GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

LIESL EICHLER CLARK
DIRECTOR

November 26, 2019

**VIA EMAIL AND REGULAR MAIL**

Mr. David Naftzger, Executive Director
Great Lakes-St. Lawrence River Basin Water Resources Council
Secretary, Great Lakes-St. Lawrence River Water Resources Regional Body
Conference of Great Lakes and St. Lawrence Governors and Premiers
20 North Wacker Drive, Suite 2700
Chicago, Illinois 60606

Dear Mr. Naftzger:

SUBJECT: 2019 Water Conservation and Efficiency Program Annual Assessment
Submitted on behalf of the State of Michigan

On behalf of the State of Michigan, please find enclosed the 2019 Water Conservation and Efficiency Program Annual Assessment being sent pursuant to and in satisfaction of the obligations included in Section 4.2.2 of the Great Lakes-St. Lawrence River Basin Water Resources Compact. Please note that these reports are subject to revision and update during the Compact Council and Regional Body program review process.

If you have any questions, please do not hesitate to contact me.

Sincerely,

James Clift
Deputy Director

Enclosure
cc (via Email):
Liesl Eichler Clark, Director, EGLE
James Milne, EGLE
Peter Johnson, Great Lakes St. Lawrence Governors and Premiers

**Great Lakes-St. Lawrence River Basin Water Resources Compact**
**Water Conservation and Efficiency Program Annual Assessment**

State of Michigan

November 22, 2019

This Water Conservation and Efficiency Program Annual Assessment fulfills Michigan's obligation under Section 4.2.2 of the Great Lakes-St. Lawrence River Basin Water Resources Compact.

## LEAD AGENCY AND OFFICE CONTACTS

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Water Use Program is the lead agency responsible for Michigan's water conservation and efficiency program.

Compact Contact: Mr. James Clift, Deputy Director, Executive Office; 517-284-6871, cliftj@michigan.gov

Program Contact: Mr. James F. Milne, Supervisor, Water Use Assessment Unit, Permits Section, Water Resources Division; 517-284-5559, milnej@michigan.gov.

## STATUS OF MICHIGAN'S WATER CONSERVATION AND EFFICIENCY GOALS AND OBJECTIVES

Michigan's water conservation and efficiency goals and objectives continue to be met through the program that was initiated with the adoption of the Compact. Public comments on how to enhance Michigan's water conservation and efficiency program have been sought by EGLE, and a major theme of these comments was the importance of a collaborative council to advise on technical issues, assist in implementation, and monitor overall progress of Michigan's program.

This issue was addressed by the formation of the Water Use Advisory Council in 2013 to collaboratively study, evaluate, and provide advice regarding Michigan's water management, conservation, and efficiency programs. These open and ongoing discussions keep the staff of these programs informed on the effectiveness and progress of these programs, providing valuable insight to guide Michigan's efforts to improve water conservation and efficient use of water. The WUAC was formally codified into Michigan law with the passage of Public Act 509 of 2018.

Michigan has also developed a 30-year Water Strategy, an all-inclusive vision and blueprint to ensure Michigan's water resources continue to support healthy ecosystems,

communities, and economies for current and future generations. The plan was collaboratively developed by state agencies and refined as a result of extensive engagement and input from nongovernmental organizations, environmental groups, communities, industry leaders, tribal governments, and others. Appendix 1 provides a full list of water conservation and efficiency recommendations from the Water Strategy, as well as a link to the WUAC water conservation and efficiency recommendations.

## WATER CONSERVATION AND EFFICIENCY PROGRAM OVERVIEW

Michigan's water conservation and efficiency program is founded on the water withdrawal assessment requirement that applies to all new or increased large quantity withdrawals (LQWs). The assessment process evaluates proposed water withdrawals relative to the environmental impact standards set for conserving and protecting the water resources of the Great Lakes Basin[1]. Through the assessment process, the likely resource impacts of a proposed withdrawal must meet the environmental impact standard and be authorized by EGLE before the withdrawal can begin[2]. To gain authorization to make an LQW after a site-specific review, water users consider conservation and efficiency of use as a means to reduce their impact. LQWs are cumulatively tracked and accounted for against the environmental standard at a sub-watershed scale, ensuring that the water resources of the basin are conserved even at a small scale[3].

