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# Protecting a Shared Future

## Assessing and Advancing the Sustainable Management of the Great Lakes through Water Conservation and Efficiency

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# Introduction

The Great Lakes—Superior, Michigan, Huron, Erie and Ontario—form the largest surface freshwater system on the Earth, containing nearly 20 percent of the world's and 96 percent of the United States' total supply of fresh surface water.<sup>2</sup> More than 40 million people depend on the Great Lakes for drinking water, fishing, recreation, and commerce. More than 1.5 million U.S. jobs are directly connected to the Great Lakes, generating more than \$62 billion in annual wages.<sup>3</sup> More than 160 million tons of commodities are shipped within and out of the Great Lakes Basin on an annual basis, with a total value of more than \$13 billion.<sup>4</sup>

Although the waters of the Great Lakes are vast, they are not inexhaustible. On average less than 1 percent of Great Lakes water is renewed annually by precipitation, surface water runoff, and inflow from groundwater sources.<sup>5</sup> The Great Lakes face other threats as well, including invasive species, climate change, pollution of the water and beaches, shoreline development, and the loss of natural areas.<sup>6</sup>

## Banding Together to Protect the Great Lakes

Protecting this shared resource has long been a priority for the governments of the United States and Canada, the states and provinces that surround the lakes—Illinois, Indiana, Michigan, Minnesota, New York, Ohio,



Pennsylvania, Wisconsin, Ontario and Quebec—and nonprofit and advocacy organizations. The latest and perhaps most significant effort to protect the lakes occurred on December 13, 2005, when the Great Lakes Governors and the Premiers of Ontario and Quebec signed the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement. At the same time, the Governors endorsed the companion Great Lakes-St. Lawrence River Basin Water Resources Compact, which became law in the United States on December 8, 2008. The Compact is legally binding among the eight Great Lakes states and the federal government, mandating the states to jointly determine how to manage the waters of the Great Lakes Basin.

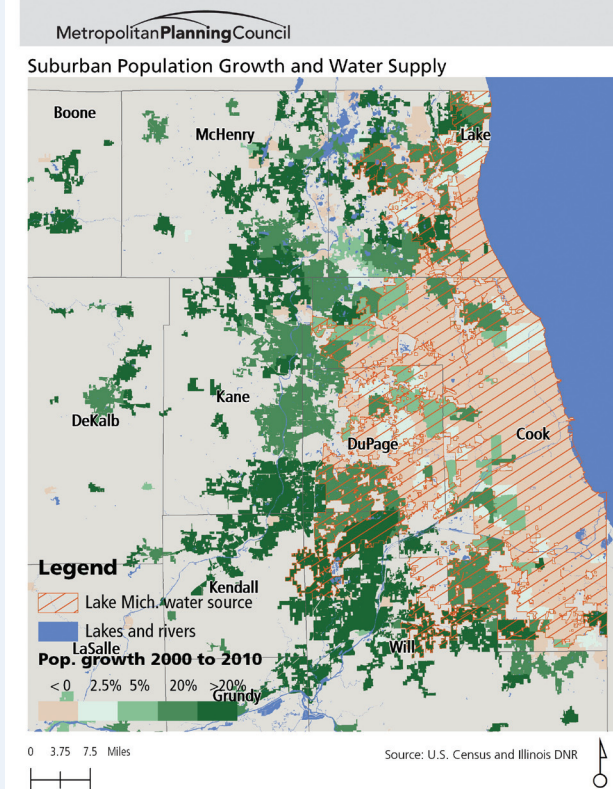
The Agreement and the Compact have two primary purposes: to prevent the diversion of Great Lakes and St. Lawrence waters outside of the Basin, and to manage the withdrawal and use of water within the Basin efficiently. In ratifying the Compact, each state agreed to undertake a series of actions, including the establishment of thresholds governing new or increased withdrawals of water; implementation of a permitting process for new withdrawals; development of water conservation and efficiency programs, including the establishment of state-specific goals and objectives to guide individual states' programs; and improved data gathering and sharing across the Basin.

Section 4.2 of the Compact (and Article 304 of the Agreement) obligates each state to develop and implement both water efficiency goals and objectives and a water conservation and efficiency program. These are unprecedented opportunities to more effectively manage the waters of the Basin for both environmental and economic gains.

### How Northeastern Illinois' Changing Population Affects Water Supply

This map (courtesy of the Metropolitan Planning Council) illustrates how changing populations in Northeastern Illinois could impact water supply. The cross-hatched orange areas represent communities who use Lake Michigan water; these are also the communities that experienced the greatest population loss from 2000 to 2009. More than 300,000 people moved into the region's "collar" counties (in green and dark green), most of whom do not receive Lake Michigan water and are projected to face groundwater shortages by 2050. This means that as communities already receiving Lake Michigan water need less of it over time, those communities just outside the boundary may need new supplies of water.

Map Courtesy of the Metropolitan Planning Council



## Confronting Water Sustainability Challenges in the Region

Efficient management is needed more than ever before. The Great Lakes states face two stark realities: population loss and aging infrastructure. The Great Lakes states lost more population than any other region of the country from 2000 to 2010.<sup>7</sup> Several of the region's cities, including Cleveland, Buffalo and Detroit, saw staggering losses.<sup>8</sup> Even Chicago, which saw a population increase from 1990 to 1999, shrank by more than 200,000 in the last 10 years.

At the same time, the U.S. Environmental Protection Agency estimates that the eight states in the Great Lakes Basin face drinking water and wastewater infrastructure needs of more than \$30 billion (see table: Assessing Water Infrastructure Investment Needs). The 2009 federal stimulus bill provided more than \$189 million across the states to address these infrastructure deficiencies. Unfortunately, that spending represents less than 1 percent of the total need. While the stimulus provided much-needed funds on a one-time basis, states traditionally rely on federal contributions to State Revolving Funds (SRF) for both Drinking Water and Clean Water to help finance these kinds of projects. Both funds face significant reductions in President Obama's 2012 budget. The Clean Water SRF is budgeted to receive \$1.55 billion, a reduction of \$55 million from 2010; the Drinking Water SRF would see a reduction of \$397 million (proposed funding: \$990 million).<sup>9</sup> The gaps between needs and funding levels have increased over time and go a long way towards explaining the grade of "D-" consistently given by the American Society of Civil Engineers, in its biannual "*Report Card for America's Infrastructure*," for both wastewater and drinking water infrastructure in the Great Lakes Basin.

As a result, just as states and utilities face major costs to repair and replace infrastructure, they have fewer customers to pay these costs. Water conservation helps address these issues by lowering the costs to pump, transport, treat, and heat water for consumers and communities. Water conservation measures can be applied at a range of levels—the state, the utility and the consumer—resulting in a wide-ranging set of practices at the system and individual level that can be utilized to meet conservation goals. Predictable conservation savings can also allow major infrastructure projects to be deferred or downsized, thus saving both construction and long-term maintenance costs.

## Realizing the Promise of the Great Lakes Compact

Unfortunately, states are moving slowly to meet the water conservation and efficiency requirements of the Compact. This issue paper reviews the history of the Compact and each state's often uneven progress towards implementing its provisions. It also identifies how each state—and the region—can ensure that the full promise of the Compact's water conservation and efficiency goals is realized. The scope of this paper is intentionally narrow, focusing only on the water conservation and efficiency programs of the eight Great Lakes states. The Provinces of Ontario and Quebec are not required to meet the deadlines until their implementing measures are finalized. This paper also does not address overarching legal and technical issues relating to the need for a robust decision-making framework, which will be the subject of future NRDC analyses.

## Assessing Water Infrastructure Investment Needs in the Great Lakes Regions Reveals Major Shortfalls

STATES	ILLINOIS	INDIANA	MICHIGAN	MINNESOTA
Estimated Need: Drinking Water	\$15,889,000,000	\$6,956,000,000	\$7,257,000,000	\$4,313,000,000
Stimulus Spending: Drinking Water	\$79,538,000	\$27,212,000	\$64,755,840	\$24,577,000
2009 Non-Stimulus Investment: Drinking Water	\$80,419,634	\$46,988,284	\$44,109,160	\$49,986,524
UNMET NEED: DRINKING WATER	\$15,729,042,366	\$6,881,799,716	\$7,148,135,000	\$4,238,436,476
Estimated Need: Clean Water	\$14,907,000,000	\$5,768,100,000	\$7,257,000,000	\$5,720,100,000
Stimulus Spending: Clean Water	\$177,243,100	\$94,447,500	\$168,509,000	\$79,682,760
2009 Non-Stimulus Investment: Clean Water	\$179,245,847	\$194,431,817	\$231,911,000	\$101,841,374
UNMET NEED: CLEAN WATER	\$14,550,511,053	\$5,479,220,683	\$6,856,580,000	\$5,538,575,866
<b>TOTAL UNMET NEED FOR CLEAN WATER AND DRINKING WATER BY STATE</b>	<b>\$30,279,553,419</b>	<b>\$12,361,020,399</b>	<b>\$14,004,715,000</b>	<b>\$9,777,012,342</b>

STATES	NEW YORK	OHIO	PENNSYLVANIA	WISCONSIN
Estimated Need: Drinking Water	\$26,279,000,000	\$14,093,000,000	\$14,555,000,000	\$5,878,000,000
Stimulus Spending: Drinking Water	\$81,602,340	\$58,460,001	\$44,006,270	\$37,750,000
2009 Non-Stimulus Investment: Drinking Water	\$59,786,953	\$61,394,001	\$129,488,122	\$34,524,934
UNMET NEED: DRINKING WATER	\$26,137,610,707	\$13,973,145,998	\$14,381,505,608	\$5,805,725,066
Estimated Need: Clean Water	\$27,011,100,000	\$12,316,800,000	\$11,097,600,000	\$5,702,600,000
Stimulus Spending: Clean Water	\$420,668,684	\$220,623,100	\$176,912,530	\$103,748,300
2009 Non-Stimulus Investment: Clean Water	\$152,574,039	\$134,703,045	\$142,497,953	\$95,547,769
UNMET NEED: CLEAN WATER	\$26,437,857,277	\$11,961,473,855	\$10,778,189,517	\$5,503,303,931
<b>TOTAL UNMET NEED FOR CLEAN WATER AND DRINKING WATER BY STATE</b>	<b>\$52,575,467,984</b>	<b>\$25,934,619,853</b>	<b>\$25,159,695,125</b>	<b>\$11,309,028,997</b>

**TOTAL UNMET NEED FOR CLEAN WATER AND DRINKING WATER IN GREAT LAKES REGION \$181,401,113,119**

Sources: "Drinking Water SRF ARRA Reporting Summary Project List," U.S. EPA, March 1, 2010. "Clean Water SRF ARRA Reporting Summary Project List," U.S. EPA, March 1, 2010. "Drinking Water Infrastructure Needs Survey and Assessment: Fourth Report to Congress," U.S. EPA, p. 58-59, 2007. "Clean Watersheds Needs Survey 2008: Report to Congress," U.S. EPA, p. H2-H3, 2008.

