Name: James Olson

Date of Submission: July 9, 2015

Location: Traverse City, Michigan

Comments:

Summary of FLOW's Recommendations to IJC on 10-Year Review Report. See attachment.

FLOW

FLOW FOR LOVE OF WATER

JULY 8, 2015

THE FOLLOWING SUMMARY COVERS THE RECOMMENDATIONS SUBMITTED BY FLOW (FLOW FOR LOVE OF WATER, JUNE 30, 2015, "COMMENTS ON DRAFT 10-YEAR REVIEW OF THE INTERNATIONAL JOINT COMMISSION'S 2000 REPORT ON THE PROTECTION OF THE WATERS OF THE GREAT LAKES."

The Great Lakes are threatened with significant current and future systemic harms, some of potentially devastating although uncertain magnitude, others chronically and incrementally interfering with or impairing public and private uses of water and shorelines, and obstructing or thwarting the sustainability of the Great Lakes, their ecosystem and watersheds. The Great Lakes Report of the IJC in 2000 set a goal of protecting the lakes and waters of the Basin from diminishment as a result of diversions, consumptive uses, and to protect the integrity and sustain these waters and ecosystems. The Agreement and Compact address out-of-basin diversions and in-basin consumptive uses to minimize impairment and harm from new or increased existing or future diversions and consumptive uses. It set a standard for decisions by a regional body and imposes a duty on states to do the same. It contemplates assessments of cumulative impacts and consideration of inevitable effects of the uncertain dimensions of climate change.

However, the Agreement and Compact and other laws do not address systemic harms or threatened interference that often fall outside more narrowly focused regulatory frameworks. It has been seen that climate change results in a massive diversion or consumptive use of these waters, and significant harm to the ecosystem. Nutrient runoff and phosphorous, invasive species, widely varying or extreme waters result in similar systemic harms. Increased droughts, storm events, and the "nexus" of intense competition for water sources for food, energy, and population and development threatened to override commitments to protect the Great Lakes, its natural systems, public and private uses, and heavy public investments in harbors, navigation, recreation facilities, drinking supply systems, and habitat projects.

Accordingly, in order to fulfill and critically need for background principles that apply or supplement existing regulatory frameworks or other regimes in a time of uncertainty and potentially high magnitude of systemic harms or threats, the IJC is urged to adopt or incorporate a the public trust doctrine as a backstop or supplementary framework and set of principles. It is recommended that the IJC adopt and encourage states and provinces to exercise a commons or hydrological or water cycle framework and apply public trust principles and standards to address, study, and make decisions and/or recommend laws and policies consistent with these principles. To do so, both countries, the states and provinces, and the IJC will significantly advance the goals and purposes of the Great Lakes 2000 Report, and at the same time strengthen the design and goals of the Agreement and Compact and more fully address or solve the systemic effects

and impacts that harm or threatened the Great Lakes, ecosystems, and the public and private uses, quality of life, and economies that depend on them.

In addition to the above overarching framework, the following specific recommendations are made to strengthen the goals of the IJC Great Lakes 2000 Report. Each of these recommendations, in turn, is uniquely related to the application of a public trust framework and principles; in turn, overarching public trust framework and principles would enhance the effectiveness of these recommendations.

a. Climate Change

The IJC 10-Year Review of the 2000 Report should recommend a reference or other actions to implement protection of Great Lakes water levels, habitat, watershed ecosystems, and the public and private uses that depend on them as follows:

> (I) Recommend a study to implement a standard and protocol to account for the effects and impacts of any diversion, consumptive use, and/or removal of water from the Basin as a result of climate change that are not subject to regulation under the Agreement or Compact or other state licensing or permitting regulations;
> (ii) Incorporate and account for the climate change effects and impacts in the approval of any diversion, consumptive use, or withdrawal of waters of the Great Lakes Basin that are subject to the Agreement or Compact or other state and provincial licensing, permitting or other regulatory actions;
> (iii) Implement as expeditiously as possible a water level/target policy that would act as a benchmark for energy policy within and outside of the Great Lakes Basin. While energy policies and requirements concerning greenhouse gases are outside the scope of the IJC 2000 Report and Reference, activities like climate change that affect water levels, flows, and sustainability are not. Water level targets and a public trust benchmark for the Great Lakes would form the basis for the IJC within the 2000 Report and Reference to educate the public, governments, provinces, and states on the relationship of climate change to the waters of the Great Lakes Basin, and urge energy policies, goals and targets that are consistent with protection of the Great Lakes and ecosystems. A new or supplemental protocol or compact for "Great Lakes Sustainable Water, Food, and Energy Agreement" could considered.

b. IJC Study of Increasing Demand and Shrinking Sources for Freshwater

The 10-Year Review of the 2000 Report should recommend study and application of the precautionary principle to take into account the threats on waters of the Great Lakes Basin as the result of drought, storm and extreme hydrological effects, and the lack of sufficient water supply to meet the demand in various areas of North America or beyond; based on such study the IJC should recommend a continuous IJC study board review as part of the countries and IJC cumulative impact assessment on water levels, flows, and the integrity of the Great Lakes and

their ecosystems; such a study board would report to the IJC on changes in demand, supply, water sources, from human consumption and activities and natural causes, and recommend proactive changes or actions by the IJC, the governments, states or provinces to strengthen protection of the Great Lakes from diversions, uses, and other removals.

c. Scientific Information Based on Hydrologic Cycle

The 10-Year Review of the 2000 Report should recommend study and incorporation of new science methods, tools, and modeling to collect information and conduct analyses based on an integrative or holistic framework that looks at and accounts for the effects and impacts on the connected or common groundwater/surface waters within the Great Lakes Basin from all human uses and activities affecting water and land and other natural processes within and the entire hydrologic cycle.

d. Water, Food, Energy, and Development "Nexus"

