Great Lakes-St. Lawrence River Basin Water Resources Compact
DRAFT – Five-Year Program Review Report
State of Michigan

This report fulfills the State of Michigan's obligation under Section 3.4 of the Great Lakes-St. Lawrence River Basin Water Resources Compact (Compact), and under Article 300 of the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement).

General Information

1. **Lead agency/agencies, contact person(s), and contact information.**

   The Michigan Department of Environment, Great Lakes, and Energy (EGLE) is the lead agency responsible for Michigan's water management and water conservation and efficiency programs. Mr. James Clift, Deputy Director, Executive Division, is the Compact contact at 517-284-6871, cliftj@michigan.gov, and Mr. James F. Milne, Supervisor, Water Use Assessment Unit, Permits Section, Water Resources Division, is the program contact at 517-284-5559, milnej@michigan.gov.

2. **Laws, statutes, rules, regulations, executive orders, administrative orders or other similarly enforceable documents that establish or implement programs meeting the requirements of the Compact.**

   The Compact is enacted into law in Michigan under Part 342, Great Lakes-St. Lawrence River Basin Water Resources Compact, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Additional legislation enabling specific aspects of Michigan's water management and water conservation and efficiency programs is enacted in Part 327, Great Lakes Preservation, of the NREPA, 1994 PA 451, as amended; the Safe Drinking Water Act, 1976 PA 399, as amended; and the Safe Drinking Water Act Administrative Rules. Specific provisions from the Compact and Agreement for water management and water conservation and efficiency program elements and their corresponding legal citations are provided below:

   a. **Compact Section 3.4/Agreement Article 300**
      Michigan Compiled Law (MCL) 324.34201
   b. **Compact Section 4.1/Agreement Article 301**
      MCL 324.34201, 324.32702, 324.32705, 324.32707, 324.32708, 324.32710, 325.1004, Michigan Administrative Rules 325.11502, 325.11504
   c. **Compact Sections 4.2(2), 4.2(4) and 4.2(5)/Agreement Article 304**
      MCL 324.34201, 324.32707, 324.32708a, 324.32723, 325.1004
   d. **Compact Section 4.3/Agreement Article 200**
      MCL 324.34201, 324.32704a, 324.32705, 324.32706a-e, 324.32723, 325.1004

e. **Compact Section 4.8, 4.9 and 4.13/Agreement Articles 200, 201, and 208**
MCL 324.34201, 324.32701, 324.32702, 324.32703, 324.32703a, 324.32704, 324.32704a, 324.32727

f. **Compact Section 4.10/Agreement Article 206**
MCL 324.34201, 324.32704a, 324.32705, 324.32706a-e, 324.32723, 325.1004

g. **Compact Section 4.11/Agreement Article 207**
MCL 324.34201, 324.32723

3. **Major changes from Michigan's 2014 Five-Year Program Review Report.**
2018 PA 209 amended Part 327, Great Lakes Preservation, of NREPA, 1994 PA 451, as amended (Part 327). This amendment created an alternative analysis process for proposed large quantity withdrawals (LQW) up to 1,000,000 gallons per day (gpd; 1 MGD) where the property can hire a qualified consultant to submit an analysis of the proposed LQW to EGLE. EGLE has 20 business days (or 25, under limited circumstances) to decide whether to authorize the proposed LQW. If EGLE does not make its decision within that timeframe, the proposed LQW is authorized under operation of law. Proposed LQWs between one and two MGD that can't be authorized by the Water Withdrawal Assessment Tool must be authorized by the conventional site-specific review process, which is also available to property owners as an option for proposed LQWs < 1 MGD.

<u>Water Management Program Report</u>

1. **Water management program scope and thresholds.**
Michigan's water management program includes registration and water use reporting requirements for virtually all large quantity withdrawals (LQWs; MCL 324.32705, 324.32707, 324.32708, 324.32723), as well as an authorization process for new or increased LQWs which requires that an environmental impact standard must be met prior to registration (MCL 324.32706). LQWs include all water withdrawals with the capacity to withdraw over 100,000 gallons per day (gpd) average in any consecutive 30-day period (MCL.324.32701). New or increased LQWs > 100,000 gpd that cannot be authorized by the on-line Water Withdrawal Assessment Tool must be authorized by a site-specific review or an alternative analysis of the proposed LQW (MCL 324.32706c). New or increased LQWs > 2,000,000 gpd (2 MGD) require a permit (MCL 324.32723). Exceptions to the registration and reporting requirements include LQWs undertaken for groundwater contamination remediation, small residential properties, and hydroelectric power generation (MCL 324.32727).

