drainage that does not impact Public Waters are exempt from permit requirements. Permits have not been required for in-stream uses for run-of-the-river hydroelectric power production where the water is not removed from its source.

Minnesota law sets priorities for water use in circumstances when there is a water shortage. From highest to lowest priority these uses are: 1. Domestic water supplies and power production with contingency water use plans 2. Uses of water consuming less than 10,000 gallons/day 3. Agricultural irrigation and processing of agricultural products 4. Power production without contingency water use plans 5. Consumptive uses in excess of 10,000 gallons/day. 6. Nonessential uses of water.

![MN Water Use: 1985 - 2018](image)

Figure 3. This graph shows overall water use from 1985-2018. Four of the five major water use sectors are depicted. Power generation is not shown. Despite a growing population, water use has remained relatively stable.
b. **Water source (groundwater, Great Lakes-St. Lawrence River surface water, and other surface water).**

   Permit requirements apply to “waters of the state”, which include surface and underground waters. Applications and permits identify the source of water and the withdrawal location. Separate applications are required for each source of water (groundwater, water basin, watercourse). Annual water use reporting is required for all water sources.

c. **Quantity (regulatory thresholds, volumes, rates, and requirements).**

   Permits are required for water withdrawals that exceed 10,000 gallons per day or one million gallons per year. Authorized water volumes and withdrawal rates are specified on permits. Permit holders submit an annual report of water use that includes monthly volumes. The surface and groundwater monitoring unit tracks the cumulative impacts to rivers and stream flows and aquifers as needed, with special emphasis on the designated Groundwater Management Areas (GWMA) in the state. “The commissioner may designate groundwater management areas and limit total annual water appropriations and uses within a designated area to ensure sustainable use of groundwater that protects ecosystems, water quality, and the ability of future generations to meet their own needs...” [MS 103G.287, Subd. 4](#)

d. **Location (statewide or Great Lakes-St. Lawrence River Basin).**

   Minnesota water management is a statewide program under the authority of the DNR. Withdrawal proposals are evaluated in accordance with the law, by location, sector, and by water source in order to assess individual and cumulative impacts. Permits identify authorized withdrawal locations.

e. **Specific exemptions as allowed in the Agreement and the Compact.**

   Transportation and emergency use exemptions in the Agreement and Compact are exempt from permit requirements or are covered by a general permit.

### 3. Application of the Standard of Review and Decision.

a. **Decision Making Standard for Withdrawals, Consumptive Uses.**

   Minnesota Statutes and rules cited under General Information, Item 2 define the standards for review and decisions on Water use proposals. All applications must consider alternatives, including conservation, and are evaluated for impacts to natural resources and other water users. Minnesota’s existing program and regulations meet or exceed the Standard of Review.

b. **Exception Standard for Diversions.**

   Diversions are subject to provisions in the Compact, which has been codified in Minnesota Statutes 103G.801 and the provisions in Minnesota Statutes, section 103G.265.
4. Overview of Database of Withdrawals, Consumptive Uses and Diversions.

Minnesota Permitting and Reporting System - MPARS

Reporting

Water appropriation permittees (i.e. registrants) are required to report annually their water use including monthly water volumes and other information. Minn. Stat. § 103G.801 incorporates this Compact reporting requirement. There has been a 99.9% compliance rate with water use reporting requirements (failure to report can result in permit termination).

Water use reporting is now mostly done online through the Minnesota DNR Permitting and Reporting system (MPARS). MPARS is an online system for water use reporting, permit applications, permit change requests, and preliminary well construction assessment requests. MPARS is designed to benefit DNR's permit holders and applicants with a simple, convenient and easy-to-use system. All permit records are maintained online, allowing permit holders to access their permit file at any time. The system includes a map of permitted projects that enables evaluation of cumulative impacts.

The information collected from the permitting and reporting process is made available to the public on the MDNR website with links to searchable databases, maps and water use report summaries.1 Minnesota’s statewide reporting system complies with the registrant reporting requirement of Compact § 4.1.4.

Compact § 4.1.5 requires each state to annually report information gathered per Compact § 4.1 to the regional water use database repository. Minnesota annually reports on withdrawals, consumptive uses and diversions from the Lake Superior basin to the Great Lakes Regional Water Use Database, and the aggregated information is available to the public online.

Minnesota Statutes require flow meters to measure water use, but other methods of measurement can be approved by the DNR. Permit and water use data are stored within the MPARS database. The data is available from DNR’s website at Water Resources Main Page. Consumptive use data are reported to the Great Lakes Commission using factors that estimate water losses by sector.

New or Increased Withdrawals and Consumptive Uses

For new or increased withdrawals and consumptive uses in the Lake Superior basin, permits are first reviewed to see if they meet state law. Then, specifically in the Lake Superior basin, no permits for water appropriation will be granted unless the proposal meets the Decision-Making Standard of Compact § 4.11. Minnesota, through MPARS, requires a project proposer to provide

1 MNDNR, Water Use Data, Minnesota Water Use Data
the location, type, quantity, and the rate of water use throughout the state, including the Lake Superior basin. Permitted water users are then required to report monthly water use totals on an annual basis. The water use information reported in MPARS can be retrieved based on a geographic area, like the Lake Superior basin, for example. This method of gathering information fulfills Compact § 4.11.