## CHAPTER 1:

# Protecting The Great Lakes: A Short History

When thinking about the need to protect the Great Lakes, limiting pollution to preserve the drinking water supplies and the recreational amenities provided to the millions of residents in the region is often what first comes to mind. In addition to those concerns, there are other major interests, including shipping and hydroelectric power, that have long been at work to preserve the Great Lakes and keep their water within the Great Lakes Basin.

### Supporting Essential Transportation and Hydroelectric Power Services

Maintaining water levels for shipping is essential to the economic vitality of the region: for every one foot drop in lake levels, a thousand-foot freighter must remove 270 tons of cargo to ensure it doesn't scrape bottom, resulting in increased costs to industry and consumers.<sup>10</sup> Water levels and volumes in the Basin are also essential for regional hydroelectric plant operation. In fact, the vast majority of the water leaving the Upper Lakes at Niagara Falls does not go over the Falls, but is used to power enormous banks of hydroelectric turbines on both the American and Canadian sides.<sup>11</sup>

### Reversing a River to Protect the Lakes

Efforts to protect the Great Lakes stretch back to the City of Chicago's diversion of water in the late 1800s. To protect its source of drinking water (Lake Michigan), the City of Chicago and the State of Illinois constructed a new canal and lock system, centered around the Chicago Sanitary and Ship Canal, which reversed the flow of the Chicago River and diverted waste away from the Lake. From the beginning, the Chicago Sanitary and Ship Canal spurred legal conflict, starting with newly "downstream" communities in the Mississippi River Valley challenging the reversal and the transport of Chicago's sewage to the Mississippi River.<sup>12,13</sup>

After decades of litigation, in 1967, the Supreme Court approved a new consent decree limiting the "Chicago Diversion" to a five-year average of no more than 3,200 cubic feet per second (cfs) by Illinois and its municipalities to support:

- Navigation, including the maintenance of adequate water levels during drought periods; and
- Discretionary diversion purposes, including the dilution of sewage with Lake Michigan water at wastewater treatment plants to maintain water quality.

The rest of the allocation was reserved for other water uses, including drinking water.<sup>14</sup> A further amendment to the decree in 1980, as well as a 1996 Memorandum of Understanding (MOU) among the parties, committed Illinois to more rigorous monitoring and accounting procedures after it was found that Illinois was exceeding its diversion amount by 15 percent.<sup>15</sup> Significantly, the MOU required Illinois to "repay" the excess water it diverted



while staying under the 3,200 cfs cap. Illinois has done so, with initial reports indicating that it could make up its historic accumulated overcharge by using the water it currently diverts *more efficiently*.<sup>16</sup>

## Establishing a Charter to Cooperatively Manage Great Lakes Resources

Enforcement of limits on the Chicago Diversion is just one part of the effort to protect the Great Lakes.<sup>17</sup>

In 1985, the Great Lakes States and Canadian Provinces signed the Great Lakes Charter, whose purpose was to: conserve the levels and flows of the Great Lakes and their tributary and connecting waters; to protect and conserve the environmental balance of the Great Lakes Basin ecosystem; to provide for cooperative programs and management of the water resources of the Great Lakes Basin by the signatory States and Provinces; to make secure and protect present developments within the region; and to provide a secure foundation for future investment and development within the region.<sup>18</sup>

A voluntary agreement to cooperatively manage the waters of the Great Lakes, perhaps the Charter's most important provision is that "no Great Lakes State or Province will approve or permit any major new or increased diversion or consumptive use of the water resources of the Great Lakes Basin without notifying and consulting with and seeking the consent and concurrence of all affected Great Lakes States and Provinces."<sup>19</sup>

## Adopting Federal Legislation to Oversee Water Management

Incorporating language authored by Sen. Howard Metzenbaum of Ohio, the 1986 U.S. Water Resources Development Act (WRDA) requires every Great Lakes governor to unanimously approve any proposed out-of-basin diversion of water from the Great Lakes Basin (a prohibition against exporting water was added in 2000).<sup>20</sup> It also prohibits any federal agency from diverting water from the Basin, or even spending federal funds to study the feasibility of diverting water, without approval by each of the Great Lakes governors.

Serious procedural gaps in the WRDA's intended protection of the Lakes were exposed in 1998, when the Province of Ontario granted a permit to the Nova Group to annually export 158 million gallons of Great Lakes water to Asia.<sup>21</sup> Approval of the permit violated no laws or policies that existed at the time. A voluntary agreement, the Charter only applied to proposals that "exceed 5,000,000 gallons per day average in any 30-day period and only provided for notification and consultation;"<sup>22</sup> the Nova Group's proposal was for 158,000,000 gallons per year. Furthermore, the WRDA's notification requirement only applied to U.S. states and not Canadian provinces.

When the Nova Group agreed to withdraw its permit application, it set off a flurry of activity in both the United States and Canada to correct these piecemeal protections of Great Lakes water on both sides of the border. This Michigan billboard (below), posted in 2001, expressed the fears of many regarding threats to Great Lakes water.



## **Updating the Charter to Address Additional Concerns**

The governors directed the Great Lakes Protection Fund to sponsor a study of potential legal problems faced by the Great Lakes along with potential solutions.<sup>23</sup> The provinces of Ontario and Quebec joined the Water Management Working Group formed by the governors to respond to the findings in the report and address the legal issues identified.

As a result, on June 18, 2001, the Great Lakes governors and the premiers of Ontario and Quebec signed the Great Lakes Charter Annex 2001 (Annex 2001), in which they agreed to prepare basin-wide binding agreement(s), such as interstate compacts, protocols or other arrangements, including a dispute resolution process between the states and provinces, “to protect, preserve, restore and improve the Great Lakes for the use and benefit of its citizens.”<sup>24</sup> The governors and premiers also agreed to continue a process that ensured ongoing public input in the preparation and implementation of the binding agreement(s) called for in Annex 2001. Included in this process were periodic progress reports to the public.

## **Establishing the Great Lakes Compact as State and Federal Law**

After years of negotiations and two public comment periods, the Great Lakes governors and premiers signed the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement, and the Great Lakes governors endorsed and called for the legislative enactment of the companion Great Lakes-St. Lawrence River Basin Water Resources Compact on December 13, 2005.<sup>25</sup> The Compact and Agreement detail how the states and provinces will manage and protect the Basin and provide a framework for each state and province to enact laws for its protection. The Compact and Agreement were shaped by extensive stakeholder engagement. Indeed, a range of organizations spurred state and federal activity to ratify the Compact: Minnesota’s Governor Tim Pawlenty was the first to sign the state legislation ratifying Compact, on February 20, 2007; Michigan’s Governor Jennifer Granholm was the last, on July 9, 2008.<sup>26, 27</sup>

President Bush signed the Compact on October 3, 2008 and the Compact became state and federal law on December 8, 2008.<sup>28</sup>

## CHAPTER 2:

# Exploring Reporting Milestones and State Progress Under The Great Lakes Compact

The Agreement and Compact contain a set of reporting milestones that both the states and the Council of Great Lakes Governors, as Secretariat to the Compact, are legally required to meet (Appendix A provides greater detail on those milestones). In addition to establishing budgets and electing co-chairs, the Council has also developed guidance relating to water use reporting protocols, guidance relating to the requirements in the Compact, and two policies relating to records access and retention.<sup>29, 30, 31</sup>

The Compact also required the Council to draft regional water conservation and efficiency goals and objectives, which it did in 2008.<sup>32</sup> The draft objectives are listed in Appendix B. The overarching goals are:

- Ensuring improvement of the waters and water-dependent natural resources;
- Protecting and restoring the hydrologic and ecosystem integrity of the Basin;
- Retaining the quantity of surface water and groundwater in the Basin;
- Ensuring sustainable use of waters of the Basin; and
- Promoting efficiency of use and reducing losses and waste of water.

### Exploring Progress Milestones and State Progress

Each state was supposed to adapt these regional goals and objectives and issue state-wide goals and objectives in 2010 as part of the second milestone (see page 10). As of April 2011, two reporting deadlines, or milestones, had occurred for the states.

#### THE FIRST MILESTONE: DECEMBER 8, 2009

By December 8, 2009, each state was required to submit the following reports:

- A description of its water management, conservation and efficiency programs that will be used to implement the Compact.
- A description of existing laws, regulations and policies, existing water management program scope and thresholds, and decision making and exception standards for withdrawals, consumptive uses and diversions.