Registered LQW facilities annually report their monthly withdrawal volumes, consumptive use, and return flow discharge information on forms provided by EGLE or the Michigan Department of Agriculture and Rural Development (MDARD; MCL 324.32707, 324.32708). Before new or increased LQWs can begin operating, they must be authorized based on an assessment of their predicted, cumulative impact along with other new LQWs to nearby river or stream flows. Large quantity withdrawals that are likely to exceed this environmental standard are restricted to a lesser amount, or they may be prohibited in order to protect local streamflow (MCL

324.32706). Michigan's management of withdrawals and water resources at the sub-watershed level ensures the protection of the waters of the Great Lakes Basin.

The Water Use Advisory Council (WUAC) is an integral part of the program in that it provides a platform for raising water withdrawal related issues and establishes an integrated framework of roles and responsibilities for all stakeholders in managing Michigan's water resources. This framework creates opportunities for the public, university researchers, industry professionals, advocacy groups, and other interested parties to be involved and to work directly with state agency personnel to set policy and shape the program's direction. This promotes better understanding and cooperation to the benefit of the program, and results in shared investment in the management and sustainability of Michigan's streams, lakes, wetlands, and groundwater.

2. Management of Water Withdrawals by:

a. Sector [public water supply, commercial and institutional, irrigation, livestock, industrial, electric power production (once-through and recirculated cooling), hydroelectric power production (off-stream and in-stream), voluntary, and other];

With the exception of hydroelectric power generation, LQWs in all the above-mentioned water use sectors are subject to the Michigan water management program. Off-stream and in-stream hydroelectric water uses are exempt from management under Michigan law (MCL 324.32727). All sectors are managed in essentially the same way, and the specific sector of water use is captured in the annual water use reporting.

b. Water source (groundwater, Great Lakes-St. Lawrence River surface water, and other surface water);

Large quantity withdrawals from all water sources including groundwater, the Great Lakes and their connecting waters, and other surface water are subject to the Michigan water management program. The specific water source is captured in the annual water use reporting. New LQWs are assessed based on the environmental impact to their source if they are from the Great Lakes or other surface water, or to nearby rivers or streams if the source is groundwater (MCL 324.32706, 324.32723, 325.1004).

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

The Michigan water management program regulates the quantity, volume, and/or rate of new or increased LQWs by tracking their cumulative impact to river and stream flows at a sub-watershed scale, or to fish populations or other uses of the lake for a direct withdrawal from a lake. The environmental impact standard is scaled to the size of the impacted stream or river and is dependent on its ecological classification. The regulatory limits are, therefore, variable across sub-

watersheds (MCL 324.32701). When the cumulative impact to a sub-watershed reaches the environmental impact standard limit, new or increased LQWs are restricted to a lesser amount, or they may be prohibited in order to preserve the local water resources (MCL 324.32706b, 324.32723). Large quantity withdrawals that withdraw less than 1,500,000 gallons of water in a given year are not required to report specific water use volumes, but they are required to file an annual report stating the water usage was less than 1,500,000 gallons (MCL 324.32707).

d. Location (Statewide/Province-wide or Great Lakes-St. Lawrence River Basin);

The Michigan water management program applies statewide.

e. Any specific exemptions as allowed in the Agreement and the Compact.

Michigan law includes exemptions from its water management program for LQWs undertaken for groundwater contamination remediation, small residential properties, and hydroelectric power generation (MCL 324.32727). Large quantity withdrawals utilized solely for fire suppression are exempt from the environmental impact standard, but they are required to register and report their annual water use (MCL 324.32721).

3. Application of the Standard of Review and Decision.

a. Decision Making Standard for Withdrawals and Consumptive Uses.

The Michigan water management program applies the Compact's Standard of Review and Decision to all new or increased withdrawals greater than two million gallons per day (MGD) capacity (MCL 324.32723). An application for these withdrawals requires each criterion of the Decision-Making Standard to be addressed by the applicant and is evaluated by EGLE during the application review. Most criteria are evaluated on a scientific basis, with the exception of 4.11.5.c (the balance between economic development, social development, and environmental protection for the existing and proposed LQWs). For this criterion some deference is granted to the weight of public comments received on the proposed withdrawal to aid in EGLE's evaluation.