Minnesota also has set two other thresholds which trigger additional requirements. First, a permit application for a consumptive use of 2 million gpd or greater in a 30-day period requires further consideration before approval regarding the sustainability of the use in balance with the water resource needs of the source basin over the life of the use, Minn. Stat. § 103G.265(3). Second, notice must be given to the governors, premiers, and water management agencies of the Great Lakes region and the international joint commission for any application for a consumptive use over 5 million gpd in a 30-day period, Minn. Stat. § 103G.265(4).

Decision-Making Standard

A preliminary well construction assessment from the DNR is required before drilling a well that will need a water appropriation permit (required to withdraw more than 10,000 gallons of water per day or 1 million gallons per year). The DNR informs the applicant whether the anticipated water use request is likely to meet the applicable requirements in law. This process helps prospective well owners to make informed decisions by providing relevant information prior to their financial investment in equipment and well construction. Once an application for a water appropriation permit is submitted, DNR staff begin reviewing and evaluating the application materials prior to issuing a permit.

Special Decision-making Guidance in Basin

For new or increased withdrawals and consumptive uses in the Lake Superior basin, no permits for water appropriation will be granted unless the proposal meets the Decision-Making Standards of the Compact § 4.11 and the requirements of Minn. Rule 6115.0670.

The Decision-Making Standard of the Great Lakes Compact lists five criteria that must be met in the basin are:

1. all water withdrawn shall be returned to the source watershed less an allowance for consumptive use;
2. the use will result in no significant adverse impacts to the quantity or quality of the waters or water dependent natural resources of the applicable source watershed;
3. the use will incorporate environmentally sound and economically feasible water conservation measures;
4. the use will comply with all applicable municipal, state, federal laws as well as regional interstate and international agreements; and
5. the use is reasonable. Compact § 4.11.
The term “reasonable” is based on consideration of six specific factors: (1) efficient use, minimize waste of water; (2) for increased withdrawal or consumptive use, efficient use of existing water supplies; (3) balance economic, social and environmental aspects of proposed use with those of existing uses sharing the water source; (4) supply potential of the water source; (5) degree and duration of any adverse impacts caused by proposed use to other lawful uses of water or to the waters and water dependent natural resources of the basin; and (6) if applicable, restoration of hydrologic conditions and functions of the source watershed. Compact § 4.11.5.

By virtue of adopting the Compact verbatim at Minn. Stat. § 103G.801, Minnesota law includes the Compact § 4.11 Decision-Making Standard.

A Minnesota regional staff guidance document on the Decision Making Standard of the Great Lakes Compact provides additional criteria for all permit requests in the Lake Superior basin. Basically, for appropriation permit requests within the basin, DNR staff first apply Compact Decision-Making Standards and then apply Minnesota administrative rule. Some sections of the compact and the rule are duplicative, making review easier.

Minn. Rule 6115.0670 identifies ten factors MNDNR shall “consider” when reviewing all permit applications, and then lists additional factors for consideration for appropriations from watercourses, basins, and groundwater. The rule stipulates that no permit shall be granted:

1. for application involving diversion of any waters of the state, surface or ground water, to a place outside the state, the remaining waters in the state will not be adequate to meet the state water resources needs during the specified life of the diversion (Minnesota Statutes, section 103G.265, subdivision
2. there is no conflict between competing users but the quantity of available waters of the state, in the area involved, are inadequate to provide the amounts of water proposed to be appropriated;
3. the appropriation is not reasonable, practical, and does not adequately protect public safety and promote the public welfare (Minnesota Statutes, section 103G.315);
4. the appropriation is not consistent with approved state, regional, and local water and related land resources management plans, provided that regional and local plans are consistent with statewide plans (Minnesota Statutes, section 103G.271, subdivision
5. there is an unresolved conflict between competing users for the waters involved and the conflict has not been resolved pursuant to provision of part 6115.0740.

The administrative rule also subjects permit approval to further criteria depending upon whether it is a surface water or groundwater appropriation. Minn. Rule 6115.0670 says that permit decisions also shall be based on other applicable provisions of Minn. Stat. chapter 103G, which includes the codified Compact.

Diversions and Exceptions

Compact § 4.8 generally prohibits all new or increased diversions, except as provided in Article 4. Compact § 4.9 sets forth three exceptions to the general ban on new or increased diversions:
straddling communities, intra-basin transfers, and straddling counties. Minnesota adopted the Compact verbatim, and therefore all proposed new or increased diversions from the Lake Superior basin are prohibited unless they meet one of the three exceptions recognized in the Compact.

New Supplemental Conservation Reporting

In early 2018, the DNR initiated the Water Conservation Reporting System supplemental to MPARS. This system tracks compliance with the new Demand Reduction Law for the 348 Minnesota utilities required to complete Water Supply Plans. By 2021 the system will provide water conservation measures for all permit holders except for dewatering permits. Water conservation reporting is voluntary, however many permittees that have reported conservation and efficiency improvements during the first 2 years have realized the benefits of the web-based water use, efficiency and conservation tracking and reporting tool. See the Water Conservation section of this report for more details.

![Public Water Supply and MN Population](image)

Figure 4. Although population continues to grow in Minnesota, water supply system use has generally declined in the past 5 years.
The chart above demonstrates total water use from public water supply systems (groundwater and surface water) and includes the population in Minnesota in millions of people from 1985 to 2018. Over the last 5 years, approximately 65% of the total water use for public water supply is from groundwater sources. Although state population continues to increase, water efficiency has decreased the total amount of water used in the state over the past 5 years.