Each state met the deadline of December 8, 2009, and the Council of Great Lakes Governors issued declarations stating that each state was in compliance.<sup>33</sup> This was a relatively easy deadline to meet—the states were asked to report on existing programs and regulations, not to create anything new (each state’s “Water Conservation and Efficiency Program Reports” can be found at: [www.glscompactcouncil.org/Resolutions.aspx](http://www.glscompactcouncil.org/Resolutions.aspx)).

## THE SECOND MILESTONE: DECEMBER 8, 2010

The second deadline—which required states to take new action—was not as easy a milestone to meet.

By December 8, 2010, each state was to:<sup>34</sup>

- Develop state water conservation and efficiency goals and objectives that are consistent with the regional goals and objectives (which are summarized above);
- Develop and implement a voluntary or mandatory water conservation and efficiency program for all users, including existing users, that is based on the state goals and objectives and must adjust to new demands and the potential impacts of cumulative effects and climate; and
- Commit to promote environmentally sound and economically feasible water conservation measures, such as:
  - Measures that promote efficient use of water;
  - Identification and sharing of best management practices and state of the art conservation and efficiency technologies;
  - Application of sound planning principles;
  - Demand-side and supply-side measures or incentives; and
  - Development, transfer and application of science and research.

No state fully met the milestones contained in the December 2010 deadline, although Wisconsin came closest. Other states, including Illinois, Ohio, Minnesota and Michigan, met part of the milestones. It is important to underscore the difficulty in fully assessing each state’s progress since states were not required to submit written reports for the December 8, 2010 reporting deadline. Only some of the states provide information online regarding their implementation of the Compact, not all of which are regularly updated. This lack of transparency must be addressed by each state and the region if the public participation language in the Compact is to be fully realized.

The following summarizes each state’s progress:<sup>35</sup>

- **Develop state water conservation and efficiency goals and objectives that are consistent with the regional goals and objectives.**

The Compact Council made the regional goals and objectives intentionally broad; each state is to add specificity when adapting these regional “markers” for specific state action. In adapting the regional goals and objectives, each state has the opportunity to create a transparent set of benchmarks to guide its annual assessment of its conservation and efficiency programs.

Five states developed state water conservation and efficiency goals and objectives, to varying levels of compliance with the milestone (each state’s goals and objectives are compiled in Appendix C):

- **Wisconsin:** With help from a grant from the Great Lakes Protection Fund, Wisconsin was the first state to develop conservation and efficiency goals and objectives, convening a public advisory committee to oversee the process.<sup>36</sup> The consensus document was intentionally written as “general and broad in scope,”

but it has been used to guide the development of Wisconsin's conservation programs.<sup>37</sup> Wisconsin just closed a comment period on its goals and objectives to solicit further public input.<sup>38</sup>

- **Illinois:** Illinois developed objectives in December 2010.<sup>39</sup> The objectives are broad and only apply to users of Lake Michigan water; the document contains one goal that comes from the Level of Lake Michigan Act.
- **Michigan:** Michigan took the easiest path—it copied the regional goals and objectives, inserting the word “Michigan” as appropriate.<sup>40</sup> In doing so, the State ignored the work of its own advisory committee, which made slightly more specific recommendations on program activities under goals and objectives.
- **Ohio:** When Ohio passed the Compact, it created a Great Lakes-St. Lawrence River Basin Compact Advisory Board (Section 3 of Amended House Bill 416 of the 127th General Assembly) to develop recommendations for legislation to implement and effectuate the Compact. On December 15, 2010, the Advisory Board released its report, which contained draft goals and objectives.<sup>41</sup> While the Legislature has not acted on the Advisory Group's recommendations, the draft goals and objectives are specific to Ohio and provide transparent benchmarks for the state as it develops a water conservation and efficiency program.
- **Minnesota:** The State's “Minnesota Water Conservation Goals and Objectives” document identifies the water conservation goals in the Compact, but does not identify state-specific objectives, apart from stating that “Minnesota's existing statutes and rules establish programs and measures that are consistent with the water conservation and efficiency goals and objectives adopted by the Regional Body and Compact Council.”<sup>42</sup>

The three other states—Indiana, New York and Pennsylvania—are not in compliance with this requirement of the Compact.

- **Develop and implement a voluntary or mandatory water conservation and efficiency program for all users, including existing users, that is based on the state goals and objectives and must adjust to new demands and the potential impacts of cumulative effects and climate.**
  - **Wisconsin:** According to its implementation legislation, the Wisconsin Department of Natural Resources (WDNR) is required to develop a voluntary statewide water conservation and efficiency program as well as a voluntary and mandatory basin program, to be implemented by rule. While the state made important progress in 2010—it finalized rules on mandatory conservation measures for new or increased withdrawals in the Basin and diversion exceptions, registration and reporting, and fees—it has not developed the statewide program mandated in its state enabling legislation.<sup>43</sup> The state plans to use a 2006 report, co-written by the WDNR and the Wisconsin Public Utility Commission, with significant stakeholder involvement, to guide the development of its statewide program in 2011.<sup>44</sup> WDNR is also expected to issue rules on requirements for public participation and the methods for determining the amount of water loss from different consumptive uses in 2011.
  - **Illinois:** Illinois has had a mandatory program since 1989 for all users of Lake Michigan water. However, the “Rules and Regulations for the Allocation of Water from Lake Michigan” has not been updated in more than 20 years. As a result, the document doesn't meet many of the regional goals and objectives, including adaptive management, incorporating the impact of climate change and best management practices, or maximizing water use efficiency or minimizing water waste. The state plans to update this guidance by the end of 2011.<sup>45</sup>

- **Michigan:** Michigan did submit a one page description of its “Conservation and Efficiency Program” by December 8, 2010. According to this document, Michigan’s “long-established Water Use Program has expanded its original role to incorporate the Compact provisions for a conservation and efficiency program to achieve Michigan’s conservation objectives.”<sup>46</sup> The foundation of the program is the state’s water withdrawal assessment tool, which is required of all new or increased large quantity withdrawals. Registrants and permit holders must acknowledge in an annual report that they have reviewed conservation measures for their sector, but are not required or even encouraged to act upon them. The state’s Advisory Council, since disbanded, issued a report in November 2009 that included a draft conservation initiative; the report recommended that the initiative be released for public review and comment, but the state has not done so. Michigan must review its conservation programs and ensure that those programs meet the Compact requirements, including the self-certification requirement in its permitting program to ensure that it is applying the standard required by the Compact.
- **Ohio:** The state’s Compact Advisory Board made a series of innovative recommendations regarding what Ohio’s water conservation and efficiency program should include, such as information and education tools and research and planning needs. It also suggests specific conservation practices, such as universal metering, audits to locate leaks and incentives for conservation, such as rewarding users who voluntarily implement strict conservation and efficiency practices.<sup>47</sup> Again, that report has not been acted upon, although there are competing bills within the State legislature to implement key provisions of the Compact. One bill, H.B. 231, would ignore the recommendations of the Advisory Board and would potentially violate the terms of the Compact, including a provision to make water conservation measures voluntary rather than mandatory.<sup>48</sup> A competing bill, H.B. 257/S.B. 186, specifically mentions the Advisory Council’s report as a key consideration in the development of a water conservation and efficiency program.<sup>49</sup>

■ **Commit to promoting environmentally sound and economically feasible water conservation measures.**

Only Wisconsin attempted to meet this requirement. In 2010, the state undertook a rulemaking to establish mandatory “Conservation and Efficiency Measures” (CEMs) for certain withdrawals greater than two million gallons per day and to promote voluntary measures for all water users. The rule, which went into effect on January 1, 2011, established four basic CEMs: conduct a water audit; develop a leak detection and repair program; educate staff and customers about water conservation activities; and measure all sources of water.<sup>50</sup> The rule categorizes water use into three tiers; more CEMs are required as more water is used.

If five of the eight states are in partial compliance (at best) with the terms of the Compact, where does that leave the other three states? The following is a brief summary of the status of Compact implementation in Indiana, New York, and Pennsylvania, as well as some additional information on Minnesota’s programs.<sup>51</sup>

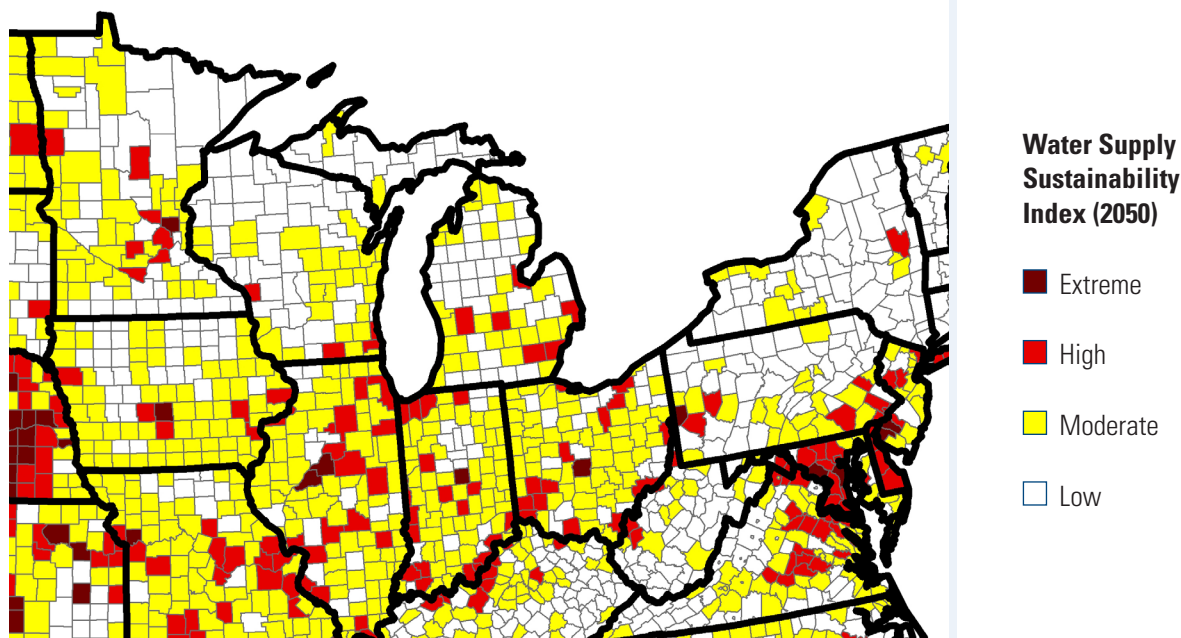
- **Indiana:** When it passed the Compact, Indiana committed to adopt voluntary water conservation and efficiency programs (Indiana Code 14-25-7) and to issue rules to clarify the requirements for permits under the water management program and develop a voluntary program (Indiana Code 14-25-7). The state has done neither. It did draft voluntary water conservation guidelines for users, but did not issue them. The guidelines include a water conservation plan and annual reporting requirements for facilities with the capability to withdraw more than 100,000 gallons per day. The State recently undertook a water use management survey; the responses will be used to tailor conservation outreach, among other uses, to different sectors.