Michigan's water conservation and efficiency program goes beyond the assessment process to comprise a comprehensive program of water use management. This program establishes an integrated framework of roles and responsibilities for private and public water users and governmental agencies in managing Michigan's water resources. Further, this framework creates opportunities for involvement by the public (e.g., local committees and volunteer efforts such as stream monitoring); universities (e.g., research and technical assistance); and other interested parties resulting in a latticework of shared investment in the sustainability of Michigan's lakes, streams, and groundwater.

In conjunction with annual water use reporting that is required for LQWs, owners are required to review water conservation measures applicable to their water use sector. Implementation of conservation measures is voluntary[4]. In sub-watersheds that are approaching the environmental impact standard, as a condition of approval an applicant must implement the water conservation measures they deem to be reasonable[5]. For

[1] MCL 324.32705
[2] MCL 324.32706b, 324.32706c, 324.32723
[3] MCL 324.32706e
[4] MCL 324.32707, 324.32708
[5] MCL 324.32706c, 325.1004

applications greater than 2 MGD capacity, it is required that all sector or withdrawal-based conservation measures are complied with as a condition of approval[6].

## WATER CONSERVATION AND EFFICIENCY PROGRAM CONSISTENCY WITH REGIONAL OBJECTIVES, AND THE PROMOTION OF ENVIRONMENTALLY SOUND AND ECONOMICALLY FEASIBLE WATER CONSERVATION MEASURES

| Compact's Water Conservation and Efficiency Objectives | Summary of Current Efforts |
|---|---|
| **I. Guide programs toward long-term sustainable water use.** | • Regulatory framework that requires resource conservation<br>• Adaptive programs that integrate new data, methods, and policies in response to changing environmental conditions |
| **II. Adopt and implement supply and demand management to promote efficient use and conservation of water resources.** | • Sub-watershed scale cumulative impact limits for withdrawals<br>• Notification of nearby water users and local government when limits are approached<br>• Restrictions on withdrawals when local impact would exceed limit or is unreasonable |
| **III. Improve monitoring and standardize data reporting within water conservation and efficiency programs.** | • Increased water use reporting data quality<br>• Outreach initiative to bring into compliance previously unreported water uses<br>• Asset management planning initiative, launched in 2017 including a $9.5 million pilot grant program administered by EGLE, with recommendations to standardize and streamline data collection. |
| **IV. Develop science, technology, and research.** | • $1.5 million geological, hydrogeological, and hydrological data collection and analysis regional pilot study. Deliverables were received on October 7, 2019. The geologic, groundwater, stream flow, and sediment characterization sample data will be used as part of evaluating future LQWs<br>• $320,000 study to document the response of stream flow to high-capacity groundwater pumping and develop groundwater models<br>• State/federal glacial geology mapping partnership<br>• More than 80 streamflow measurement locations added in high water use areas<br>• Increased use of site-specific data and regional withdrawal impact models<br>• Research to develop an open-source, real-time sensor network in the Clinton River to assess and manage stormwater through hydrologic modeling |

[6] MCL 324.32723

| | |
|---|---|
| | • Dedicated funding source for research and innovation through the Michigan Great Lakes Protection Fund. |
| **V. Develop education programs and information sharing for all water users.** | • Annual agriculture irrigation practices workshops<br>• Additional water use data made available online<br>• Water use data published in media outlets<br>• Michigan Water School provides education and training on water management for local appointed and elected officials<br>• Students to Stewards Initiative developed to integrate water literacy principles into K-12 school curriculum and build a culture of stewardship |

**I. Guide programs toward long-term sustainable water use.**

Michigan's LQW assessment process, environmental impact standard, and cumulative impact tracking system have effected significant changes in the planning and development of LQWs. This process has driven the integration of long-term sustainable water use concepts into water management decisions and has raised the awareness of water use and resource impact implications. The LQW assessment process is designed to be adaptive and able to respond to changing environmental conditions. Additional hydrologic data is continually being collected and, combined with refined models for better decision-making, the LQW assessment methods and policies keep up with current understanding to ensure long-term sustainable water use.