5. Permit applications and other program information.

Potential water users apply for a permit online using MPARS. Additional program information is available at DNR Water Permits. Minnesota Rules 6116.600 – 6115.0810 define standards for evaluating water appropriation permit requests.

6. Initiatives to support scientific understanding of the surface and ground waters of the Basin and impacts from Withdrawals, Consumptive Uses, and Diversions.

a. Ballot Measures.

Beyond the General Funding, Minnesotans are fortunate that voters approved a constitutional amendment that dedicates proceeds from 3/8’s of one percent of sales tax to provide for clean water, natural resource protection, recreation and cultural heritage protection for 25 years. This was approved by a vote of the people in Minnesota in 2008. Thirty-three percent of the sales tax revenue from the Legacy amendment is allocated to the Clean Water Fund resulting in over $971.5 million for Clean Water projects. Those funds may only be spent to protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater from degradation. At least five percent of the clean water fund must be spent to protect drinking water sources. Over 60 projects have direct implications to Lake Superior water management.

Protecting Minnesota’s waters is a joint effort between seven partner agencies, who collaborate and partner on Minnesota’s water resource management activities under the Clean Water Fund. With these funds we have been able to embark on new efforts toward the implementation of the Water Conservation and Efficiency goals adopted by the Council and Regional Body.

Figure 5. Clean Water Land & Legacy were approved by tax payers. Figure 6. Environmental Trust Funds is generated by the MN State Lottery.
The Environment and Natural Resources Trust Fund (ENRTF) was established following voter approval of a constitutional amendment in 1988. The money in the Trust Fund is generated by the Minnesota State Lottery. The Trust Fund holds assets that can be appropriated, "for the public purpose of protection, conservation, preservation, and enhancement of the state's air, water, land, fish, wildlife, and other natural resources." Since 1991, the ENRTF has provided approximately $500 million to approximately 1,000 projects around the state. Some of the projects recently funded by ENRTF, specific to Lake Superior include: Evaluation of Lake Superior Water Quality Health; Developing Membrane Filtration System to Treat Lake Superior Ballast Water and two other ballast water research projects; and management of North Shore Trout Stream, and many others.

b. **Tribal Partnerships**

The Fond du Lac Band has partnered with the USGS, with support from the Minnesota Chippewa Tribe, the Bois Forte Band, the Leech Lake Band, and the Mille Lacs Band, to develop a regional groundwater flow model of the upper St. Louis River watershed ([Simulation of the Regional Groundwater-Flow system in the St. Louis river Basin, Minnesota; Scientific Investigations Report 2019-5033](https://doi.org/10.3133/si20195033)). This modeling effort characterizes groundwater movement in the watershed, and includes more detailed local, high-resolution steady-state groundwater models of selected land use change areas, particularly areas affected by historic and current mining activity, and extreme hydromodification resulting from extensive ditching in vast peatlands of the watershed. This model will provide useful background information to help understand hydrologic changes in mining regions.

c. **One Watershed One Plan**

The vision of One Watershed, One Plan is to align planning with major watershed boundaries for prioritized, targeted, and measurable watershed plans developed and implemented locally. Lake Superior North One Watershed One Plan is now complete: [Lake Superior North: One Watershed, One Plan](https://www.ctlab.umn.edu/lake-superior-north-one-watershed-plan). This plan is highly focused on ecosystem protection, which feeds indirectly into sustaining the surface water sources that most people use for drinking water in the region. The Board of Water and Soil Resources leads this planning effort.

d. **Lake Superior Collaborative: A DNR Initiative for Collaborative Water Governance.**

Water governance has always required cooperation, but as demand for water and water-based resources increases the need for integrated water resource management has never been greater. Millions of dollars of federal money are brought into Minnesota annually for Lake Superior management. The objectives of this collaborative effort are to enhance DNR direct participation in Great Lakes programs, responsibilities and initiatives, coordinate lake-wide activities with cross-jurisdictional programs, coordinate Lake Superior activities with internal State programs, and advance Lake Superior restoration and protection priorities through a variety of means.
The Six DNR Programs in Great Lakes Management

- **The Great Lakes Fishery Commission** - The Great Lakes Fishery Commission was established in 1955 by the Canadian/U.S. Convention on Great Lakes Fisheries. The commission coordinates fisheries research, controls the invasive sea lamprey, and facilitates cooperative fishery management among the state, provincial, tribal, and federal management agencies.

- **Minnesota’s Lake Superior Coastal Program** - Minnesota’s Lake Superior Coastal Program is a federal-state partnership dedicated to the comprehensive management of our coastal resources. The Program provides technical and financial resources for the local community, by bringing federal dollars into Minnesota for the Lake Superior coastal area.

- **Lake Superior Lakewide Action and Management Plan** - Each Great Lake has a Lakewide Action and Management Plan (LAMP). LAMP provides a management framework for a binational, watershed-based approach to the overall restoration, protection and maintenance of the Lake Superior ecosystem.

- **St. Louis River Restoration Initiative (SLRRI)** - Minnesota DNR is leading habitat restoration projects in the estuary to address degradation of fish and wildlife populations, and to restore fish and wildlife habitat. For each project, DNR and its partners identify ecological targets to guide selection, design, construction and monitoring projects. Some SLRRI restoration projects are also designated management actions within the Remedial Action Plan for the St. Louis River Area of Concern (SLRAOC) program. The SLRAOC is a bi-state...
initiative that has identified 78 management actions to address nine of the International Joint Commission’s fourteen Beneficial Use Impairments.