It is recommended that the IJC implement a protocol that takes into the competing uses and future demand for freshwater, particularly the waters of the Great Lakes Basin, from agriculture, energy production and fossil-fuel extraction, and thermoelectric facilities, and their effect on water levels, flows, or the ecosystems and watersheds of the Great Lakes Basin; such protocol would include an integrative approach that accounted for the entire or virtual water loss or removal from these uses, and balance these competing demands and uses consistent with the overarching goal that protects the water levels, flows, and ecosystems of the Great Lakes Basin.

e. Water Law and Policy

The 10-Year Review report should recommend the establishment of an independent "Law and Policy Study Board" that assesses and reports to the IJC and the governments on significant changes in water law, such as riparian and groundwater law standards and criteria regarding water use and diversions within and outside watersheds, lakes, or streams, with a goal to maintaining common law and statutory principles that supplement the overall goals regarding diversions, consumptive uses, and protection of the flows, levels, and ecosystems set forth in the IJC Great Lakes 2000 Report.

The IJC should also consider, consistent with the approach taken in the IJC 2000 Report, establishing a "Law and Policy 'Study Board'" that would advise the IJC and its scientific study boards and references on a continuing basis.

f. Public Right to Navigation, Boating and Fishing and Public Trust Principles

The 10-Year Review Report should add a section that recommends the adoption of public trust duties and principles as an overarching framework to protect the integrity of natural flows, levels, ecosystems, and the public and private uses of the navigable waters of the Great Lakes, from human uses and activities within and outside the Great Lakes basin and its watersheds. This will provide a "backstop" to the present 2000 Report and its goals, as well as supplementing existing laws and regulations, and the Agreement and Compact. These principles will also empower governments to implement and apply the recommendations addressed in these Comments. The public trust principles would call for::

(i) Fulfillment of state and provincial and governmental duties to protect and preserve the public rights and trust in these public trust navigable waters;

(ii) Consideration in governmental decisions and actions of the effects and impairment from human uses and activities on these waters and their public uses;

(iii) Prohibit or restrict diversions, consumptive uses, removal of waters of the Great Lakes, or other effects and impacts on quantity and quality of these waters, that would materially impair flows, levels, their ecosystems, and the public trust uses that depend on them.

As noted, in recommendation e. above, the IJC should also consider, consistent with the approach taken in the IJC 2000 Report, establishing a "Law and Policy Study Board'" that would advise the IJC on its actions, references, recommendations, and studies consistent with the goals of the 2000 Report.

g. International Trade Agreements

Because of the increased competition and pressure and demand for water in North America and elsewhere in the world, and the uncertainty of rulings under trade agreements like NAFTA, it is recommended that the 10-Year Review Report urge the adoption of a declaration, resolution, or new guiding principle that puts the public, foreign governments, and investors on "notice" that the two countries, states, and provinces hold and have:

(I) Inherent sovereign, ownership, and/or control as the Crown, in Canada, and sovereign governments, in U.S., over the waters of the Great Lakes Basin, including lakes, streams, groundwater, and hydrosphere, and their ecosystems;
(ii) Hold and manage these waters of the basin within their respective jurisdictions and between them their shared common international boundary waters subject to a paramount public right of navigation, boating, and fishing, and as a public trust for the protection of navigation, fishing, boating, swimming, sustenance, and other public uses and needs associated with these waters;(iii)Hold and manage these waters as a trust that prohibits the transfer, grant, or subordination or impairment of these public trust waters.

As in specific recommendations e. and f., above, new developments and trends in international trade law agreements, decisions, or claims would be included in the work of the "Law and Policy Study Board."

Name: James Olson

Date of Submission: July 9, 2015

Location: Traverse City, Michigan

Comments:

Dear Executive Secretary of the IJC, FLOW is pleased to submit the attached Comments on the IJC 10-Year Review of its 2000 Protect the Great Lakes Report. Thank you for the opportunity, Sincerely, Jim Olson President Liz Kirkwood Executive Director FLOW (Flow for Love of Water) (231) 944-1568 liz@flowforwater.irg

See attachment.

Before the International Joint Commission

Comments on Draft "Ten Year Review of the International Joint Commission's Report on Protection of the Waters of the Great Lakes Basin."

Submitted to the
Office of the International Joint Commission
Ottawa, Canada
and
Office of the International Joint Commission
Washington, D.C.

By James M. Olson and Elizabeth R. Kirkwood
FLOW (For Love of Water)
Great Lakes Water Law and Policy Center
Traverse City, Michigan
June 30, 2015

ABOUT FOR LOVE OF WATER ("FLOW")

For Love of Water ("FLOW") is a 501(c)(3) non-profit organization whose mission is to recognize the Great Lakes as a commons held in public trust for the benefit of current and future generations and to raise public awareness on how public trust principles can counter potential and actual harms to the systemic threats of the Great Lakes. Based in Traverse City, Michigan, FLOW provides technical assistance and conducts legal and policy research on the most pressing water issues affecting in the Great Lakes. FLOW educates and empowers decision-makers at all levels about the role of the public trust and commons as a key stewardship strategies to protecting the Great Lakes as a commons. More information about FLOW and our staff, board, programs, supporters, and events can be found at www.flowforwater.org

ABOUT THE AUTHORS

This report was prepared by James M. Olson (Founder and President, FLOW) and Elizabeth Rosan Kirkwood (Executive Director, FLOW).