**II. Adopt and implement supply and demand management to promote efficient use and conservation of water resources.**

EGLE works with many water users and industry contractors on an individual basis throughout the assessment process to ensure withdrawals are implemented in an efficient manner that reduces the impact to water resources. This assessment process incorporates both supply-side management of the water resources using a specialized database that tracks cumulative impact of withdrawals at the sub-watershed level, and demand-side management by notifying all affected water users when withdrawal limits begin to be approached in an area. Michigan's common law reasonable use doctrine is the legal foundation underlying the assessment process. It also promotes the conservation and efficient use of water in its own way when conveying to water users that water is a shared, finite resource under this doctrine. Users are encouraged to conserve up front, rather than when required to in the event of a conflict situation when supplies are limited or overtaxed. The LQW assessment process is designed to be adaptive and able to respond to changing environmental conditions.

## III. Improve monitoring and standardize data reporting within water conservation and efficiency programs.

Measurement and evaluation of water conservation and water use efficiency, and changes over time remain difficult to track from an agency perspective, in part because reporting is voluntary. Ongoing improvements to electronic data collection systems and databases and use of new tools are resulting in better consistency in water use data collection, and a better ability to identify trends in water use and account for variability. Additional resources are being allocated to conduct further review of data collected to ensure data accuracy and quality. Compliance with reporting requirements by water users was increased through a special outreach initiative to identify and bring into compliance previously unreported water uses. Approximately 232 previously unreported large quantity withdrawals were brought into compliance through this initiative.

Michigan's Water Strategy also includes a recommendation to create a coordinated strategy for groundwater data collection, including a data management system. Such data is a critical measurement and indicator of the effects of water use and the effects of water conservation and efficiency practices. State and federal agencies, research institutions, and stakeholders continue to assess available groundwater data and develop strategies for effective data integration to advance coordinated water monitoring programs and improve decision making.

Additionally, Executive Directive 2017-1 launched an asset management pilot program, which provided recommendations for the development of a comprehensive, statewide strategic framework for water infrastructure asset management. Recommendations emphasized standardizing and streamlining data collection, storage, and analysis. In 2018, the Michigan Infrastructure Council and the Michigan Water Asset Management Council were created in statute to develop and direct implementation of a statewide strategy. EGLE has provided financial support for asset management planning for water utilities, awarding $9.5 million in grants under its drinking water asset management pilot program, in addition to providing SAW grants and technical assistance.

## IV. Develop science, technology, and research.

Michigan is actively developing science, technology, and research on an ongoing basis through the efforts of various projects by state, federal, and academic institutions. Michigan is funding several research projects in high water use areas to better understand the groundwater-surface water interaction. This data will be used to improve the assessment and forecasting of new water uses' impact on the resource through increased use of site-specific data and more localized regional

models. Increasing and improving the quality of data is imperative to effectively promote proactive conservation and efficient use to water users before obvious shortage issues occur. Examples of these research projects include:

- WUAC Recommendations: Michigan's Quality of Life (QOL) agencies (EGLE, Michigan Department of Agriculture and Rural Development (MDARD), and the Department of Natural Resources (DNR) prioritized the recommendations in the Water Use Advisory Council's December 12, 2014, final report and are implementing key recommendations.

- Temperature Logging Sensor Studies: The DNR, Fisheries Division, deploys temperature loggers to study stream temperatures and conducts fish population surveys in Michigan's lakes and streams.

- USGS Monitoring Partnerships: EGLE and the U.S. Geological Survey (USGS) have a joint funding agreement for operating stream gages and monitoring wells, as well as collecting miscellaneous stream flow measurements. The USGS also conducted a study of the interactions between high-capacity wells in shallow groundwater and streamflow in nearby streams in two watersheds in the west-central portion of Michigan's Lower Peninsula (their final report is under internal agency review).