## Accounting for Climate Change When Assessing Water Resource Availability

The Compact requires that conservation programs adjust to the potential impacts of climate change. A 2010 report by NRDC and Tetra Tech demonstrates the significant impact that climate change will have on the sustainability of water supplies in the coming decades. While these impacts will be more severe in the southwestern and western parts of the country, 78 counties in the Great Lakes states could experience “extreme” or “high” risks of water shortages by mid-century.

### Water Supply Sustainability Index With Climate Change Effects (2050)



Read the full report and view the Water Sustainability Index using Google Earth at [www.nrdc.org/globalwarming/watersustainability/index.asp](http://www.nrdc.org/globalwarming/watersustainability/index.asp).

- Minnesota:** Minnesota has some of the strongest conservation requirements in the Great Lakes Basin. Water conservation measures for public water suppliers serving more than 1,000 people include a requirement for a water emergency and conservation plan, adoption of a conservation rate structure, annual reporting of water use by customer categories, and the implementation of demand reduction measures. Minnesota DNR staff believe their existing programs constitute compliance with the Compact. While the State recently created a web page dedicated to the Compact, it lists a series of programs, but does not identify how these programs make up a water conservation and efficiency program consistent with the Compact.<sup>52</sup>
- New York:** In part to comply with the Compact, the New York State Department of Environmental Conservation (DEC) pursued statewide water withdrawal legislation, which passed on June 16, 2011 after more than three years of advocacy and State review. The legislation regulates withdrawals with a threshold capacity of more than 100,000 gallons per day and directs the DEC to develop a conservation program based on the Compact’s regional conservation and efficiency goals. While this landmark

legislation creates a comprehensive framework for compliance, the delays in its passage prevented the DEC from meeting the December 2010 requirements. New York can draw on a number of existing programs to do so, including its model integration of green infrastructure strategies into its State Revolving Fund guidelines and an advisory committee report that made a series of recommendations on implementation, including a method for establishing baseline volumes, a conservation program, and a water management program.<sup>53</sup>

- **Pennsylvania:** The Pennsylvania Department of Environmental Protection (DEP) is administering its voluntary water conservation program through an online water resources technical assistance center. The center, operated by Save Water PA, was developed by the Pennsylvania Environmental Council and Pennsylvania Organization for Watersheds and Rivers. While its mission, “to encourage the efficient use of water resources in Pennsylvania by providing comprehensive information and resources on water conservation and use,” clearly supports the goals of the Compact, it does not fulfill the requirements of the Compact to establish water conservation and efficiency programs, goals and objectives. An online technical assistance center, no matter how innovative, cannot establish those goals and objectives for the state, which must also identify how it will promulgate rules regarding the process for permitting water withdrawals.



## CHAPTER 3:

# Achieving Regional Water Conservation and Efficiency Goals: Policy Prescriptions for Communities and States

The Compact's regional goals and objectives recognize that, even in a region of relative water abundance, the management of water to maximize efficiency and minimize waste is critical. Common sense policies can help contain the rising cost to consumers of water and wastewater service and maintain the reliability of fresh water supply that gives the Great Lakes states a globally competitive advantage. These policies can also help states and utilities address critical infrastructure needs at a time when many face declining populations.

Unfortunately, as the review on pages 10 through 14 demonstrates, most states aren't taking advantage of this opportunity to better manage their water uses, despite the Compact's legal mandate. Each state is to "adopt and implement supply and demand management to promote efficient use and conservation of water resources." This objective is coupled with the call for the states to "maximize water use efficiency and minimize waste of water," a specific and somewhat ambitious criterion for Compact compliance. Each state has a specific obligation to develop and adopt programs to fulfill this objective with regard to water use within the Great Lakes Basin portion of each state, and not simply in the context of reviewing local applications for out-of-basin diversions, for which more specific provisions apply.

NRDC has identified five actions that community water systems should undertake and eight policies that states can enact to achieve the water conservation and efficiency goals and objectives of the Compact. Each of these actions has multiple benefits, from reducing operating costs to creating greater system resiliency to deal with potential climate-related impacts (see sidebar: Accounting for Climate Change). Many of actions listed here have previously been identified and recommended by either the advisory councils and committees that three states (Michigan, New York, and Ohio) formed to guide Compact implementation, the statewide report Wisconsin commissioned, or the public water utility model proposed by the Alliance for the Great Lakes and endorsed by organizations across the Great Lakes.<sup>54</sup> Some states are already implementing some of the recommended actions and policies.

## FIVE ACTIONS FOR COMMUNITY WATER SYSTEMS

### 1. Mandatory Water Conservation Planning

Water conservation planning should be required of all water utilities, as well as for existing and new water users. Water conservation should not be simply suggested; it should be a mandated component of any existing or new permit for withdrawal of Great Lakes water.

**Recommendation:** Each state should amend its existing permitting process to require water conservation planning as a condition of permit. Each state should also ensure that parallel requirements are included in any new permit, including those for consumptive uses.

### 2. Metering

Metering is a fundamental tool of water system management and conservation. Water that is not measured cannot be efficiently managed. Metering can improve water use in many contexts:

#### *A. Universal Metering for Community Water Systems*

Service-connection metering informs customers about the amount of water they're using. By using metering data, community water suppliers can more accurately track water usage and bill customers appropriately.

**Recommendation:** All community water systems should be required to fully meter all service connections, and to use metered water for billing purposes. Exceptions may be made for the smallest systems, provided the exceptions are reviewed periodically to account for current information on the technology and economics of metering and billing systems.

#### *B. Multifamily Submetering*

Multifamily submetering measures tenants' actual water usage in multifamily buildings. Most occupants of apartments and condominiums are not currently billed directly for the amount of water they use. Instead, the cost is divided among the occupants and essentially included in the rent for apartments and in association fees for condominiums. Submetering is the only apartment water-billing method that results in water conservation. One study found that water usage in submetered properties decreased by 15.3 percent on average, or 21.8 gallons per day per unit, compared with properties that include the cost of water in rent.<sup>55</sup> States are increasingly requiring submetering in new buildings.

**Recommendation:** Just as all service connections should be individually metered, the submetering of individual units in master-metered multifamily housing should be required for all new multifamily construction, and encouraged in existing buildings. State policies governing the terms and conditions under which submetering can be adopted in existing multifamily buildings should be clarified to encourage more widespread adoption of the practice.<sup>56</sup>

#### *C. Large Landscape Metering*

Outdoor water use is often the largest single end use of water. The water used to irrigate large urban ornamental landscapes can be better managed when the quantities applied are accurately measured and billed.

**Recommendation:** In recognition of the special challenges of efficiently irrigating large (greater than ¼ acre) landscaped areas, separate metering and billing should be required for all large landscapes with built-in irrigation systems.

### 3. Pricing

When measured as a percentage of household income, U.S. residents pay less for water and wastewater services than residents of other developed countries.<sup>57</sup> Unfortunately, the price that most consumers pay for water does not capture the full cost of treating and delivering that water. Drinking water and wastewater utilities must be able to price water to recover the costs of building, operating, and maintaining a system.

**Recommendation:** The use of declining block rates, whereby customers within a particular class are offered lower unit costs at higher levels of consumption, should be eliminated. Exceptions could be provided to an individual utility that can demonstrate that its declining block rate accurately reflects declining real costs of service, in both the short- and long-term. Additionally, the adoption of seasonal rates should be evaluated and implemented, except where an individual utility can show that its summer peak demand does not contribute to higher utility costs. Although most states do not regulate the rates established by publicly owned water systems, these two prescriptive requirements for rate design can be adopted without the state assuming responsibility for the other aspects of water utility ratemaking.

As a corollary to the above, utility cost recovery for wastewater collection and treatment service should include a volumetric component, as well as any fixed charges. Volumetric pricing for residential and small commercial customers can be accomplished by the use of data from the water meter.

### 4. Timely, Accurate, and Understandable Billing for Water and Wastewater Service

Timely, accurate and understandable billing information helps consumers make informed choices about water use.

**Recommendation:** States should establish standards for water and wastewater billing frequency (preferably monthly), billing clarity, and meter accuracy. Volumes should be presented in understandable units, preferably gallons, and compared with volumes billed over the previous 12 months. Improved meter accuracy at very low flows is needed to ensure that significant leakage volumes are registered by the meter and billed to the responsible customer.

### 5. Water Loss Accounting and Water Loss Reduction

Water system leaks or breaks can cause service interruption, health and safety concerns and lost revenue. It is increasingly important for utilities to account for the water that travels from the source to end users.