- **Great Lakes Compact Council** - The Great Lakes–St. Lawrence River Basin Water Resources Compact Council implements the Compact. The Compact is state and federal law that details how the states will work together to manage and protect the Great Lakes Basin. The governors of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin are members of the Council. In addition to Compact Council, the Great Lakes–St. Lawrence River Water Resources Regional Body, that includes the premiers of Ontario and Quebec along with the eight Great Lakes governors, is guided by the Great Lakes Agreement for management and protection of the Great Lakes Basin water resources.

- **Aquatic Invasive Species Program** - The Great Lakes Restoration Initiative (GLRI) was launched in 2010 to accelerate efforts to protect and restore the Great Lakes. The GLRI Action Plan II summarizes the actions that federal agencies plan to implement during FY15-19. The purpose of the MNDNR AIS program is to prevent the introduction of new invasive species, curb the spread and minimize harmful effects of nonnative species.

a. **Groundwater Management Areas** - The framework for improved scientific understanding and sustainable management of Minnesota’s water resources is centered in three program areas: mapping; monitoring; and managing. DNR has drafted a strategic plan for improving its groundwater management. Three pilot areas in the state (none are within the Great Lakes Basin, however) have been designated as groundwater management areas (GWMA) where the strategic plan’s objectives and strategies will be written into a GWMA Plan for DNR implementation.

b. **Minnesota Sea Grant Work** – Minnesota Sea Grant continues to partner with the DNR and other organizations to help prevent the spread of aquatic invasive species. Minnesota Sea Grant provides leadership and support in sharing the best available science to improve ballast water policy, and assists in timely and effective implementation of ballast water management and control systems on vessels. The Minnesota Sea Grant is part of the National Oceanic and Atmospheric Administration’s (NOAA) Sea Grant Program, which supports 33 similar programs in coastal states throughout the United States and Puerto Rico. It receives funding through the NOAA-Office of Oceanic and Atmospheric Research and the University of Minnesota. The program partners with local, regional and national organizations and is an integral member of the Great Lakes Sea Grant Network.

c. **Climate Change Impacts** – The DNR state climatologists, the University of Minnesota and others are closely monitoring Lake Superior in terms of a changing climate.

- One of the most remarkable changes has been the speed with which the lake changes. In 2013, the water levels on Lake Superior were nearing historic lows and the shipping industry was concerned about navigation. Now, just six years later in 2019, Lake Superior is setting record high levels. The three-foot rise in such a short time span is remarkable for a lake the size of Lake Superior, the largest lake in the world by surface area. This has happened only once before in historic records, from approximately 1926-1932.
Various storms between 2017-2019 produced significant shoreline erosion and damage to the existing city infrastructure. These storms produced sustained winds at 40-50 mph, with waves of 15.7 feet and storm surges over 1.3 feet.

These and other rain events have caused significant damage to communities resulting in large plumes of sediment-rich water surging into the lake, turning the water a pinkish-iron color. In an effort to mitigate the impact of intense rains, the DNR provided tours and training on rain gardens in Duluth.

North Shore rivers and streams from the Knife River to the Pigeon River are all susceptible to impacts from climate change. However, certain rivers are at greater risk than others. DNR fisheries staff are developing and implementing strategies. Changes are occurring faster than anticipated with air temperature and precipitation greatly impacting fish habitat. Warmer temperatures may reduce the number of streams that support brook trout because they are the most thermally-sensitive species.

Around the Great Lakes we can expect to see more harmful algal blooms, warmer water temperatures and declining ice cover, more rain storms flushing runoff from farm fields and parking lots, and more coastal erosion and beach closures.

Future resilient coastal and watershed habitat restoration strategies and infrastructure-hardening continue to be planned and implemented.

Experts from the University of Minnesota contributed to a report titled, "An Assessment of the Impacts of Climate Change on the Great Lakes".

d. **Mining** - The DNR Division of Lands and Minerals manages mining activities through permitting, provides technical expertise, and collects information to support and inform permitting decisions. Water resources related to mining are managed through the regulation and monitoring of water appropriation permits. There are five active taconite mines pits (or portions of pits) in the Lake Superior Watershed. The taconite mines appropriating within the watershed may use groundwater and/or nearby surface waters, including the reuse of water for operations. Northshore Mining Company is the only operation that appropriates water directly from Lake Superior for plant operations.