- Groundwater Modeling Study: The three QOL agencies also partnered with external stakeholders to co-fund a three-year study in Cass County in southwest Michigan. The Cass County study collected geologic, groundwater, and stream data, evaluated multiple methods for field data collection, and developed groundwater models for several sub-watersheds in Cass County. The study ended on September 30, 2019, with the final deliverables submitted on October 7, 2019. EGLE and USGS reviewers cited several problems with the construction and calibration of the models but the geologic, groundwater, stream flow, and sediment characterization sample data will be useful for evaluating future LQWs. Each of these monitoring and data collection efforts have been stepped-up and focused in areas of the state where groundwater LQWs are most prevalent to increase understanding of groundwater-surface water interaction, and the effects of groundwater use on stream ecology especially.

Geologic and Groundwater Research: The glacial geology of Michigan is quite complex and varied, and it is one of the major challenges in gaining a better understanding of Michigan's groundwater resources. Research is continually ongoing by state, federal, and academic institutions. Examples of current research include a joint project with EGLE and the Michigan State University Department of Civil and Environmental Engineering to develop innovative ways of using technology to process and analyze existing information in Michigan's extensive groundwater database. In addition to these data collection and monitoring efforts, the Michigan

Geological Survey (MGS) and USGS perform surveys and sample collections to map Michigan's glacial geology in three dimensions on a county-by-county basis. By December 2019, MGS and USGS will have completed 19 three-dimensional glacial geology maps and two county bedrock geology maps. Approximately 8% of the glacial geology in Michigan has also been mapped in three dimensions.

EGLE is also supporting research on innovative, real-time sensor network in the Clinton River. The goal of this work is to develop an open-source technology to assess and manage stormwater through hydrologic modeling that is accessible at a local scale. Dissemination and use of similar sensor networks would increase the availability of real-time data about Great Lakes water conditions and improve the state of knowledge about water quantity and quality.

The Michigan Great Lakes Protection Fund exists as a dedicated funding program to support research to improve scientific understanding of Great Lakes issues. The fund is administered by the Michigan Office of the Great Lakes.

## V. Develop education programs and information sharing for all water users.

EGLE and MDARD staff make educational presentations and share information at various conferences and meetings, as well as personal communication to interested parties. The WUAC and its subcommittee meetings are open to the public and provide educational opportunities and information sharing for water users and water managers. Meeting notes and informational materials from the WUAC proceedings are posted on an EGLE webpage. Increased access to data and awareness of water use by the public has been accomplished by publishing additional water use data online, at public information meetings, and in various media outlets. In addition, EGLE provides webinars, conferences, training, and information for businesses and industry to support enhanced water conservation and efficiency. Michigan State University Extension also convenes meetings around the state with agricultural water users to share information about conservation practices for irrigation.

In 2016, MSU Water Resources Institute, MSU Extension, and Michigan Sea Grant developed and launched the Michigan Water School focused on educating local appointed and elected officials about water management and the impact of their decisions on water resources including water quantity and quality. The two-day program provides science-based information in the areas of water quantity, water quality, water economics and water policy.

Additionally, EGLE is developing an initiative to integrate water literacy principles in K-12 school curriculum, in partnership with the Michigan Department of Labor and Economic Opportunity, Department of Education, DNR, and numerous community partners. This effort, called From Students to Stewards Initiative, is intended to develop a life-long culture of stewardship by integrating Great Lakes and freshwater literacy principles into standards-based school curricula through place-based, authentic-experience approaches to improve stewardship behavior and provide an engaging context to motivate school performance. This initiative will teach STEM/STEAM concepts using place-based, problem-based, and project-based approaches with a focus on Great Lakes literacy principles to foster the next generation of water stewards, leaders, skilled workers, and decision-makers needed to solve complex water issues in a changing world.

Other efforts are ongoing to promote water stewardship through outreach, education, and development of effective statewide communication strategies to improve the public's understanding of their impact on water resource and actions and behaviors that support responsible water use.

Appendix 2 provides a full list of the water conservation and efficiency goals and objectives of Michigan's Water Conservation and Efficiency Programs.