**Recommendation:** Each community water system should prepare and submit an annual water balance report using the methods identified in American Water Works Association (AWWA) Manual M-36, *Water Audits and Loss Control Programs*, and the accompanying free software provided by AWWA. Water losses that are deemed economically recoverable, that are cost effective to identify and eliminate, should be eliminated within ten years.

## EIGHT STATE WATER EFFICIENCY POLICIES

### 1. Plumbing Efficiency Standards

Federal plumbing efficiency standards haven't been updated since 1992. More efficient products are currently available at little or no penalty in terms of either cost or performance. The Plumbing Manufacturers Institute has supported stronger efficiency standards in several states.

**Recommendation:** States should adopt new efficiency standards covering the sale and installation of new tank-type toilets, urinals, and lavatory faucets. States should also strengthen the standards for showerheads used in new construction.<sup>58</sup>

## 2. Water Efficiency in New Ornamental Landscapes

Costly summer peak demands must be more effectively managed. The same management strategies can help to hedge against demands imposed by a warmer climate in the future. Adopting criteria to promote water efficiency in the ornamental landscapes surrounding new residential and commercial development can help to achieve this goal.

**Recommendation:** Simple prescriptive requirements, such as adequate soil preparation, prohibitions of turf in thin strips or on steep slopes that preclude efficient watering, and a requirement that rain shut-off devices be installed in any new in-ground irrigation system, can be adopted as a first phase. More involved but flexible rules to require water budgets for new landscapes can be scheduled for gradual implementation over the next 5 to 10 years.

## 3. Decoupling of Sales Volume and Revenue Recovery for State-Regulated Utilities

Investor-owned water companies subject to rate review and approval by the state (and all water utilities in Wisconsin) may suffer a loss of revenue and diminished earnings if successful water conservation programs are carried out while rates are fixed.

**Recommendation:** To align the interests of state-regulated utilities more clearly with improvements in water use efficiency, those utilities undertaking conservation programs should be allowed to recover costs and a portion of lost revenues through a “decoupling” mechanism approved by the state public utility regulatory commission, similar to the treatment given to energy utilities by many state PUCs.<sup>59</sup>

## 4. Ensuring State Revolving Funds (SRFs) Support Water Efficiency

Under the Clean Water Act, EPA makes financial contributions to Clean Water State Revolving Funds to finance water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management. The Safe Drinking Water Act, as amended in 1996, authorized EPA to provide funding support for state-authorized Drinking Water State Revolving Funds, for drinking water systems to finance infrastructure improvements. Both allow funds to be used to finance water efficiency measures and programs; however, only four of the Great Lakes states allow this use (Indiana, New York, Ohio, Wisconsin).

**Recommendation:** Eligibilities and guidelines for state Clean Water SRFs and Drinking Water SRFs should be clarified to fully support improvements in water use efficiency. First, each state’s eligibility rules should be made consistent with EPA guidelines clarifying that water efficiency measures, including utility investments in incentives and rebates for utility customers, are eligible for SRF funding.<sup>60</sup> Second, all applicants for grants or loans for flow-related projects should be required to demonstrate that the sizing and timing of the project for which SRF funding is being requested has taken into account the implementation of enacted water efficiency standards and other cost-effective water efficiency measures.<sup>61</sup>

## 5. Prohibiting the Waste of Water

State law should clearly prohibit the waste of water. Wasteful practices include once-through cooling with publicly supplied water; irrigation runoff that leaves a water-user’s property; and failure to make timely repairs to visible leaks and breaks, whether on public or private property.

**Recommendation:** States should pass legislation prohibiting the waste of water, including clear definitions of practices deemed wasteful and appropriate penalties for violations. States may defer to local enforcement, but eligibility for state financial assistance and state regulatory approvals should be at risk for jurisdictions that fail to enforce the law.<sup>62</sup>

## 6. Enabling Onsite Re-use

Gray water is defined as “untreated wastewater which has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and which does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes.”<sup>63</sup> Gray water includes wastewater from bathtubs, showers, bathroom washbasins, clothes washers, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers.

**Recommendation:** State law and regulation should clarify the ability of consumers to reclaim and reuse for non-potable applications water generated or captured onsite from rainwater, foundation pumping (i.e., sump pumps), laundering, showering, and bathing. State law should also allow the use of centrally treated wastewater (recycled water) for purposes such as irrigation and industrial cooling.

## 7. Maintaining and Improving Local Water Resources through Green Infrastructure

Green infrastructure refers to the use of more natural systems, such as wetlands, street trees, and other types of vegetation to store and treat stormwater instead of the “hard infrastructure” that is traditionally used, such as pipes, pumps, and storage tunnels. Green infrastructure can improve the rate at which groundwater aquifers are 'recharged' or replenished; it can also provide additional storage capacity to wastewater and stormwater treatment facilities, potentially forestalling additional hard infrastructure investment.

### Green Infrastructure Strategies



CREDIT: COURTESY OF ROOFSCAPES, INC.

Chicago's City Hall has a green roof that absorbs rainwater and helps to insulate the building.



CREDIT: COURTESY OF SEATTLE PUBLIC UTILITIES

A swale in Seattle helps retain stormwater and green the streetscape.



CREDIT: WWW.FLICKR.COM/ROGER\_MOMMAERTS

This rain barrel allows the homeowner to collect rainwater for reuse.

Green infrastructure approaches include wetland and streamside buffer restoration and the installation of rain gardens, green roofs, and rain barrels. These practices can increase water infiltration to recharge drinking water supplies (such as through wetland restoration) and can conserve water by capturing it for later reuse (such as through rain barrel installation). Adoption of green infrastructure can be undertaken at multiple levels: city-wide, such as Chicago's requirement for green roof installation in the central business district; neighborhood, such as Seattle's Street Edge Alternative (SEA) initiative; or individual, such as rain barrel installation.



**Recommendation:** States and municipalities should specify the required levels of on-site retention and recharge for new development and redevelopment. These entities should require the on-site retention and recharge (i.e. without discharge) of sufficient rainfall from each precipitation event so as to ensure no adverse effects from the site. This should include provisions to maximize the amount of on-site infiltration and/or reuse of water so retained.

## 8. Water and Wastewater Permit Review

Utilities seeking state permits for new or expanded water withdrawals or wastewater discharges should demonstrate that the volumes sought in such permits have taken into account the implementation of reasonable water conservation measures.

**Recommendation:** States should require the preparation and submission of water conservation plans by applicants seeking new or expanded withdrawals, as well as submission of an alternatives analysis that quantifies the effects of local conservation programs on the proposed level of withdrawal or discharge.

Appendix D identifies additional measures that utilities seeking to withdraw new or additional supplies of Great Lakes water should be required to implement. By December 2013, a water management program to regulate new or increased withdrawals and consumptive uses must be developed. These measures should be included in this water management program.

## CHAPTER 4:

# Conclusion and Overarching Recommendations

The Great Lakes-St. Lawrence River Water Resources Compact is an historic opportunity to protect the waters of the Great Lakes Basin and to ensure the region's continued economic and environmental vibrancy. While the states have been slow to fully embrace the opportunities within the Compact, it is not too late for them to do so. NRDC recommends immediate action in the following areas:

### **Achieve Compliance With Overdue Requirements**

States must come into compliance immediately with the requirements of the December 2010 milestone regarding water conservation and efficiency programs, goals, and objectives.

### **Meet Reporting Targets**

States must ensure that they are on track to comply with the December 2011 reporting milestone, which requires them to report on the progress of implementing their water conservation and efficiency programs, goals, and objectives.

### **Pursue Recommended Water Conservation and Efficient Actions**

States should work with their community water systems to identify the relevant water conservation and efficiency actions outlined on pages 15 to 20; and develop a strategy, with milestones, to implement them by 2013 (when the Compact must be fully implemented).

### **Increase Public Participation and Transparency**

States should also explore additional mechanisms to increase public participation and transparency into Compact implementation, through the establishment of advisory committees or councils; the creation of websites devoted to Compact implementation; and other appropriate means.

The Compact faces numerous challenges to full implementation, including changes in political leadership (six of the eight Great Lakes governors changed parties in the November 2010 elections), declining state budgets and increasing strains on limited resources. But no implementation challenge is as serious as the threat posed to the world's greatest surface freshwater system by not taking advantage of the Compact's provisions.