In late 2018, the DNR issued permits for the PolyMet NorthMet project, a copper-nickel-precious metals mine located in the Lake Superior Watershed. Mining activities have not begun.
at the NorthMet project site. For all mines, ambient and permit required monitoring networks provide data on groundwater levels, surface water levels and flows, precipitation, and water use that are used to evaluate individual and cumulative impacts.

e. Preliminary well construction assessment - Recent changes to Minnesota water laws now require potential well owners to request a preliminary well construction assessment from DNR before constructing a well that will need a water use permit. DNR provides information on water resources in the area, the likelihood that their project could receive a water use permit, and alerts the applicant to resource concerns and additional monitoring and aquifer testing that they may be required to perform at their expense during the water use permit application process. The potential well owner can then make an informed decision on whether to invest in a well and other equipment.

f. County Groundwater Atlas Program – Due to the complex hydrogeology of Minnesota, and the states dependence upon groundwater, the DNR and the Minnesota Geological Survey (MGS) are collaborating to create tools to assist in the long term management of these valuable resources. Detailed maps and reports of the geology and hydrogeology of Minnesota are available or underway for resource managers, industry, agriculture, researchers and others. A County Geologic Atlas prepared by the MGS provides information about the geology of a county. The DNR prepares the County Groundwater Atlas based on the work of the MGS. A Groundwater Atlas characterizes flow systems, aquifers, groundwater chemistry, relative age of groundwater and sensitivity to pollution. The following two figures provide the status of the county atlas programs as of 2019:
Figure 9  County Geologic Atlas Part A

Figure 10 County Geologic Atlas Part B
g. Community-based Aquifer Management Partnership (CAMP) is a process that combines social and groundwater sciences so communities can take a greater leadership role in managing their shared aquifers. A CAMP Dashboard consisting of their aquifer cross-section, water users, reported water use volumes, use trends, and observation well data provides the starting point. The local community determines the direction and extent of the next steps based on these initial conversations about water use, users and availability.

7. Additional information

a. Strategic Planning. The Ecological and Water Resources Division is one of seven divisions in the Minnesota Department of Natural Resources. In 2018, the division released its Ecological and Water Resources Division Strategic Plan 2018-2028. This plan provides the division’s strategic direction for the next 10 years and is designed to communicate the division’s goals, describe some important trends and issues facing the division as it pursues those goals. The eight strategic issues for the division to focus on are: biological diversity; water resources; invasive species; climate change; communication and collaboration; data; workforce health; and sustainable funding. One of the primary goals is: “Minnesota water resources will be managed and used sustainably and the water quality will be improved and protected.” The plan recognized that 100 non-native species are living in Lake Superior and the wetlands in the basin. It highlighted the effort of Minnesota’s Lake Superior Coastal Program, The Water Conservation Reporting System, and Project WET’s water conservation educational efforts.
WATER CONSERVATION AND EFFICIENCY PROGRAM REPORT

1. Status of Minnesota’s water conservation and efficiency 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

2. 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

- *NEW 2015 Minnesota Statutes*, section 103G.291, Subd. 4 Demand Reduction & Rates
  To encourage water conservation, a new Demand Reduction Law went into effect January 1, 2015 requiring every public water supplier serving more than 1,000 people to implement demand reduction measures. Demand reduction measures must include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction.

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 Riparian 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 riparian buffer law will likely achieve the greatest benefit to surface water quality in agricultural lands, there may be some improvements in the water quality of tributaries entering into Lake Superior. Buffers also ensure some protection of water quality into the future, everywhere they are installed.

• **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, *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.

3. 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.


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 Interagency Report - Advancing Safe and Sustainable Water Reuse in Minnesota report was published in 2018.

5. The Metropolitan Council is offering Water Efficiency Grants of up to $50,000 to municipal water suppliers to help increase water efficiency in their communities. Grants can be used for rebates to residents and commercial properties that replace inefficient water-using devices with approved devices that use substantially less water, or for irrigation system audits. A total of $750,000 will be available for spending through June 2022. The 2019 Minnesota Legislature designated the monies from the Clean Water Fund of the Minnesota Clean Water, Land and Legacy Amendment. Local governments are responsible for designing their own rebate/grant program.
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.

**Lake Superior Drainage Basin**

![Lake Superior Drainage Basin](image)

Figure 11. Lake Superior Drainage Basin showing Areas of Concern (AOC) in the US and Canada. Minnesota has one AOC on the St. Louis River. Map used with permission from Environment and Climate Change Canada.
• **St. Louis River Area of Concern Program.** The St. Louis River Area of Concern (SLRAOC) is one of 43 AOCs across the Great Lakes basin that, as designated by 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, well-defined lists of Beneficial Use Impairments, removal targets, management actions, and timelines for restoring habitat and removing contaminant are described in the 2018 Remedial Action Plan. 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 administer this AOC. The Fond du Lac Band is also an implementing agency within the AOC, as is the DNR. Progress is being made implementing management actions with 46.8% completed as of October 1, 2019. Primary funding for Minnesota’s work is provided through the U. S. EPA Great Lakes Restoration Initiative, Minnesota’s Clean Water and Outdoor Heritage Funds, the Natural Resources Damages Assessment fund, and contributions from responsible parties.

Several construction projects to restore aquatic habitat and remediate contaminated sediments in the SLRAOC were initiated or completed in 2018-2019:

- **Kingsbury Bay/Grassy Point Habitat Restoration Projects** – Construction began at these two integrated projects in 2019. An estimated cost of $15 million dollars will be needed to complete aquatic habitat restoration at those two locations by 2021. [WDIO Kingsbury Bay/Grassy Point](https://www.wdio.com) and [KBJR 6 Kingsbury Bay/Grassy Point](https://www.kbjr6.com).

- **Wild Rice Restoration in the SLR Estuary** – Efforts are underway to restore wild rice habitat, which has been significantly reduced, by seeding stands to restore 275 acres. No seeding was completed in 2018, but 9,100 pound of seed was dispersed over 96 acres in 2019. Additionally, efforts are underway to find effective ways to reduce depredation by geese. The team is working with the 1854 Treaty Authority, the Natural Resources Department of the Fond du Lac Band of Lake Superior Chippewa, and other partners.