## WATER CONSERVATION AND EFFICIENCY PROGRAM IMPLEMENTATION TIMELINE AND STATUS

All components of Michigan's water conservation and efficiency program have been implemented. The foundation of the program, the water withdrawal assessment process, has been in effect since 2009. Sector-based water conservation measures are required to be reviewed annually by all large water users. Additional state funding resources have recently been allocated to bolster program areas of need. From the beginning, it has been recognized that the program would continually adapt and that the staff would be open to changes necessary for improvement and enhancement. Michigan has shown a strong commitment to this forward-looking approach, continuing to improve its program, and remains dedicated to the betterment of the program and to upholding the ideals of the Compact.

## APPENDIX 1: WATER CONSERVATION AND EFFICIENCY RECOMMENDATIONS FROM MICHIGAN'S WATER STRATEGY

Goal 1: Michigan citizens are stewards of clean water and healthy aquatic ecosystems.

Outcome: Individuals and communities understand their responsibility for and make informed and responsible decisions regarding water resources.

Recommendations:

1-2: The State, working with stakeholders, will develop a public outreach campaign that highlights stewardship practices and encourages actions that sustain water resources.

Goal 2: Michigan's aquatic ecosystems are healthy and functional.

Outcome: Aquatic systems are resilient and diverse.

Recommendations:

2-8: Incorporate planning for wet weather extremes, droughts, and increased seasonal variability of precipitation into state, regional, and community planning to mitigate impacts to ecological, economic, social, and cultural resources.

2-11: The State, working with tribal governments and stakeholders, will establish new partnerships to develop innovative strategies to enhance wetland restoration and green infrastructure efforts in Michigan. The Tribes will work with the State to elevate the recognition, protection, and restoration of native wild rice stands throughout the state.

2-14: Refine and improve the water withdrawal assessment process and model to ensure sustainable use of water resources and that high priority is given to incorporating existing and new data to better represent local and regional water resources and surface water/groundwater interactions.

2-15: Provide technical and financial support to communities and their partners to plan and implement green infrastructure techniques and low-impact development while preserving natural spaces that contribute to water quality, including application of these techniques in the design of new developments, redevelopments, and road projects to ensure storm water management, improved hydrology, and overall water quality.

2-16: Modernize road and highway planning and infrastructure and integrate with watershed planning to effectively accommodate storm water

runoff and infiltration needs, thereby reducing the costs and impacts of flooding.

2-17: Enhance financial and technical support of local stakeholder efforts to develop and implement watershed management plans to restore impaired waters, protect high quality waters, and develop and utilize local water resource assets.

Goal 3: Michigan communities use water as a strategic asset for community and economic development.

Outcome: Economic and community development plans and efforts fully leverage water assets to create great places to live, work, and play.

Recommendations:

3-1: Emphasize water resources as assets in state, regional, and community planning efforts to provide appropriate, sustainable protection and to fully leverage community-based economic opportunities.

Goal 5: Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.

Outcome: Policy, innovative practices, and technologies are developed and adopted to grow sustainable water-based economies.

Recommendations:

5-3: Establish voluntary water efficiency targets for all major water sectors to reduce water use impacts and costs.

5-4: Promote innovative technologies that reduce cost and water loss, or convert waste products to usable materials.

5-5: Develop a water conservation and reuse strategy for the State, local governments, and public and private facilities that incorporates the use of green infrastructure, grey water systems, and energy production that includes recognition programs.

5-6: Fund a pilot project, through a competitive bid process, for the initiation and evaluation of a new model for wastewater management. This pilot program will assess the opportunities and barriers to creating a "Water Resources Utility of the Future," focused on:

- Reclaiming and reusing water

• Extracting and finding commercial uses for nutrients and other constituents

• Capturing waste heat and latent energy in biosolids and liquid streams

• Generating renewable energy using its land and other assets

• Using green infrastructure to manage storm water and improve urban quality of life

5-7: Define measures of agriculture water conservation and establish voluntary targets for utilizing best management practices (BMPs) that reflect conformance with the Irrigation Water Use Generally Accepted Agricultural and Management Practices in areas of existing or potential water stress.