## ENDNOTES

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- 3 “The Great Lakes: Vital to Our Nation’s Economy and Environment,” Michigan Sea Grant, University of Michigan, 2011; <http://www.graham.umich.edu/pdf/greatlakesjobs.pdf>.
- 4 “Great Lakes Waterborne Commerce Profile,” U. S. Army Corps of Engineers, Huntington District, 2008; [http://outreach.lrh.usace.army.mil/Basin/Great%20Lakes/GL\\_basin.htm](http://outreach.lrh.usace.army.mil/Basin/Great%20Lakes/GL_basin.htm). In 2008, approximately 157 million tons of commodities were transported between and within U.S. ports; with iron ore/steel products composing 38 percent of this tonnage, followed by coal and aggregates with 25 percent and 20 percent respectively. 4.1 million tons of commodities were shipped out of the basin; grain accounted for 53% of this tonnage.
- 5 Protection of the Waters of the Great Lakes,” International Joint Commission, undated; <http://www.ijc.org/php/publications/html/interimreport/interimreporte.html>
- 6 NRDC’s “*Testing the Waters*” is an annual report documenting beach closures across the country. In 2009, beach closures and advisories reached their sixth-highest level since NRDC began tracking these events 20 years ago. See “*Testing the Waters: A Guide to Water Quality at Vacation Beaches*,” Natural Resources Defense Council, July 2010; <http://www.nrdc.org/water/oceans/ttw/ttw2010.pdf>. The 2010 data will be available after June 29, 2011 on NRDC’s website at <http://www.nrdc.org/ttw>.
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- 16 Daniel Injerd, “Lake Michigan Water Availability White Paper,” Illinois Department of Natural Resources for the Northeastern Illinois Regional Water Supply Planning Group, January, 2009, p.2009; quoted in “*Water Supply Planning in the Chicago Metropolitan Region*,” Martin Jaffe, *Sea Grant Law and Policy Journal*, Vol. 2, No. 1 (June 2009); p. 7.
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- 20 “Water Resources Development Act of 1986,” November 17, 1986, P.L. 99-662, Title XI, 1109, 100 Stat. 4230.
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- 33 The Council maintains a website, <http://www.glscompactcouncil.org/Resolutions.aspx>; each state’s Water Management Program and Water Conservation and Efficiency Program reports can be found here, as well as the Council’s Declaration of Findings.
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- 54 “Great Lakes/St. Lawrence River Water Conservation Model Policies & Measures (State/Provincial Model; Public Water Utility Model,” Alliance for the Great Lakes, undated.
- 55 “National Multiple Family Submetering and Allocation Billing Program Study,” Aquacraft, Inc. and the East Bay Municipal Utility District, 2004, p. xxii; <http://www.cuwcc.org/resource-center/products/end-use-studies.aspx>
- 56 See “National Multiple Family Submetering and Allocation Billing Program Study,” for a good list of policy considerations for submetering existing buildings.
- 57 “Full-cost Pricing (website),” U.S. Environmental Protection Agency; <http://water.epa.gov/infrastructure/sustain/fullcostpricing.cfm>
- 58 Recommended standards: Tank-type toilets, 2.28 gpf; urinals, 0.5 gpf; lavatory faucets, 1.5 gpm; showerheads (new construction), 2.0 gpm.
- 59 Michigan, Wisconsin, and New York have approved decoupling for state-regulated electric utilities and Illinois, Indiana, New York, Ohio, And Wisconsin have approved decoupling for natural gas utilities.
- 60 A recent survey posted by the Alliance for Water Efficiency found that SRF eligibility policies in Illinois, Michigan, and Minnesota are more restrictive than current EPA guidance.
- 61 Flow-related projects for DWSRF include source, storage, transmission, and treatment projects; [Note: excludes distribution]. Flow related projects for CWSRF include major collectors, treatment, SSO, and CSO projects [Note: excludes local collection and non-point].
- 62 Note: While all other recommendations made here are directed toward water efficiency within the municipal water supply sector, the prohibition against irrigation runoff can be drawn to apply to agricultural irrigation as well, as with Nebraska’s statute requiring action to control or prevent the surface runoff of ground water used for irrigation (see NRS 46-708).
- 63 California Water Code Section 14876; <http://law.onecle.com/california/water/14876.html>

## APPENDIX A

### GREAT LAKES-ST. LAWRENCE RIVER BASIN WATER RESOURCES COMPACT & AGREEMENT MILESTONES<sup>1</sup>

#### DECEMBER 8, 2008

The Council:

- Identified regional water conservation and efficiency goals and objectives.
- Established a Rules and Regulations Committee.
- Appointed the Council of Great Lakes Governors to serve as Secretariat.
- Adopted by-laws and interim guidance (which was further refined and replaced by guidance adopted in June, 2010).
- Elected a Chair and Vice Chair.

#### JUNE 17, 2009

The Council:

- Created a standing Advisory Committee to ensure ongoing public participation and management of the water resources.
- Adopted a FY 2010 budget.
- Adopted interim state/provincial reporting protocols to a regional water use database.
- Elected a Chair and Vice Chair.

#### DECEMBER 8, 2009

- Each State submitted a report describing its water management and conservation and efficiency programs, as well as baseline volumes of diversions, consumptive uses and/or water withdrawals. These reports must be submitted every five years.

#### JANUARY 7, 2010

- The Council reviewed the State reports and issued Declarations of Findings on each State's submittal. Future reviews are to take place every five years after the effective date of the Compact, or at any other time, if a State requests. At any time, the Council may recommend how to develop and enhance each State's water conservation and efficiency programs.

#### JUNE 10, 2010

The Council:

- Adopted refined interim guidance (replacing the guidance adopted in December, 2008);
- Adopted an FY 2011 budget.

#### DECEMBER 8, 2010

Each State was to:

- Develop water conservation and efficiency goals and objectives consistent with the Basin-wide goals and objectives.
- Implement a voluntary or mandatory water conservation program for all, including existing, basin water users.
- Commit to promote Environmentally Sound and Economically Feasible Water Conservation Measures such as:
  - a. Measures that promote efficient use of Water;

- b. Identification and sharing of best management practices and state of the art conservation and efficiency technologies;
- c. Application of sound planning principles;
- d. Demand-side and supply-side Measures or incentives; and,
- e. Development, transfer and application of science and research.

#### **DECEMBER 10, 2011**

The Council:

- Adopted a memorandum of understanding between the Council of Great Lakes Governors and the Compact Council.
- Adopted policies on access to and retention of records.
- Elected a Chair and Vice Chair.

#### **DECEMBER 8, 2011**

Each State must assess its programs, report to the Council and the Regional Body and make this assessment publicly available.

#### **DECEMBER 8, 2012**

Each State must assess its programs, report to the Council and the Regional Body and make this assessment publicly available.

#### **DECEMBER 8, 2013**

**Each State must:**

- Develop and maintain a water resources inventory for the collection, interpretation, storage, retrieval exchange, and dissemination of information concerning the water resources of the State, including, but not limited to, information on the location, type, quantity, and use of those resources and the location, type, and quantity of withdrawals, diversions and consumptive uses.
- Develop a water withdrawal registration form, including: the name and address of the registrant and date of registration; the locations and sources of the withdrawal or diversion; the capacity of the withdrawal or diversion per day and the amount withdrawn or diverted from each source; the uses made of the water; places of use and places of discharge; and report that information to a Great Lakes—St. Lawrence River water use data base repository. Make aggregated information publicly available.

**The Council must:**

- Assist each State to develop a common base of data regarding the management of the water resources of the basin and to establish systematic arrangements for the exchange of those data.
- Set a date by which any person who withdraws water in an amount of 100,000 gallons per day or greater average in any 30-day period (including consumptive uses) from all sources, or diverts water of any amount, must register the withdrawal or diversion.
- Review and modify the basin-wide objectives, every five years.

**The Council and the States must:**

- Coordinate the collection and application of scientific information to further develop a mechanism by which individual and cumulative impacts of withdrawals, consumptive uses and diversions are assessed.
- Assess cumulative impacts of withdrawals, diversions and consumptive uses every five years, which shall form the basis for a review of the Standard of Review and Decision, Council and Party regulations and their application.

## APPENDIX B

### GOALS AND DRAFT OBJECTIVES IN THE GREAT LAKES-ST. LAWRENCE RIVER BASIN AGREEMENT AND COMPACT

#### Goals<sup>2</sup>

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.

#### Draft Objectives<sup>3</sup>

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

- Use adaptive programs that are goal-based, accountable and measurable.
- Develop and implement programs openly and collaboratively, including with local stakeholders, Tribes and First Nations, governments and the public.
- Prepare and maintain long-term water demand forecasts.
- Develop long-term strategies that incorporate water conservation and efficient water use.
- Review and build upon existing planning efforts by considering practices and experiences from other jurisdictions.

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

- Maximize water use efficiency and minimize waste of water.
- Promote appropriate innovative technology for water reuse.
- Conserve and manage existing water supplies to prevent or delay the demand for and development of additional supplies.
- Provide incentives to encourage efficient water use and conservation.
- Include water conservation and efficiency in the review of proposed new or increased uses.
- Promote investment in and maintenance of efficient water infrastructure and green infrastructure.

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

- Improve the measurement and evaluation of water conservation and water use efficiency.
- Encourage measures to monitor, account for, and minimize water loss.
- Track and report program progress and effectiveness.

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

- Encourage the identification and sharing of innovative management practices and state of the art technologies.
- Encourage research, development and implementation of water use and efficiency and water conservation technologies.
- Seek a greater understanding of traditional knowledge and practices of Basin First Nations and Tribes.
- Strengthen scientific understanding of the linkages between water conservation practices and ecological responses.

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

- Ensure equitable public access to water conservation and efficiency tools and information.
- Inform, educate and increase awareness regarding water use, conservation and efficiency and the importance of water. Promote the cost-saving aspect of water conservation and efficiency for both short-term and long-term economic sustainability.
- Share conservation and efficiency experiences, including successes and lessons learned across the Basin.
- Enhance and contribute to regional information sharing.
- Encourage and increase training opportunities in collaboration with professional or other organizations in order to increase water conservation and efficiency practices and technological applications.
- Ensure that conservation programs are transparent and that information is readily available.
- Aid in the development and dissemination of sector-based best management practices and results achieved.
- Seek opportunities for the sharing of traditional knowledge and practices of Basin First Nations and Tribes.