In addition to the Compact's Standard of Review and Decision, EGLE must also determine whether permit applications under MCL 324.32723 are reasonable under Michigan's common law for water uses. Michigan uses the "reasonable use balancing test" that evaluates: the purpose of the proposed use; the suitability of the proposed use to the location; the extent and amount of harm caused by the proposed use; the extent, duration, necessity, and application of the use, including any effects on the quantity, quality, and level of the water; and any other factor relevant under the circumstances of the particular case.

Large quantity withdrawals subject to Michigan's water management program, but less than two MGD capacity are required to meet an environmental impact standard. They are not evaluated by the Decision-Making Standard criteria.

b. Exception Standard for Diversions.

The Michigan water management program applies the Exception Standard and evaluates each criterion for any proposed Diversion. Under Michigan law, a diversion does not include the supply of ballast for vessels; use in a noncommercial project on a short-term basis for firefighting, humanitarian, or emergency response purposes; a transfer of water from a Great Lakes watershed to the watershed of its connecting waterways; or a transfer of water out of the Great Lakes Basin in a container 5.7 gallons or less (MCL 324.32701).

4. Reporting and database of Withdrawals, Consumptive Uses, and Diversions.

Michigan's water management program requires annual water use reporting for virtually all LQWs. Separate databases of Withdrawals, Consumptive Uses, and Diversions are maintained by the agencies responsible for each branch of the Michigan water management program: EGLE Community Water Supply Program for public water supplies, the MDARD for agricultural water uses, and EGLE Water Use Program for all other LQWs. Large quantity withdrawal owners have the option of reporting using paper forms provided by the agency or directly to EGLE's or MDARD's databases using an online reporting system.

Michigan Department of Environment, Great Lakes, and Energy Water Use Program staff compiles the annual water use reporting data for community water supplies, agricultural water uses, and all other water uses under EGLE's jurisdiction and submits the annual water use data to the Great Lakes Commission and others upon request. All methods of measurement of water use volumes are approved, as are acceptable estimation methods in lieu of a measurement device. A separate database is also maintained by the EGLE Water Use Program to track the cumulative impact of new or increased LQWs relative to the environmental impact standard for each sub-watershed in the state (MCL 324.32706e). In 2019, MDARD instituted a new online water use reporting data base for agricultural reporting. The new system will continue to require all reporting criteria, but it will also allow for greater administrative functions.

Regional notice is only required under the Compact when a proposed consumptive use (or the consumptive use portion of a proposed LQW) exceeds five million gallons per day (five MGD).

5. Withdrawal application forms.

Michigan's water management program utilizes an online application, the Water Withdrawal Assessment Tool (WWAT; http://www.deq.state.mi.us/wwat) to process all applications for new or increased LQWs up to two MGD capacity.Also, MCL 324.32706c provides for a site-specific review by EGLE or an alternative analysis of

the proposed withdrawal submitted by a qualified hydrologist or hydrogeologist for any proposed withdrawals that cannot be authorized by the WWAT. A water withdrawal permit is required for new or increased LQWs greater than two MGD capacity.

6. Initiatives to support an improved scientific understanding of the Waters of the Basin and an improved understanding of the groundwater of the Basin and the role of groundwater in Basin water resource management.

Michigan's Quality of Life Agencies (EGLE, 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.

The DNR, Fisheries Division, deploys temperature loggers to study stream temperatures and conducts fish population surveys in Michigan's lakes and streams. 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).

The three Quality of Life agencies also partnered with external stakeholders to co-fund a three-year study in Cass County in southwest Michigan. The Cass County study, which is still in progress, collects geologic, groundwater, and stream data, evaluates multiple methods for field data collection, and will develop groundwater models for several sub-watersheds in Cass County. The study ends on September 30, 2019, with the final deliverables due to be submitted by the end of October 2019. 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.

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) performs surveys and sample collections to map Michigan's glacial geology in three dimensions on a county-by-county basis. To date (June 2019), MGS has completed 13 three-dimensional glacial geology maps and one county bedrock geology map with three more 3-D glacial geology maps scheduled to be completed by October 2019. Approximately 8% of the glacial geology in Michigan has also been mapped in three dimensions.

1. **Water conservation and efficiency goals and objectives.**

Michigan adopted goals and objectives consistent with the basin-wide conservation and efficiency goals and objectives set forth in Section 4.2(1) of the Compact on December 8, 2010 (Appendix 1). These goals and objectives were developed by the former Water Resources Conservation Advisory Council (WRCAC), a stakeholder forum of executive and legislative appointees that was established for collaborative study, evaluation, and advisement for Michigan's water management and water conservation and efficiency programs. The WRCAC was eliminated by executive order of the Governor in October 2009. In 2013, the Michigan Department of Environmental Quality (DEQ, now EGLE) established a similar forum, WUAC, to convene discussions and evaluate Michigan's water management and water conservation and efficiency programs, including the conservation and efficiency program's goals and objectives. The WUAC was formally codified into Michigan law with the passage of Public Act 509 of 2018.