James Olson is the founder and President of FLOW, and also is a senior principal of Olson, Bzdok & Howard, and P.C. in Traverse City, Michigan. Jim currently advises on the direction of the organization, and also draws on his legal and policy expertise to guide FLOW. In addition to publishing critical analyses on current and emerging issues, including water, commons, public trust, fracking and systemic threats and solutions for the 21st century, Jim also speaks on behalf of FLOW through a robust schedule of presentations, lectures, and panel discussions. Jim has represented clients, written books and articles, and lectured widely on environmental, land use, water, and public trust law for more than 40 years. He is a graduate of Michigan State College of Law (Detroit College of Law) and has an L.L.M. Degree in public lands, natural resources, and environmental law from the University Of Michigan Law School.

Elizabeth Rosan Kirkwood is the Executive Director of FLOW, managing and directing all programs. Prior to working for FLOW, Liz worked for USAID in Thailand as an environmental attorney to implement a regional environmental governance, water, and sanitation program in Southeast Asia. She also worked as an environmental litigator at Farella, Braun & Martel in San Francisco where she represented clients on natural resource and energy related matters. She graduated from Williams College with a degree in Environmental Studies and History, and received her J.D. and Environmental Certificate from Lewis & Clark Law School.

ACKNOWLEDGEMENTS

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DISCLAIMER

I. INTRODUCTION

On May 13, 2015, the International Joint Commission released its "Draft 10 Year Review"[1] of its 2000 Report on the Protection of the Waters of the Great Lakes.[2] The following comments are submitted to assist the IJC in finalizing its 10-Year Report. They are also submitted to foster the overall protection and sustainability of the Great Lakes under the Boundary Waters Treaty,[3] the 2000 Report, the new Great Lakes Basin-St. Lawrence River Basin Sustainable Water Resources Agreement[4] and parallel Great Lakes Basin-St. Lawrence River Basin Compact,[5] and the Great Lake Water Quality Agreement.[6]

Under the BWT, the IJC has ample authority to prohibit any diversion of the Great Lakes and connecting rivers or channels "affecting the natural flow or level" unless authorized by both countries,[7] and prevent or restore the boundary waters of the Great Lakes and ecosystem from "pollution."[8] The IJC has been charged with both the authority and responsibility to address the systemic threats and continuing harms that plague these waters and the 40 million people who reside around the Great Lakes. The IJC's 2000 Great Lakes Report was a major catalyst for the protection of the Great Lakes from diversions and consumptive uses. The 2000 report resulted in negotiation and signing of the Great Lakes Agreement and the Great Lakes Compact by two provinces and eight states – a stunning achievement that establishes a governance framework with standards to protect these boundary waters from unacceptable diversions and consumptive uses, to implement efficiency and conservation measures, and to evaluate cumulative assessments that improve the basin's overall water management and ecosystem. Beyond the Agreement and Compact, the IJC is charged with a continuing and broader responsibility to assure that the quantity and quality of these waters are not affected or polluted on either side of the border that runs between Canada and the United States.

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[1] Ralph Pentland and Alex Mayer (authors), Draft– May 13, 2015 Ten Year Review of the International Joint Commissions' Report on "Protection of the Waters of the Great Lakes," www.ijc.org/_____. ("hereinafter "Draft 10-Year Report").

[2] IJC, Protection of the Waters of the Great Lakes Final Report of the Governments of Canada and the United States, February 22, 2000. http://www.ijc.org/files/publications/129 [hereinafter "Great Lakes 2000 Report" or "2000 Report"].

[3] Treaty Between the United States and Great Britain Relating to the Boundary Waters Between the United States and Canada, U.S.-U.K., Jan. 11, 1909, 36 Stat. 2448 [hereinafter "BWT"]; more recently, Canada "acclaimed" [formally adopting what had been recognized and followed for nearly 100 years] the Canadian International Boundary Waters Treaty Act, Government of Canada 2001 (Royal Assent 18 December 2001).

[4] Hereinafter the "Great Lakes Sustainable Water Resources Agreement" or "Agreement." <http://www.cglg.org/media/1332/great_lakes-st_lawrence_river_basin_sustainable_water_resources_agreement.pdf >.

[5] Hereinafter the "Great Lakes Compact" or "Compact." <http://www.greatlakes.org/document.doc?id=144>.

[6] Hereinafter the "GLWQA."

[7] Each country reserved "exclusive jurisdiction and control over use and diversion" within their country (Article II) subject to review of "use, diversion or obstruction" that would "affect water levels or flows on the other side of the boundary. Article III.

[8] Article II.

Water itself knows no boundaries. As recognized by the Great Lakes Agreement and Compact, water moves in a singular hydrologic system[9] defined by its arcs – from precipitation to ground and surface water, from wetlands and tributaries like springs, creeks, and streams to our Great Lakes, from the St. Lawrence River and finally out to the ocean, again – and all of the time taken up by plants, evaporation, and human intervention, as well as continuously affected by natural processes and other human activities, such as fossil-fuel energy production, automobile travel, building development and design, and agriculture. Each activity affects the arc and the whole of the water cycle, and in turn, impacts the lakes, their ecosystems, and the life that depends on them.

In this second decade of the 21st century, it is more evident than ever that the Great Lakes face unprecedented systemic threats that have fallen outside the reach of current laws and policies. These threats, including climate change, extreme weather, and fluctuations in flows and levels, phosphorous-loading and harmful algal blooms, invasive species such as quagga mussels and Asian carp, persistent plastic and toxins, and ultimately, the soaring demand for a finite water supply in the basin and beyond for drinking water, food, energy, and development that contradicts the fundamental understanding of water as part of a common shared water system[10] and not an asset on a balance sheet. These are the challenges we face today and for the next decades, these are the challenges to which we must continue to respond, and these are the challenges to comprehensively address in the 2015 IJC's 10-Year Report.

Therefore, FLOW submits these Comments to assess the Draft 10-Year Report, and then to address the challenges and recommendations to seek collaborative solutions to these systemic harms and threats that lay ahead. First, these Comments summarize and place into perspective some of the key findings and conclusions of the Draft 10-Year Report. Second, the Comments present additional recent or future developments on each of the issues or concerns followed by specific comments for each of these issues or concerns. Third and final, FLOW submits a number of specific recommendations and a concluding overarching recommendation to supplement the Agreement, Compact, and the IJC's original 2000 Report and subsequent reviews.