## APPENDIX C

### ILLINOIS, WISCONSIN, OHIO, MICHIGAN, AND MINNESOTA WATER CONSERVATION GOALS AND OBJECTIVES

#### Illinois' Lake Michigan Water Conservation Goal<sup>4</sup>

A U.S. Supreme Court Decree [Wisconsin v. Illinois, 449 U.S. 48 (1980)] limits Illinois' diversion of Lake Michigan water. That Decree also contains language that has been incorporated into Illinois law, the Level of Lake Michigan Act (615 ILCS 50), which sets forth the Department's Lake Michigan water allocation goal. The goal of Illinois' Lake Michigan water conservation program is taken directly from Illinois state law, and is stated below:

*"The Department shall require that all feasible means reasonably available to the State and its municipalities, political subdivisions, agencies and instrumentalities shall be employed to conserve and manage the water resources of the region and the use of water therein in accordance with the best modern scientific knowledge and engineering practice." (615 ILCS 50/5)*

#### Illinois' Lake Michigan Water Conservation Program Objectives

The Department's water conservation and efficiency program contains the following objectives:

- Enforce the adoption of standards that require the efficient use and conservation of Lake Michigan water by the end user (homeowner, business/industry).
- Enforce standards for good water system management and leakage control by the owner/operator of a public water supply system.
- Ensure that Lake Michigan water diverted directly in the Chicago Waterway system for various purposes is kept to a minimum.
- Collect water use data annually; monitor changes in water use patterns. Encourage public water supply systems to evaluate the effectiveness of their conservation efforts.
- Prepare and maintain long-term water demand forecasts.
- Promote the adoption of water rate structures that encourage conservation and water efficiency.
- Encourage water suppliers to invest in water infrastructure and the use of innovative technology to improve water systems management.
- Encourage research, development and implementation of water efficient technologies. Develop linkages with organizations such as USEPA's Water Sense Program, the Alliance for Water Efficiency and others, to keep abreast of the latest conservation technologies.
- Inform, educate and increase awareness regarding water use, conservation and efficiency via newsletters and other such means of communication.
- Work with our Lake Michigan water allocation permittees and our Great Lakes basin partners to enhance information sharing.

The Department's program to implement these conservation objectives includes both a regulatory and a non-regulatory component. Section 3730.307 of the Department's Rules and Regulations for the Allocation of Water from Lake Michigan (17 IL Adm. Code Ch I. Sec. 3730) spells out a number of requirements that Lake Michigan water allocation permittees must undertake. The Department will, through newsletters and other means of communication, encourage Lake Michigan water allocation permittees to consider non-regulatory measures such as conservation pricing, conservation education and information sharing.

## Wisconsin Great Lakes Water Conservation Goals and Objectives<sup>5</sup>

### Statement of Intent:

Wisconsin is developing water use efficiency and conservation program goals and objectives. The development of these goals and objectives is only one in a series of efforts underway in the Great Lakes States and Provinces to improve water conservation and efficiency throughout the Great Lakes Basin.

Wisconsin's water use efficiency and conservation goals and objectives will be general and broad in scope and are applicable to the portion of the state located within the Great Lakes Basin. The goals and objectives in themselves will not establish new programs or requirements. Instead, the goals and objectives will assist the State in developing environmentally sound and economically feasible water conservation and efficiency policies and programs that are protective of public health and will help ensure the sustainable use of the Great Lakes.

Because a uniform management approach will not fit all waters, water users, or government agencies, the goals and objectives will provide flexibility to adapt to changing information and conditions.

Building upon this effort, the Wisconsin Department of Natural Resources will work with other state agencies and water users to develop a water use efficiency and conservation program that promotes accountability through administrative rulemaking and reporting, as required by 2007 Wisconsin Act 227, which implements the Great Lakes-St. Lawrence River Basin Water Resources Compact (Compact) in Wisconsin.

### Great Lakes 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.
5. Promoting the efficiency of use and reducing losses and waste of water.

### Wisconsin Mission:

Sustainably manage the quantity and quality of water in the state to ensure that water is available to be used to protect and improve our health, economy and environment now and in the future.

### Wisconsin Adaptation of the Great Lakes Objectives:

- 1. Improve monitoring and standardize data reporting among state and provincial water conservation and efficiency programs.** Collect information that will assist with understanding the waters of the Basin and how these waters are used, and share accurate and comparable information with the public and other states and provinces.
  - Identify and map all streams, lakes, rivers, ponds, springs, wetlands and major groundwater systems including major recharge areas.
  - Monitor water resources and water use patterns to identify and track regional trends.
  - Collect, analyze and report water use information from all user groups.
  - Develop predictive methods for evaluating how the waters of the Basin may be used in a sustainable fashion.
  - Monitor the implementation of best management practices and other efforts to promote sustainability.
  - Make information readily available to the public, including providing information about the waters of the state and water use on a state web site.
- 2. Adopt and implement supply and demand management to promote efficient use and conservation of water resources.**
  - Communicate how to most efficiently use the waters of the Basin.
  - Identify best management practices for different categories of water users.



- Coordinate water use efficiency and conservation programs within the state.
  - Coordinate water use efficiency and conservation programs with ongoing energy efficiency programs and other efforts to reduce greenhouse gas emissions.
  - Develop a mechanism to communicate the importance of water use efficiency and conservation practices with water users.
- 3. Guide programs toward long-term sustainable water use.** Sustain the quantity and quality of the waters of the Basin.
- Use adaptive programs that are goal-based, accountable and measurable.
  - Develop administrative rules for new and increased uses and diversions as defined in the Compact
  - Develop specific conservation and efficiency requirements for new and increased uses and diversions as defined in the Compact. Engage users and coordinate with agencies, tribal governments and other government officials.
  - Fund activities associated with understanding, communicating, planning, and promoting the sustainable use of the waters of the Basin.
  - Periodically review the status of the waters of the Basin, how they are used, and the effectiveness of the management practices.
  - Develop a water conservation and efficiency program for improving the sustainability of the quantity and quality of the waters of the Basin.
  - Develop a process for maintaining and improving the understanding, communicating, planning, and promoting of the waters of the Basin.
  - Develop administrative rules when necessary to implement the water conservation and efficiency program.
  - To the extent possible, seek public input on water conservation and efficiency policies and programs affecting the management and use of the waters of the Basin.
  - Seek a greater understanding of tribal traditional knowledge and practices regarding the importance of water and its sustainable use.
- 4. Develop education programs and information sharing for all water users.**
- Promote improved understanding of the importance of water.
  - Improve public awareness of the importance of water conservation and efficiency.
  - Emphasize educating school children, businesses, and government officials on the economic, societal, and ecological values of water, including sustainability.
  - Seek opportunities to share traditional knowledge and practices of Wisconsin tribes.
- 5. Develop science, technology and research.**
- Develop innovative and timely approaches to address emerging water management issues.
  - Encourage the development of water-related industries and technologies to position Wisconsin as a global industry leader.
  - Identify research and monitoring needs related to the interaction of groundwater and surface waters, and strategies for managing and protecting groundwater.
  - Promote the development of systems and tools for an integrated approach to groundwater and surface water that would predict the effects of water withdrawal, management, and conservation and efficiency practices within the Basin.
  - Leverage the resources of Wisconsin's research institutions to focus on problems affecting the human and natural communities of the Great Lakes, including analyzing barriers to sustainable water use.
  - Foster cooperation and sharing of resources and information among all federal, tribal, state and local agencies as well as with international partners.

## Ohio Recommended Lake Erie Basin Water Conservation & Efficiency Objectives<sup>6</sup>

### 1. Promote the efficient use and conservation of water.

- a. Develop and implement mechanisms to communicate the importance of water use efficiency and conservation practices.
- b. Identify and promote supply, demand, and mitigation best management practices for the various categories of water use.
- c. Identify incentive programs to encourage water conservation and pursue their implementation.
- d. Promote innovative technology for water reuse.
- e. Promote the conservation of existing water supplies to delay or prevent the need for developing additional supply sources.
- f. Promote investment in and maintenance of efficient water infrastructure, including green infrastructure.
- g. Coordinate state agency and local government water use efficiency and conservation programs.

### 2. Guide programs toward long-term sustainable water use.

- a. Develop and maintain water management plans for sustaining the quantity and quality of the waters of the Basin, including the inventorying and assessment of ground and surface water resources, the analysis of water use trends and formulation of long-term water use forecasts, and the development of strategies to incorporate voluntary water conservation practices.
- b. Use adaptive programs that are goal-based, accountable, and measurable and that build upon existing efforts by considering practices and experiences from other jurisdictions.
- c. Develop and implement voluntary water management and conservation programs openly and collaboratively, including local stakeholders, governments, and the public.
- d. Develop programs to encourage voluntary Lake Erie Basin water conservation and efficiency practices.
- e. Develop and implement a process for maintaining and improving the understanding, communicating, planning, and promoting of the waters of the Basin.

### 3. Develop water conservation education programs and information sharing.

- a. Educate school children, businesses, citizens, and government officials on the economic, societal, ecological and qualitative values of water.
- b. Encourage and increase training opportunities in collaboration with professional or other organizations in order to increase water conservation and efficiency practices and technological applications.
- c. Promote the cost-saving aspect of water conservation and efficiency for economic and natural resource sustainability.
- d. Disseminate information regarding identified best management practices for different categories of water use, including evaluation and results achieved.
- e. Compile published information on specific water conservation efforts in Ohio and elsewhere and make it available to the public so that all are aware of how water can be used and conserved.
- f. Ensure equitable public access to water conservation and efficiency tools and information.
- g. Ensure that voluntary conservation programs are transparent and that information is readily available.
- h. Enhance and contribute to regional information sharing; share conservation and efficiency experiences, including successes and lessons learned across the Basin.

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

- a. Support the development of water-related industries and technologies to position Ohio as a global industry leader.
- b. Identify research and monitoring needs related to the interaction of ground water and surface water, and strategies for managing and protecting water resources.
- c. Use scientific data and analyses to improve conservation and efficiency.

- d. Support the development of systems and tools for an integrated approach to ground water and surface water management that would predict the effects of water withdrawal and conservation practices within the Basin and strengthen scientific understanding of the linkages between water conservation practices and ecological responses.
  - e. Leverage the resources of Ohio's research institutions to focus on problems affecting the human and natural communities of the Great Lakes, including analyzing barriers to sustainable water use.
  - f. Foster cooperation and sharing of resources and information among all federal, tribal, state, and local agencies, educational institutions, private sector, and non-governmental organizations, as well as with international partners.
  - g. Support research, development, and implementation of state-of-the-art water conservation technologies, including the identification and sharing of innovative management practices.
- 5. Improve monitoring and standardize data reporting among state and provincial water conservation and efficiency programs.**
- a. Collect, analyze, and report water use information for registered withdrawals in the various categories of water use.
  - b. Make information readily available to the public, including information about the waters the Lake Erie Basin and water use, on a state website.
  - c. Monitor the implementation of best management practices for water conservation and share this information with the public, while protecting proprietary information.
  - d. Improve the measurement and evaluation of water conservation practices; identify and encourage measures to monitor, account for, and minimize water loss.
  - e. Track and publicly report program progress and effectiveness.