5-8: Enhance voluntary water conservation measures through technology and outreach for agriculture to optimize water use while reducing impacts and costs.

Goal 8: Michigan has integrated outcome-based monitoring systems that support critical water-based decisions.

Outcome: Monitoring systems are in place at a scale and frequency to ensure water quality and quantity are maintained to support diverse uses and values.

Recommendations:

8-1: Develop a coordinated, comprehensive monitoring strategy for groundwater quantity and quality, including a data management system.

8-2: Secure a long-term, sustainable funding source for groundwater and surface water quality and quantity monitoring that is continually improved with new technologies.

8-3: Implement a pilot decision-support framework that includes monitoring, data and information, and analytical tools. This framework will assess ecological, economic, social, and cultural values and outcomes at local and regional watershed scales.

Goal 9: Michigan has the governance tools to address water challenges and provide clean water and healthy aquatic ecosystems.

Outcome: Policies, organizational, and institutional structures are in place to achieve goals and outcomes of the Strategy.

Recommendations:

9-3: Uphold the Great Lakes Compact and Agreement by actively participating in the Great Lakes-St. Lawrence River Regional Body and Great Lakes-St. Lawrence River Compact Council including financial support of these entities entrusted to govern the Compact and Agreement.

9-4: State and Tribal governments will meet on an ongoing basis to discuss and develop strategies to support management of Michigan's shared water resources. The State and Tribal governments will jointly develop agendas reflecting the priorities of all parties involved.

The Water Use Advisory Council Conservation and Efficiency Recommendations are available online.

## APPENDIX 2: MICHIGAN WATER CONSERVATION AND EFFICIENCY PROGRAM

Water Conservation and Efficiency Goals and Objectives

### Goals

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.

### Objectives

1. Utilize Michigan's Water Use Program and Water Withdrawal Assessment Process to guide long-term sustainable water use.

   a. The programs will be adaptive, goal-based, accountable, and measurable.

   b. Continue to develop and implement programs openly and collaboratively, with local stakeholders, Tribes and First Nations, governments and the public.

   c. Prepare and maintain long-term water demand forecasts.

   d. Develop long-term strategies that incorporate water conservation and efficient water use practices.

   e. Review and build upon existing planning efforts by considering practices and experiences from other jurisdictions.

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

   a. Maximize water use efficiency and minimize waste of water.

   b. Promote appropriate innovative technology for water reuse.

   c. Conserve and manage existing water supplies to prevent or delay the demand for and development of additional supplies.

   d. Provide incentives to encourage efficient water use and conservation.

   e. Consider water conservation and efficiency in the review of proposed new or increased uses.

f. Promote investment in and maintenance of efficient water infrastructure.

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

a. Improve the measurement and evaluation of water conservation and water use efficiency.

b. Encourage measures to monitor, account for, and minimize water loss.

c. Track and report program progress and effectiveness.

4. Develop science, technology, and research.

a. Encourage the identification and sharing of innovative management practices and state of the art technologies.

b. Encourage research, development, and implementation of water use and efficiency and water conservation technologies.

c. Seek a greater understanding of traditional knowledge and practices of Basin First Nations and Tribes.

d. Strengthen scientific understanding of the linkages between water conservation practices and ecological responses.

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

a. Ensure equitable public access to water conservation and efficiency tools and information.

b. Inform, educate, and increase awareness regarding water use, conservation, and efficiency and the importance of water.

c. Promote the cost-saving aspect of water conservation and efficiency for both short and long-term economic sustainability.

d. Share conservation and efficiency experiences, including successes and lessons learned across the Basin.

e. Enhance and contribute to regional information sharing.

f. Encourage and increase training opportunities in collaboration with professional or other organizations to increase water conservation and efficiency practices and technological applications.

g. Ensure that conservation programs are transparent and that information is readily available.

h. Aid in the development and dissemination of sector-based best management practices and results achieved.

i. Seek opportunities for the sharing of traditional knowledge and practices of Basin First Nations and Tribes.