A. THE IJC DRAFT 10-YEAR REPORT

[9] Compact, Sec. 1.3 [Findings] (1)(b): "The Waters of the Basin are interconnected and part of a single hydrologic system."

[10] As discussed later in these Comments, it should be recalled that under the common law of the states and province of Ontario and the civil law of Quebec, ownership or sovereign control over a body of water is considered public or *communis*, and the right to use water, a usufruct connected with land or with a recognized shared use as a citizen or member of the public. See Madeleine Cantin Cumyn, *Issues in Environmental Law: Joint McGill-Vermont Law School Workshop on Water*, 34 VT. L. REV. 858, 861-863 (2010). Like air and wildlife, water is always moving and has been considered a commons in western common and civil law since the Justinian Code. J. Inst. 2.1.1; *Arnold v Mundy*, 6 N.J.L. 1 (1821); *Illinois Central Railroad v Illinois*, 146 US 387 (1892); James M. Olson, *All Aboard: Navigating the Course for Universal Adoption of the Public Trust Doctrine*, 15 VT. J. ENV. L. 148-151 (2014). Canada and the provinces recognize in some form that water is public or held by the Crown, although the courts have also recognized a public right to use and enjoy navigable waters for navigation and fishing, and early decisions described government's obligation as a "trust" to protect this public right. *Id.*, see also Sec. II, C, "The Right to Public Use of Navigable Waters in Canada," pp. 164-166.

The Draft 10-Year Report is the result of a serious commitment by the IJC and its authors to critically review the status of its efforts to protect the Great Lakes since its previous reports, recommendations or other actions to adapt to changing circumstances or conditions that affect flows and levels, pollute or threaten the ecosystem and public or private uses of these waters. The Draft 10-Year Report evaluates several categories or issue areas, following the general framework of the IJC's 2000 Report and its first 2004 review report.[11] Those areas include findings, recommendations, and identification of remaining issues on the following: recent and future developments, legal and policy considerations, management and decisions concerning diversions and exceptions, such as the proposed Waukesha diversion (Wisconsin's request for the delivery of 10.1 million gallons of water out of the basin) to "straddling communities, consumptive uses, international trade law,[12] new scientific knowledge or data, cumulative impact assessments, climate change, groundwater, and steps to implement conservation measures.

The Draft 10-Year Report highlights that cooperation between the states and provinces, and the governments of Canada and the United States have considerably advanced the goals of protecting and sustaining the waters and ecosystem of the Great Lakes Basin.[13] Moreover, the report concludes that "the Compact and Agreement provide a level of overall protection similar

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[11] See e.g., Draft 10-Year Report, Exec. Summary, pp. 4-1; Protection of the Waters of the Great Lakes, Review of the Recommendations of the 2000 Report, (IJC, August 2004).
In the two decades leading up to the IJC's 2000 Great Lakes report, several proposals surfaced to divert water from Lake Superior or Lake Michigan to the western part of the United States, including proposals to increase the Chicago Diversion to address low water levels and navigation in the Mississippi River, diversion of water to the southwest, and a pipeline to divert water to Wyoming for coal extraction and transport as a slurry back to the Great Lakes region. In response, the provinces and states around the Great Lakes took action that resulted in signing in 1985 of the Great Lakes Charter. The 1985 charter while not legally binding pledged the faith of the provinces and states to protect the waters within the Great Lakes basin from large diversions or exports out of the Great Lakes Basin. The provinces and states also recognized that water in the basin was public and held in trust for citizens, and that management, protection and conservation of these waters and the integrity of the ecosystem are equally important goals. On the United States side, the collaboration between the states that led to the charter also led to the adoption of the Water Resources Development Act (WRDA) of 1986. The WRDA imposed an outright ban on any diversions unless consented to by all eight states bordering the Great Lakes. After the 2000 Report, Canada granted royal assent (gave legal effect to) to the Canadian International Boundary Waters Treat Act on December 18, 2002.

[12] Dan Behm, "Preliminary DNR Blessing Moves Waukesha Great Lakes Water Bid Forward," MILWAUKEE JOURNAL SENTINEL, (Jun. 25, 2015) <http://www.jsonline.com/news/waukesha/preliminary-dnr-blessing-moves-waukesha>; Garret Ellison, "Wisconsin City Clears First Hurdle in Bid to Divert Great Lakes Water," MICHIGAN LIVE, (Jun. 26, 2015) < http://www.mlive.com/news/grand-rapids/index.ssf/2015/06/waukesha_diversion.html > ; National Wildlife Federation, "Lake Michigan Diversion Application Review Released by Wisconsin DNR," Press Release, (Jun. 25, 2015) < http://www.nwf.org/News-and-Magazines/Media-Center/News-by-Topic/Wildlife/2015/06-25-15-Lake-Michigan-Diversion-Application-Review-Released-by-Wisconsin-DNR.aspx>. In addition to approval by Wisconsin DNR, the "straddling county" request will be the first full review of one of the exceptions to the diversion ban under the decision-making standard of the Compact.

[13] 2015 Draft-10-Year Report, p. 68.

to that recommended by the IJC in 2000," and also "provide a solid foundation for managing Great Lakes diversions and consumptive uses into the foreseeable future."[14]

Generally, the Agreement and Compact (1) protect the Great Lakes from new or increased out-of-basin water diversions; (2) allow for narrow exceptions for public water supply diversions that straddle community or county boundaries under fairly stringent standards, including return flow; (3) obligate states and water users to a water management regime and decision-making standard for withdrawals and consumptive uses; (4) establish obligations to create conservation measures; and (5) implement a governance process that allocates authority between a regional body for new or increased large quantity withdrawals and consumptive uses based on review, cumulative impact, and conservation efforts to protect the integrity or sustainability of the ecosystem.