- **Sediment Remediation sites** – Three sediment remediation projects were completed in Minnesota, under the direction of the Minnesota Pollution Control Agency, in 2019: Minnesota Slip, Slip C and Slip 3.

- **St. Louis River Interlake/Duluth Tar Site (SLRIDT)** - The Fond du Lac Band is a Natural Resource Trustee for both the SLRIDT site and the [US Steel site](https://www.ussteel.com).

• **Invasive Species Management.** Minnesota has an active and aggressive [Aquatic Invasive Species Management Program](https://www.mndnr.gov). 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 organism, the Bloody Red Shrimp (Hemimysis anomala) was recently reported in the Duluth/Superior Harbor near the Superior ore docks on the Wisconsin side of the harbor and later confirmed on the Minnesota side of the harbor. Until the discovery in Duluth Superior the Bloody Red Shrimp had not been found in Lake Superior. US Fish and Wildlife Service biologists have the specialized equipment for early detection and monitoring of Bloody Red Shrimp and were instrumental in the initial discovery and sampling of the species. The Fond du Lac Natural Resources biologists and 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.** GLRI Action Plan III (FFY 2020-FFY 2024) was released in October 2019. The plan was developed openly and collaboratively, involving local stakeholders, Tribes, governments and the public. The Plan describes the non-regulatory program to accelerate efforts to protect and restore the largest system of fresh surface water in the world. Action Plan III sets goals in five Focus Areas:
DNR has resource management programs that intersect all five Focus Areas and DNR routinely seeks GLRI funding to support initiatives in each area.

- **Western Lake Superior Sanitary District Success Story.** In September 2018, Western Lake Superior Sanitary District (WLSSD) celebrated 40 years of improving water quality in the St. Louis River and Lake Superior. To mark the milestone, WLSSD held an open house event to celebrate their success. For decades, communities and 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 treatment plant began operations in September 1978, the treatment plant met federal quality regulations from day one; the results were stunning and quick. The St. Louis River, free from most domestic and industrial sewage and other pollution, transformed almost immediately. Over the years, more nearby areas connected into WLSSD’s effective treatment system including small communities on the north shore of Lake Superior, Pike Lake, the City of Rice Lake (formerly a township), and Oliver, Wisconsin. In all, WLSSD now treats all of the sewage that was once discharged from 17 different points along the lower St. Louis River. WLSSD has continually improved and upgraded its treatment system to ensure ongoing effectiveness, reliability, efficiency and ensuring valuable resources are recovered from the waste treatment processes. In 2001, WLSSD opened a $33 million anaerobic digestion facility that recovers nutrients from wastewater solids and turns them into valuable fertilizer. The process also creates a methane-rich gas that is used for heat. Now, the district is working to build systems to recover 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, Environmental Initiative staff are exploring needs and perspectives to inform the development of a statewide Source Water Protection Collaborative 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 19 water 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

<table>
<thead>
<tr>
<th>City</th>
<th>Approved Y/N</th>
<th>Date of last action or approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Marais, City Of</td>
<td>Y</td>
<td>6/14/17</td>
</tr>
<tr>
<td>Silver Bay, City Of</td>
<td>N</td>
<td>Edits sent back 8/22/19</td>
</tr>
<tr>
<td>Two Harbors, City Of</td>
<td>Y</td>
<td>12/19/16</td>
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<tr>
<td>Duluth, City Of - Public Works Dept.</td>
<td>Y</td>
<td>1/30/17</td>
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<tr>
<td>Lutsen Mountains Corporation</td>
<td>N</td>
<td>Nothing received yet. Reminder sent 8/8/19</td>
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<tr>
<td>Superior Water Light &amp; Power Co.</td>
<td>N</td>
<td>Draft received 1/22/19 and review pending</td>
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<tr>
<td>Cloquet, City Of</td>
<td>Y</td>
<td>6/22/18</td>
</tr>
<tr>
<td>Carlton, City Of</td>
<td>Y</td>
<td>12/19/16</td>
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<tr>
<td>Aurora, City Of</td>
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<tr>
<td>Babbitt, City of</td>
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<td>Edits sent back 10/15/2019</td>
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<tr>
<td>Biwabik Public Utilities</td>
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<td>Exempt</td>
</tr>
<tr>
<td>Chisholm, City Of</td>
<td>N</td>
<td>Nothing received yet. Reminder sent 8/8/19</td>
</tr>
<tr>
<td>Eveleth, City of</td>
<td>N</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; draft received 10/2/19</td>
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<tr>
<td>Gilbert, City Of</td>
<td>N</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; draft received 11/14/18</td>
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<tr>
<td>Buhl, City of</td>
<td>Y</td>
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</tr>
<tr>
<td>Virginia Public Utilities</td>
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</table>
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

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

<table>
<thead>
<tr>
<th></th>
<th>2017 Data</th>
<th>2018 Data</th>
<th>Statewide Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Non-Res. connections</td>
<td>2,022</td>
<td>2,041</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

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

e. 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. 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 12. 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 13. The University of Minnesota Technical Assistance Program (MnTAP) helps businesses conserve water and energy. Through this program, Minnesota businesses have conserved over 800 million gallons of water annually.](image)