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 WUAC. The WUAC's charge includes these general issues. Other public comments on the program are being addressed through the proceedings of the WUAC and its work groups. The December 12, 2014, Final Report of the WUAC contained 69 recommendations for further action, 23 of which concerned water conservation. The WUAC continued to meet following its 2014 Final Report and is now mandated by Part 328, Aquifer Protection, of the NREPA, 1994 PA 451, as amended. During the same time period, Michigan developed a 30-year Water Strategy, an all-inclusive 30-year 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 2 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.

2. **Water Conservation and Efficiency Program Overview.**

The foundation of Michigan's water conservation and efficiency program is the water withdrawal assessment required of all new or increased LQWs (MCL 324.32705). The assessment process evaluates proposed water withdrawals relative to environmental impact standards set for conserving and protecting the water resources of the Great Lakes Basin. Through the assessment process, the likely resource impacts of a proposed withdrawal are predicted in advance of withdrawing

water and a proposed withdrawal must meet the environmental impact standard before the withdrawal can occur (MCL 324.32706, 324.32723). To gain authorization to make an LQW, water users consider conservation and efficiency of use as a means to reduce their impact. Large quantity withdrawals 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 (MCL 324.32706e).

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, all LQW owners are required to review water conservation measures applicable to their water use sector. Implementation of conservation measures is voluntary (MCL 324.32707, 324.32708). 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 (MCL 324.32706c, 325.1004). For applications greater than two MGD capacity the approval condition requires that all sector or withdrawal-based conservation measures are complied with (MCL 324.32723).

3. Water conservation and efficiency program consistency with regional objectives, and promotion of Environmentally Sound and Economically Feasible Water Conservation Measures.

a. Guide programs toward long-term, sustainable water use.

Michigan's LQW assessment process, environmental impact standard and cumulative impact tracking system have produced 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. It has raised the awareness of water use and resource impact implications. (MCL 324.32708, 324.32708a) Additional hydrologic data, being collected on a continuous basis, is used with refined models for better decision-making. As a result, the LQW assessment methods and policies keep up with current understanding to ensure long-term, sustainable water use.

b. 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 through the assessment process on an individual basis to help implement withdrawals in an efficient manner that reduces the impact to water resources. (MCL 324.32708, 324.32708a) The LQW assessment process is designed to be adaptive and able to respond to changing environmental conditions.

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

Measurement and evaluation of water conservation and water use efficiency is difficult to track in Michigan on a statewide basis particularly from an agency perspective. This is because reporting of water conservation and efficiency practices is voluntary. However, ongoing improvements in water use data collection and QA/QC measures are resulting in better, standardized data that improve the ability to monitor water conservation. 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 as well as 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.

d. 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. Significant investments have been made as funding is available to further these developments. The WUAC convenes scientific and policy discussions amongst stakeholders and technical experts to evaluate Michigan's water management and water conservation and efficiency programs, and to identify where improvements and updates could be made.

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

A dedicated educational program has not been developed in Michigan, although EGLE and MDARD staff make educational presentations and share information at various conferences and upon request to a variety of interested parties. The WUAC and its subcommittee meetings are open to the public and information from their proceedings is posted on EGLE's website. Michigan State University Extension also convenes several meetings and focus group sessions around the state–primarily with agricultural water users, but also with other sectors to provide information and education on Michigan's water use. EGLE also collaborates with the Michigan Farm Bureau and the Michigan Ground Water Association on education and outreach activities for the Water Use Program. 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 resources and actions and behaviors that support responsible water use.

4. 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 fully in effect since July 2009. Sector-based water conservation measures have been developed and are in use. Additional state funding resources have recently been allocated to bolster program areas of need. From the beginning, it has been acknowledged that the program would continually adapt and that the staff would be open to changes necessary for improvement and enhancement. Michigan has shown strong commitment to this forward-looking approach and seeks to remain vigilant for the betterment of the program and to uphold the ideals of the Compact.

APPENDIX 1: 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.

APPENDIX 2: WATER CONSERVATION AND EFFICIENCY RECOMMENDATIONS FROM MICHIGAN'S WATER STRATEGY

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

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.

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.

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.

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.

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.

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 at Michigan.gov/waterstrategy under the Development tab.