However, the authors of the Draft 10-Year Report also caution that "there is substantial uncertainty regarding factors such as future changes in consumptive use, and changes in water supply due to climate change. This – and the prospect of adverse cumulative impacts of new human interventions – suggests a need for great caution in dealing with factors that are within the control of Basin Managers, such as adaptive management protocols, improved monitoring, and continual improvements in our knowledge of basin hydrology."[15]

The Draft 10-Year Report also recognizes the issues and concerns over the "straddling community" and "straddling county" exceptions to the diversion ban in the Compact. Waukesha, Wisconsin, a suburb of Milwaukee, other communities, and more recently Waukesha County, have applied to the Wisconsin Department of Natural Resources for approval of its request to the City of Milwaukee to supply 10.1 million gallons of water from Lake Michigan to communities and developments outside the basin.[16] The "straddling county" exception may not cover multiple communities represented by a public water supply company, and there are significant questions concerning distinctions between serving communities with need, additional towns without need, and private future development, new land uses, and sprawl.[17]

Finally, the Draft 10-Year Report identifies significant questions involving the interpretation of standards, the implementation of conservation measures, and whether the scope of cumulative impact assessment is scaled to lake-wide and watershed levels to protect the integrity of the Great Lakes ecosystem.[18] This also includes important questions concerning the process and procedures that govern regional review and approval by the Regional Body under the Compact.[19]

B. FLOW COMMENTS

As a whole, FLOW agrees with the findings and recommendations in the Draft 10-Year Report. However, FLOW submits that the IJC's 10-Year Review and Final Report also should emphasize

[14] The Compact was enacted as state law by all eight states, and finally approved by the United States Congress and signed by the President in 2008, Pub. L. No. 110-342, 122 Stat. 3739 *et seq*. (2008).
[15] Draft 10-Year Report, p. 18.
[16] See *supra* note 12.
[17] *Id.*
[18] Draft 10-Year Report, pp. 48.
[19] Compact Sec. 4.5. [Regional Review].

and address several other dramatic recent changes and new developments that do or are likely to impact levels, flows, the overall ecosystem, public and private uses of the Great Lakes, and exert pressure on the Agreement and Compact from both positive and negative shifts in common and statutory law and an up-tick in private investor trade law claims. To address these dynamic forces and changes at work, the IJC also should consider establishing an overarching commons and public trust framework[20] in its 10-Year Report. This framework, in turn, will advance the goals of the 2000 Great Lakes Report and supplement the Agreement and the Compact to protect the integrity of these extraordinary boundary waters.

1. CLIMATE CHANGE, EFFECTS, IMPACTS, AND ADAPTATION AND MITIGATION

Climate change causes or contributes to extreme effects on water levels and flows, including low levels and resulting impairment of fish, fish habitat and spawning, birds and habitat, and impacts to coastal wetlands. Land use and development result in clearing of forests, trees, vegetation, and storm water management with a change in run-off and recharge patterns, which in turn alter flows and levels, and/or increase flooding.[21] Many human actions, such as release of greenhouse gases from fossil fueled thermo-electrical facilities, have direct hydrological effects and impacts. As a result, human activities and climate change with extreme changes in hydrological conditions, whether drought or increased evaporation or precipitation and storm events, in effect, result in an essentially "diversion" or removal of water from the Great Lakes or their tributary waters.

a. Recent and Future Developments

Climate change has and in the future will likely drop water levels in some areas of the basin from one to four feet.[22] The Chicago diversion at 3200 cubic feet per second drops surface water of the affected Great Lakes by two inches. At times of low water levels in Lake Michigan and Lake Huron that fall within the historical range (approximately 6 feet) of recorded water levels for the Great Lakes, the impact of climate change over two feet is critically significant in terms of effects or impacts on wetlands, shipping, boating, fishing, and tourism.[23] These impacts, in turn, interfere directly with public and private use and enjoyment and result in substantial costs in terms of dredging, harbor access, navigation, and loss of commercial revenues.[24] Climate change impacts also manifest with high water levels, increased evaporation, or intensified or more frequent precipitation or storms. Together, climate change impacts and human activities

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[20] See Section 6, *infra*, Public Trust Comment and Recommendation.
[21] *4 Degrees: Turn Down the Heat: Climate Extremes, Regional Impacts and the Case for Resilience*, (Report for World Bank by Potsdam Institute for Climate Research and Climate Analytics (June 2013).
[22] See *supra*, note 31; Noah Hall and Bret Stuntz, *Climate Change and Great Lakes Water Resources.* National Wildlife Federation, Washington DC (November 2007), at pp. 7-9, http://online.nwf.org/site/DocServer/Climate_Change_and_Great_Lakes_Water_Resources_Report_FI.pdf *citing* Solomon et al., "Climate Change 2007, Intergovernmental Panel on Climate Change, "Frequently Asked Questions, http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG_Pub_FAQs.pdf; *Climate Change and Water Quality in the Great Lakes Region*, p. 5 (Great Lakes Water Quality Board, IJC 2003) [hereinafter NWF CLIMATE CHANGE].
[23] *Id.*
[24] *Id.*

and developments result in significant alteration of groundwater recharge, runoff to surface waters, and accompanying loss of public and private uses and high costs.[25]

A credible World Bank report, "*4 Degrees: Turn Down the Heat,*" compiled and protected the devastating impacts on coastal populations, food production, drinking water, water supplies, human health, ecosystem and wildlife loss, and wetland and habitat loss.[26] As one leading journalist observed: the earth is striking back and demonstrating its "unyielding power and its increasingly dangerous capacity to push back hard."[27]