**Efficiency in the Commercial, Industrial and Institutional Sector**

The Minnesota Technical Assistance Program (MnTAP) is an outreach program at the University of Minnesota that for 35 years has helped 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 800 million gallons of water annually. 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 leadership group of nearly 30 organizations advancing a circular economy through collaboration. Individually, each organization is committed to sustainability, and recognize that together they can have a larger, societal-level systemic impact on their operations, industries, environment and community. The organizations include 3M, Best Buy, Ecolab, General Mills, Target, Xcel Energy and others. The Coalition focuses on energy, water and materials issues to optimize use of resources, minimize waste and conserve resources. In the water area, the Coalition developed a Corporate Guide to Sustainable Landscaping Guide on “greening grey infrastructure” or promoting infrastructure and practices designed to mimic the natural water cycle and add value to corporate landscapes. 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 and 2019 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 2019-2021.
- 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 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](https://www.dnr.state.mn.us/watermonitoring) collects data and provides information about climate, stream flow, lake levels and groundwater levels in Minnesota. This information helps the DNR and others carry out statutory responsibilities and water management strategies and programs. The Water Monitoring and Surveys Unit uses a unique database and processing software known as WISKI for storage and management of the data from the networks.

The team accesses and interprets data that is collected at varying intervals and served to the public via the following websites.

- [Stream gage sites](https://www.dnr.state.mn.us/watermonitoring/streamgages.html) from 275 locations
- [Groundwater level sites](https://www.dnr.state.mn.us/watermonitoring/groundwaterlevelsites.html) more than 2,000 sites from groundwater observation wells and permit required monitoring wells
- [Volunteer rain gage network](https://www.dnr.state.mn.us/watermonitoring/volunteerraingages.html) approximately 1,500 volunteers read precipitation gages
- [Lake level sites](https://www.dnr.state.mn.us/watermonitoring/lakel levelsites.html) approximately 930 volunteers read lake level gages
- [Climate mesonet sites](https://www.dnr.state.mn.us/watermonitoring/climatebehavior.html) 40 climate mesonet sites; data will soon be via the stream gage webpage
Products produced by the Water Monitoring and Surveys Unit include:

- Production and distribution of weekly statewide stream flow conditions reports during the open water season (typically April through October).
- Production and distribution of monthly statewide hydrologic conditions report (includes: climatology, stream flow, lake levels and groundwater levels) during the open water season (typically April through October).
- A variety of climate and weather related products from the State Climatology Office.
- Determination of Ordinary High Water Level for public water basins.
- 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 floods.

Cooperative Groundwater Monitoring Program

The purpose of the cooperative environmental research program is to continuously improve the Lands and Minerals Division’s foundation of scientific knowledge to support environmental review and permit decisions for metallic minerals and peat mining and reclamation in Minnesota. The Lands and Minerals Cooperative Environmental Research Program performs objective research studies that evaluate the environmental effects of mining in the State of Minnesota, and provide science-based guidance for environmentally sound mining practices that are protective of natural resources. The research program collaborates with the mining industry and their representatives, academic and research institutions, and other State agencies to enhance the scope and capability of the research conducted. Research results are made readily accessible to provide assurance to the public that environmental review and permitting decisions are science-based. The research program strives to continuously educate and improve staff knowledge to remain current, fill knowledge gaps, and grow with advancing methods and technology.

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. The MDH continues to work with national health agencies to research the cause and prevention of Legionella.

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, county and local partners organize special events to search waters for new infestations of invasive species. One such event known as Starry Trek, is conducted at various locations around Minnesota each year has resulted in the discovery of small infestations of starry stonewort and in many cases led to successful management.

Turfgrass Irrigation Efficiency Research
The University of Minnesota Turfgrass Science program has been conducting extensive research with the Golf Course Superintendents Association and the Minnesota Department of Transportation to develop best turfgrass management practices for reducing irrigation in various turfgrass systems throughout the state. This research includes utilizing low-input turfgrass species and implementing precision-management protocols at high-end facilities (golf courses, sports fields, etc.) and establishing and maintaining sustainable turfgrasses for roadsides. They also work with the Metropolitan Council to promote the use of drought-resistant turfgrass species in residential and commercial properties, and the importance of implementing improved sprinkler system technologies like smart irrigation controllers and soil moisture sensors which are able to significantly reduce water use. The UMN turfgrass science program conducts 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.

- **Power Generation at Wastewater Facilities** – The Wastewater Treatment Plant Project: Energy Efficiency and Renewable Energy Generation final report and action plan aimed to increase energy efficiency (E2) in Minnesota municipal wastewater treatment plants (WWTP) and scope opportunities for onsite power generation. The project was completed in 2017 by Minnesota Department of Commerce, Minnesota Pollution Control Agency and MnTAP, and funded through a grant from the U.S. Department of Energy.

- **Energy Providers and Water Suppliers** - In 2019, the Minnesota Department of Commerce awarded MnTAP a $70,000 Conservation Applied Research Development grant to research and provide recommendations on how energy providers can help water utilities conserve energy. The report is not yet available.

- **Wastewater/Energy Efficiency Training Model** – A Conservation Applied Research and Development (CARD) Grant funded project was completed 2019 on “Driving Wastewater Treatment Energy Efficiency through a Cohort Training Model”.