## Michigan Water Conservation and Efficiency Goals and Objectives<sup>7</sup>

### 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.
  - 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. Include 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-term 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 in order 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.

## **Minnesota Water Conservation Goals and Objectives<sup>8</sup>**

Minnesota's existing statutes and rules establish programs and measures that are consistent with the water conservation and efficiency goals and objectives adopted by the Regional Body and Compact Council.

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

- a. Ensuring improvement of the Waters and Water Dependent Natural Resources;
- b. Protecting and restoring the hydrologic and ecosystem integrity of the Basin;
- c. Retaining the quantity of surface water and groundwater in the Basin;
- d. Ensuring sustainable use of Waters of the Basin; and
- e. Promoting the efficiency of use and reducing losses and waste of Water.

Minnesota statutes require the Department of Natural Resources to develop and manage water resources to assure an adequate supply to meet long-range seasonal requirements for domestic, municipal, industrial, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes from waters of the state (M.S. 103G.265). Water conservation plays a critical role in balancing the development and protection of Minnesota's water resources. Minnesota's water conservation programs include water supply planning, implementation of measures to improve water use efficiencies, and placing prohibitions or limits on wasteful or inefficient uses of water. These programs guide the review of applications for the use and appropriation of waters of the state.

**Water Appropriation Permits.** A permit is required for all groundwater or surface water withdrawals that exceed in 10,000 gallons per day or one million gallons per year. Applicants for water appropriation permits must evaluate alternatives to the actions proposed in the permit application including conservation measures to improve water use efficiencies and reduce water demand.

**Measuring Withdrawals.** Flow meters are required to measure water withdrawals. Other methods of measurement can be approved based on the type and volume of the appropriation.

**Water Use Reporting.** Permit holders are required to submit annual water use reports and fees based on the volume of water appropriated. The annual water use reporting fee schedule is intended to encourage conservation.

- Increasing block rates for annual volumes over 50 million gallons that range from \$3.50 to \$8.00 per million gallons
- Summer surcharges for municipal use and golf course and landscape irrigation
- Special rates for once-through HVAC systems that use groundwater

**Statewide Drought Plan.** This plan provides a framework of conservation measures and water use priorities for responding to drought.

**Water Use Priorities.** Minnesota statutes establish water use priorities. Nonessential uses are the lowest priority and are subject to restrictions to protect higher priority uses.

**Public Water Suppliers** (serving over 1,000 people)

- Must have an approved water supply plan that addresses emergency preparedness, water sustainability and water conservation.
- Water conservation rate structures are required by January 1, 2013.
- Demand reduction measures that include conservation rates and education programs are required before requesting increases in authorized water volumes or new municipal wells.
- Annual reports provide water use by customer categories and unaccounted water
- Annual water use fees are subject to a summer surcharge of \$30/million gallons for volumes above winter use level.
- Benchmarks for unaccounted water, per capita use, and peak demands were developed in consultation with the American Water Works Association and are used for water supply planning and permitting approvals.

**Soil and Water Conservation Plans.** Failure to implement adequate soil and water conservation measures can result in suspension or termination of a water appropriation permit.

**Landscape Irrigation Systems.** Automated irrigation systems are required to have technology that inhibits or interrupts operation during periods of sufficient moisture.

**Prohibited or Limited Uses.** The use of groundwater for augmenting surface water basins and groundwater use for once-through heating ventilation and air conditioning (HVAC) systems.

## APPENDIX D

### NRDC RECOMMENDATIONS FOR POLICIES THAT SHOULD PRECEDE APPROVAL OF NEW OR ADDITIONAL DIVERSIONS

By December 8, 2013, withdrawals and diversions must be registered and a water management program to regulate new or increased withdrawals and consumptive uses must be developed, per Article 4 of both the Compact and Agreement. Utilities seeking to withdraw new or additional supplies of Great Lakes water that will not be returned to the basin of origin have a special set of responsibilities to demonstrate wise and effective stewardship of water resources and related infrastructure assets. All water efficiency measures that are found to be cost-effective should be fully implemented by such utilities before diversion of Great Lakes water is permitted to take place. NRDC recommends that state policies should require the following four analyses and actions by each utility seeking to divert Great Lakes water:

#### **Pricing to Promote Efficiency**

Communities seeking diversions should go beyond merely eliminating declining block rates and thoroughly explore and implement increasing block rates that are appropriate and equitable for their service area. Summer peaking systems should evaluate and implement seasonal rates.

#### **Determine the Avoided Cost of Water**

A crucial step in balanced planning is an assessment of the costs avoided by reducing water demand, or more simply, the value of saved water. To be useful, such avoided cost determinations must take into account the potential savings of both short-run operating costs and long-run capital costs. A utility's avoided cost methodology and resulting computation of avoided cost should be approved by the state.<sup>9</sup>

#### **Implement All Cost-Effective Water Conservation Measures**

Using the value of saved water as a benchmark, utilities seeking diversions should be required to fully exploit all cost-effective opportunities for saving water within their service area.

#### **Limit Diversions to Amounts that Cannot be Obtained through Efficiency**

The Compact clearly envisions greater use of water efficiency as a water management tool. Just as diversion applicants must make a showing that there are no reasonable supply alternatives to the importation of Great Lakes water, applications for diversions must be limited to amounts that cannot be obtained through locally cost-effective efficiency measures.

It is important to note that the development and application of these policies requires that a legally robust and technically sound decision-making body be established, staffed and funded to oversee and enforce the Compact framework; this institutional requirement will be the subject of a future NRDC analysis.

## APPENDICES ENDNOTES

- 1 See, generally, “Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement,” State of Illinois, State of Indiana, State of Michigan, State of Minnesota, State of New York, State of Ohio, Province of Ontario, Commonwealth of Pennsylvania, Government of Quebec, State of Wisconsin, December 13, 2005; [http://www.cglg.org/projects/water/docs/12-13-05/Great\\_Lakes-St\\_Lawrence\\_River\\_Basin\\_Sustainable\\_Water\\_Resources\\_Agreement.pdf](http://www.cglg.org/projects/water/docs/12-13-05/Great_Lakes-St_Lawrence_River_Basin_Sustainable_Water_Resources_Agreement.pdf). “Great Lakes-St. Lawrence River Basin Water Resources Compact,” States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio and Wisconsin and the Commonwealth of Pennsylvania, December 13, 2005; <http://www.glscompactcouncil.org/Docs/Agreements/Great%20Lakes-St%20Lawrence%20River%20Basin%20Water%20Resources%20Compact.pdf>.
- 2 “Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement,” State of Illinois, State of Indiana, State of Michigan, State of Minnesota, State of New York, State of Ohio, Province of Ontario, Commonwealth of Pennsylvania, Government of Quebec, State of Wisconsin, December 13, 2005, p. 18; [http://www.cglg.org/projects/water/docs/12-13-05/Great\\_Lakes-St\\_Lawrence\\_River\\_Basin\\_Sustainable\\_Water\\_Resources\\_Agreement.pdf](http://www.cglg.org/projects/water/docs/12-13-05/Great_Lakes-St_Lawrence_River_Basin_Sustainable_Water_Resources_Agreement.pdf). “Great Lakes-St. Lawrence River Basin Water Resources Compact,” States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio and Wisconsin and the Commonwealth of Pennsylvania, December 13, 2005, p. 11; <http://www.glscompactcouncil.org/Docs/Agreements/Great%20Lakes-St%20Lawrence%20River%20Basin%20Water%20Resources%20Compact.pdf>.
- 3 “Resolution #5—Adoption of Basin-Wide Conservation and Efficiency Objectives,” Great Lakes-St. Lawrence River Basin Water Resources Council, December 8, 2008; [http://www.glscompactcouncil.org/Docs/Resolutions/GLSLRBWRC\\_Resolution5-BasinWideConservationEfficiencyObjectives.pdf](http://www.glscompactcouncil.org/Docs/Resolutions/GLSLRBWRC_Resolution5-BasinWideConservationEfficiencyObjectives.pdf).
- 4 “Illinois’ Lake Michigan Water Conservation Goals and Objectives,” Illinois Department of Natural Resources, December, 2010.
- 5 “Wisconsin Great Lakes Water Conservation Goals and Objectives,” Wisconsin Department of Natural Resources, December 8, 2008.
- 6 “The Great Lakes-St. Lawrence River Basin Water Resources Compact,” Ohio Great Lakes Compact Advisory Board Final Recommendations to the Governor and General Assembly, December 15, 2010, p. 9-11.
- 7 “Michigan Water Conservation and Efficiency Program: Appendix A – Water Conservation and Efficiency Goals and Objectives,” Michigan Department of Natural Resources and Environment, December 8, 2010.
- 8 “Minnesota Water Conservation Goals and Objectives,” Minnesota Department of Natural Resources, December 8, 2010; [http://files.dnr.state.mn.us/waters/watermgmt\\_section/great\\_lakes\\_compact/water\\_conservation\\_goals\\_20110413.pdf](http://files.dnr.state.mn.us/waters/watermgmt_section/great_lakes_compact/water_conservation_goals_20110413.pdf)
- 9 For one methodology, see *Water Utility Direct Avoided Costs from Water Use Efficiency*, California Urban Water Conservation Council, November 2006.