These effects and impacts of climate change are magnified by roving droughts, such as the devastating record drought in California and other parts of the Western U.S. and Canada, China, the Middle East, and other areas around the world.[28] Climate change impacts are also magnified by storms, including Hurricane Katrina, Hurricane Sandy, Typhoon Haiyan in the Philippines, and deadly landslides and floods throughout the world that reflect the seriousness of extreme weather events coupled with poverty, lack of management or apathy, and inadequate human design, planning, or response.[29] Predicted increased temperatures continue to shrink ice caps, alter wetlands and other coastal habitats, raise sea levels, and intensify rates and volumes of evaporation, removing water on the surface of the earth to currents of "rivers" of water in the hydrosphere, alter agricultural zones, fauna and animal habitats zones.[30] Depending on the report or study, climate change will significantly affect and likely reduce water levels in some areas of the Great Lakes boundary waters by one to four feet as a result of increased evaporation and changes in precipitation.[31] Lower or extreme changes in lake levels impact or impair shorelines, coastal wetland and bird habitats, forests, fishing spawning grounds and habitats, fish reproduction, boating, shipping, swimming, beaches, and other recreational activities.[32]

Not surprisingly, the U.N. studies and reports on the effects of climate change are "all about water"[33] and call for nation-states in a nearly SOS-like message to take immediate action to

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[25] Hurricane Katrina and Tropical Storm Sandy are strong evidence of these impacts and costs.
[26] *4 Degrees: Turn Down the Heat*, *supra* note 21.
[27] Keith Schneider, "Earth Pushes Back," Circle of Blue, Nov. 3, 2014. http://www.circleofblue.org/waternews/2014/commentary/editorial-in-the-circle-fresh-focus/earth-pushes-back/.
[28] *4 Degrees: Turn Down the Heat*, *supra* note 21.
[29] Keith Schneider, "Warnings – They are so Easy to Ignore," Circle of Blue, April 1, 2104. http://www.circleofblue.org/waternews/2014/commentary/editorial-in-the-circle-fresh-focus/warnings-easy-ignore/.
[30] *4 Degrees: Turn Down the Heat*, *supra* note 21, Chpt. 2, Fig. 6.3, and text, pp. 152-155.
[31] Compare 4 to 6 degree F increase in temperature by 2041 to 2070, Draft 10-Year Report, p 52, with 7.2 to 9 degree F (4 degree C) in the NWF CLIMATE CHANGE, *supra* note 23. Temperature increases, despite fairly constant but variable precipitation, reduce ice cover and significantly trigger more evaporation in fall time periods; thus increased temperature, extreme variations in precipitation, and loss of ice cover have significant downward-effect on water levels (Freshwater Summit, Grand Traverse Watershed Center, Dr. David Hyndman, Dean, Department of Geology, Michigan State University, Oct. 31, 2014 <http://www.gtbay.org/2014/09/07/fws2014/>).
[32] IJC Draft 10-Year Report, pp. 50-51; Great Lakes 2000 Report, p. 24-25; NWF CLIMATE CHANGE.
[33] Jesse Reiblich and Christine A. Cline, *Climate Change and Water Transfers*, 41 PEPP. L. REV. 439, 441 (2014) (The authors present a timely survey of the common law and statutory framework of states and

reduce greenhouse gases, mitigate climate change, and implement adaptation and resilience-like measures. The U.N. warns states and countries who remain apathetic with a blunt statement: "[I]gnoring global warming is not an option."[34]

b. Comments and Recommendations

Both the Agreement and Compact mandate that the Regional Council conduct a cumulative impact assessment every five years that gives substantive consideration to climate change and take into account uncertainties.[35] Similarly, the IJC's 2000 Report and the Draft 10-Year Report also caution the need to increase knowledge and adaptive responses related to climate change.[36] Accordingly, it is essential that the IJC establish an affirmative and comprehensive policy and program to address the effects on water levels and the ecosystem of the Great Lakes from climate change.[37] To date, international, federal, and state efforts to address climate change have focused primarily on limiting greenhouse gases in the atmosphere through reductions of CO^2.[38] One energy agency has warned that temperature increases have gone off course, with inevitable untold impacts world-wide, chastising governments for not doing enough.[39] Despite these warnings, the U.S. Supreme Court's decision is hot off the press as of yesterday, blocking part of EPA's efforts to reduce greenhouse gases and CO^2 levels under the Clean Air Act.[40]

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their ability to assess and respond in the context of water transfer authority to the alarming effects and impacts of climate change).

[34] *Id*., at 440.

[35] Compact, Sec. 4.15(1)(b).

[36] Great Lakes 2000 Report, pp. 23-25; 2015 Ten-Year Report, Sec. 2.2, pp. 52-54. The authors recommend that: "Reductions in uncertainty in future hydro-climate conditions will greatly assist in assessing cumulative impacts of climate change on lake levels." *Id*; but see dire call for action expressed by Reiblich and Kline, "Climate Change and Water Transfers," *supra*, pp. 440-442; Fifth Assessment, International Governmental Panel on Climate Change, *supra* notes 22, 33.

[37] International Joint Commission, *Building Collaboration Across the Great Lakes – St. Lawrence River System: An Adaptive Management Plan for Addressing Extreme Water Levels* (May, 2014) <http://www.ijc.org/files/publications/FinalReport_AdaptiveManagementPlan_20130530.pdf>. Water level targets tied to climate change predictions and reduction, mitigation could be tied into the water level plans and study board work, evaluation, and adaptive management responses as part of its on-gong adaptive management strategy.