- **Water Conservation Kits** - 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)

<table>
<thead>
<tr>
<th>Source</th>
<th>Withdrawn</th>
<th>Consumed</th>
<th>Returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Croix River</td>
<td>112.31</td>
<td>0.0</td>
<td>112.31</td>
</tr>
<tr>
<td>Lake Superior</td>
<td>9.83</td>
<td>0.0</td>
<td>9.83</td>
</tr>
<tr>
<td>Mississippi River</td>
<td>459.87</td>
<td>7.18</td>
<td>452.69</td>
</tr>
<tr>
<td>Minnesota River</td>
<td>36.47</td>
<td>0.0</td>
<td>36.47</td>
</tr>
<tr>
<td><strong>Upper Midwest Total</strong></td>
<td><strong>618.48</strong></td>
<td>7.18</td>
<td>611.30</td>
</tr>
</tbody>
</table>

**Does not include groundwater**

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**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**

- **The 1854 Treaty Authority** participates in a variety of activities within the 1854 Ceded Territory and Lake Superior basin. Participation is ongoing in environmental review of projects impacting water quality, remediation and restoration of sites within the St. Louis River Estuary, wild rice management and restoration, invasive species management (aquatic and terrestrial species) including boat inspections, fisheries monitoring including lake sturgeon in the St. Louis River estuary, and climate change initiatives.

- **Fond du Lac Environmental Program monitoring**: The FDLEP has conducted comprehensive water quality monitoring and stream gaging for the lakes, streams and reservation reach of the St. Louis River for 20 years, in support of its federal water quality standards program. The Band uses this monitoring data to assess the quality and condition of reservation waters, and reports to the community and U.S. EPA. The monitoring program has also identified nonpoint source impacts, climate change impacts, and has led to several lake and stream restoration projects. The Band has also conducted hydrologic investigations related to wild rice waters, and has done some limited groundwater monitoring.
- **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](https://www.fdlb.org) Natural Resources Program is responsible for management and restoration of five primary wild rice lakes on the Reservation and is a partner with the St. Louis River Area of Concern and the restoration work being conducted as part of that program. Tribal work includes research on environmental contaminants such as sulfate, 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 sulfate and climate change on wild rice.

- **Grand Portage Band of Minnesota Chippewa Tribe** has adopted an Antidegradation Policy as part of their [Grand Portage Reservation Water Quality Standards](https://www.grandportageband.com/environmental/). The Policy states that: The Tribe's existence has been dependent on the ability of the land and waters to provide natural resources for consumption, subsistence, cultural preservation, religious practice and sustainable economic development. Areas within the Reservation serve as a refuge for Tribal members to continue to practice a life that exemplifies sustainable economic development, and that preserves the resources critical to cultural integrity and survival of the Tribe. The policy also outlines protection of existing designated areas and decision-making standards.

- **Traditional Knowledge**: Minnesota continues to seek a greater understanding of traditional knowledge and practices of Basin First Nations and Tribes. For example, the DNR participated on the steering committee for a recent collaborative tribal Health Impact Assessment (HIA) that the Fond du Lac Band led in partnership with MN Department of Health. This HIA ([Expanding the Narrative of Tribal Health: The Effects of Wild Rice Water Quality Rule Changes on Tribal Health, 2018](https://www.mndnr.gov/water/water-quality/water-quality-data-and-assessment)) connected the health of manoomin, or wild rice, to the health of the tribal community, and provided recommendations for sustaining wild rice for future generations. The DNR Water Policy Consultant is actively exploring collaborating with tribal partners on water policy issues. Minnesota PCA maintains a [water permit contact list](https://www.mndnr.gov/water Câmara do Pantanal for the 12 federally recognized tribes in Minnesota and 11 reservations.

- **AIS Prevention**: 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 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.

- The [Shakopee Mdewakanton Sioux Community](https://www.shakopee-mdewakanton.com) (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.
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; 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.

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.

Figure 14. We Are Water MN Guides are published in Native languages, Spanish, Hmong and English.

Figure 15. We Are Water MN is a traveling water education exhibit

**Minnesota Project WET**

**Minnesota Project WET** trains teachers and other educators in hands-on, interactive lessons that are focused on water and encourage critical thinking. By providing training, materials, and support, 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](http://www.greatlakesaquarium.org) 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 on professional development opportunities.

**H₂O for Life**

In Minnesota, 144 schools have participated in the national program [H₂O For Life](http://www.h2oforlife.org). H₂O for Life offers a service-learning program designed to engage, educate and inspire youth to become global citizens. U.S. students learn about the global water crisis and take action by raising funds for water, sanitation and hygiene education projects at schools in the developing world.

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**Figure 16.** Water Education is required in 4th and 8th grade. H₂O for Life is becoming increasing popular.

**Figure 17.** Race 2 Reduce is a Minnesota-based K-12 water education curriculum.

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**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](http://www.race2reduce.org) 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](http://www.mrwa.org/poster-contest) is held annually for 4th grade students to showcase their artwork through a poster drawing of water conservation practices. In 2018, MRWA partnered with the [MN Department of Health](http://www.mndepartmentofhealth.gov) 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.
• Two Harbors hosted a series seven of Community Education events in 2018 to help homeowner create more efficient homes, one session focused on water efficiency. The classes were organized by Minnesota GreenCorps.

• 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 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. Eden Prairie also offers rebates for native landscaping and smart irrigation controllers. Further information can be found at the link below.

• Rochester Public Utilities has 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 of Rochester has 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.

4. 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 and provide education and outreach
• 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.