[38] See *Massachusetts v. EPA*, 549 U.S. 497 (2007) (holding that CO^2 is subject to the Clean Air Act); *Utility Air Regulatory Group v EPA*, 134 S. Ct. 2447 (2014) (holding EPA could not submit all stationary and mobile sources of CO^2 to permit requirements, although it could impose "best available control technology" to address greenhouse gases). EPA can and must regulate CO^2 emission under the Clean Air Act, but it may not exceed its authority or the intent of Congress in its actions to limit or reduce CO^2 in the atmosphere. A more comprehensive approach is needed to address effects of climate change on water bodies like the Great Lakes. The Clean Water Act addresses water quality, not quantity, and has no air pollution component. Essentially, while science can demonstrate cause and effect between air impacts and water quantity and quality, there is no law that ties and addresses this interconnection in a holistic or integrative manner.

[39] Chris Mooney, *"The World Is Off Course to Prevent Two Degrees C of Warming, Says Energy Agency,"* THE WASHINGTON POST, June 14, 2015 <http://www.washingtonpost.com/news/energy-environment/wp/2015/06/14/the-world-is-off-course-to-prevent-two-degrees-c-of-warming-iea-says/>.

[40] *Michigan et. al. v. EPA*, __ U.S. __ No. 14-46 (decided June 29, 2015) http://www.supremecourt.gov/opinions/14pdf/14-46_10n2.pdf

Current focus is unduly narrow and fragments reductions in greenhouse gases, such as CO^2 in the atmosphere, from protection of water levels, wetlands, habitats, and losses in shipping, tourism, public and private property uses and values, and recreation.

The BWT recognizes boundary waters like the Great Lakes are shared between the U.S. and Canada. In final analysis, the treaty and obligations of the IJC are also "all about water" – the effects on flows or levels from "diversions" and pollution. From the perspective of the surface of the boundary waters of the Great Lakes, climate change has affected levels and flows more than any other diversion.

The Compact declares that the "waters of the Basin" [41] are "precious natural resources shared and held in trust by the states."[42] The Agreement declares that these waters are a "shared public treasure and the States and Provinces as stewards have a shared duty to protect, conserve and manage these renewable but finite waters."[43] The states and provinces have a shared responsibility "to protect, conserve, restore, improve and manage the waters… for the use, benefit and enjoyment of all their citizens, including generations yet to come."[44] Removal of water from climate change processes could be considered a substantial "diversion" from the Basin, but it is unlikely that the processes would meet the definition of "diversion."[45] However, climate change and evaporation processes to the extent they are attributed to human activities directly affecting the hydrologic cycle, including the water levels, flows, and water quality in the Great Lakes, may fit the definition of "consumptive use." The Agreement and Compact define "consumptive use" as the "portion of… water withheld from the Basin due to evaporation, incorporation into Products, or other processes."[46]

A portion of the water withdrawn for steam electrical generating is not returned due to evaporation.[47] Generating plants that burn fossil fuels also contribute greenhouse gases that result in changes in water levels and groundwater recharge, which impact the sustainability of water uses and coastal and shoreline ecosystems.

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[41] Sec. 1.2, 122 Stat. at 3742 ("Waters of the Basin" means "Great Lakes and all streams, rivers, lakes, connecting channels and other bodies of water, including tributary groundwater").
[42] Id., Sec. 1.3(1)(a), at 3742.
[43] Great Lakes Sustainable Water Resources Agreement, Preamble, pp. 1-2. The provinces and states also committed to taking affirmative actions from climate and cumulative effects or demands on water. "In light of possible variations in climate conditions and the potential cumulative effects of demands that may be placed on the Waters of the Basin, the States and Provinces must act to ensure the protection and conservation of the Waters and Water Dependent Natural Resources of the Basin for future generations." *Id*. The Draft 10-Year Report, Cumulative Impact Assessment, pp. 40-48. The Draft Report reviews cumulative effects from variations in water levels, and the need for continued collection of data and scientific knowledge to manage diversions (exceptions), consumptive uses, and withdrawals or other removals, including increased temperatures and evaporation from greenhouse gases and climate change.
[44] *Id*., Sec. 1.3(1)(b).
[45] Compact Sec. 1.2.
[46] Sec. 1.2, at 3740.
[47] See Sec. 4.a(3) *infra*.

Accordingly, it would be prudent and entirely consistent with the BWT and 2000 Report for the IJC to set target water level ranges to protect each of the Great Lakes and their lake and shoreline ecosystems by recommending that governments adopt these targets and enact regulations to enforce these targets in all applicable water, natural resource, and energy permit and approval processes.[48]

In the alternative, the IJC could encourage federal governments, states, and provinces, and local governments to take actions to reach or maintain these water level targets through a "Great Lakes Sustainable Water and Energy Nexus Compact"[49] to reach agreement on these levels and enforce them through commitment to greenhouse reductions, and corresponding energy conservation, efficiency, forestation, and renewable energy goals. Moreover, the IJC should recommend as a water/energy "nexus" policy[50] that Canada, the United States, and other countries include protection of water levels and flows, as well as related ecosystems and human health, food, economies, and recreation as a driving component of meeting targets to reduce the effects from climate change.

In addition, the IJC and final report should urge parties to the Agreement and Compact to supplement the diversion, consumptive use, cumulative impact assessment, and conservation goals and decision-making standards with guidelines on assessment of water levels related to climate change in determining whether to approve an application to withdraw or consume water from a watershed that is subject to regulation under the Agreement and Compact, or other natural resource and energy regulations of the states and provinces.

Finally, the IJC should separately consider adding a new "guiding principle" for decisions and references under the BWT and including in its 10-Year Review Report a recommendation that the IJC, governments, states and provinces focus on water as a commons to address climate change and follow (1) a comprehensive scientific approach based on a hydrological or water cycle model for the Great Lakes Basin, lake-sheds, and watersheds, and (2) commons framework based on the public trust doctrine[51] or the public's paramount right to navigation, fishing, and boating in the Great Lakes or *l'etat guardian de patrimoine commun* that to protect

[48] Adaptive Management Plan (IJC 2014), *supra*; James Olson and Elizabeth Kirkwood, "Comments to the IJC on Draft Adaptive Management Plan for Addressing Extreme Water Levels (FLOW, April 15, 2013), pp. 3, 8-9.

[49] See discussion of the emerging science and policy surrounding the "water, energy, food nexus," Sec. 4 *infra*. An energy and water "nexus" compact or agreement could provide a framework, principles, and standards that could be managed by the Regional Body and Regional Council under the Great Lakes Agreement and Great Lakes Compact. This would ensure an integration of food and energy demands and uses of water, within and without the basin, into the body's and Regional Council's Great Lakes diversion, use, and removal of water , scientific data and information, climate change, cumulative assessment, and groundwater issues. Short of such a new agreement of compact, the IJC could study and recommend the integration of these issues by the Regional Council, largely because they bear directly on the protection of the Great Lakes and the integrity of watersheds and ecosystems.

[50] *Id*.

[51] Maude Barlow and James Olson, Report to the International Joint Commission on the Principles of the Public Trust Doctrine, November 30, 2011, pp. 8-25, 28-31.

the uses and ecosystem of the Great Lakes described more fully in Section 6 and the Conclusion to these Comments.[52]

2. INCREASING DEMAND AND DECREASING SOURCES FOR WATER

a. Recent Events and Developments

Approximately 1 billion people are without enough safe freshwater.[53] World population will grow by another 2 billion people by 2050, with potentially another billion without safe drinking water. Demand for water will outstrip freshwater supplies by as much as 30 to 40 percent in 2040.[54] The demand for food production and stress and impacts from climate change will exacerbate the crisis.

Droughts like California or in other areas of the west are not only having a devastating effect on drinking water, development, farming, energy extraction, but a dramatic impact on water law and policies.[55] Droughts in other parts of the world cannot be ignored,[56] both because of climate change impacts, shifting food production demands for soil and water, and pressures for foreign land and farming investment, which would include investment expectations in the right to use water through acquired ownership or control of land. Everything is on the table, and this raises uncertainty about the federal authority and role in water allocation in the United States. Moreover, these droughts, which are expected to be more frequent because of increasing temperatures and more frequent hot and variable weather and precipitation events,[57] the demand for drinking water, public water supplies, energy production and extraction, and farming and food has or will exhaust traditional water sources, such as snow melt, reservoirs, and groundwater.

In short, while California and other states at least initially seek to solve this devastating water crisis internally through increased conservation and water management strategies,[58] the

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[52] Olson, *All Aboard*, supra, n10 at p. 145, and text at p. 166.

[53] Study by Denmark's Aarus University, Vermont Law School and US Center for Naval Analyses. www.rt.com/news/17628-world-water-crisis-2040; Water.org www.water.org/water-crisis/one-billion - affected/; "Water Crisis," "Agricultural Crisis," Environmental Crisis," "Increase in Tension," www.worldwatercouncil.org/library/archives/water-crisis/.

[54] *Id*., rt.com/news/ "world-water-crisis-2040."

[55] "Drought is Only One Explanation for California's Water Crisis," World Resources Institute, March 27, 2014 (Climate change worsens complex, vulnerable water management systems and laws already vulnerable to slight changes in state and Colorado River water supplies. In the future or long-term, California will have to reduce growth and demand for water [FLOW Comments' author's note "or import it]). Governor Brown has launched $ 687 million plan to conserve and recycle water.

[56] Keith Schneider, "Water Challenges Asia's Rising Powers," YALE GLOBAL, July 12, 2011. http://yaleglobal.yale.edu/content/water-challenges-asia-powers-part-i.

[57] Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment, Summary for Policy Makers, Working Group III, SMP 1.3, SMP 2.2, April 13, 2014.; see also *4 Degrees: Turn Down the Heat*, *supra* note 21.

[58] A. Maddocks, P. Rieg, and F. Gasert,*"Drought Is Only One Explanation for California's Water Crisis*," World Resources Institute (April 8, 2014) < http://www.wri.org/blog/2014/03/drought-only-one-explanation-california%E2%80%99s-water-crisis>; *see also* California Sustainable Groundwater

increasing intensity and duration of droughts of this nature will undoubtedly trigger unprecedented political pressure for a national water policy that would allocate or divert water from one region of the United States to another.

b. Comments and Recommendations

The Draft 10-Year Report concludes that "the Agreement and Compact, if fully and rigorously implemented, will provide a solid foundation for managing Great Lakes diversions and consumptive uses into the foreseeable future."[59] It also concludes that the current magnitude of consumptive uses is smaller than the level of uncertainty in water balance components," and "[u]nless proposals for new consumptive uses or diversions are substantially larger than current levels or the science of lake hydrologic balances improves, the impacts of these proposals … will be too small to estimate."[60] Elsewhere, the Draft 10-Year Report notes that no new diversions have occurred or been sought, except for those inside or for a county that straddles the basin divide like Waukesha, Wisconsin. Finally, the Draft 10-Year Report notes that "the mega-diversion era ended in the United States with the central Arizona Project in the 1970s," but that "climate change and other unforeseen circumstances could conceivably change the calculus in North America."[61] As a result, the Draft 10-Year Report cautions that the precautionary approach adopted in the Agreement and Compact to deal with diversion proposals "should continue to be employed by the Great Lakes states and provinces in order to protect the Great Lakes from an ever-increasing number of large-scale removals."[62]

Because of the magnitude and forecasted magnitude of more frequent and variable droughts around the world, not only should the Draft 10-Year Report recommend continued application of the precautionary principle, it should incorporate into the report the growing uncertainty of the political climate along with droughts and water scarcity in other parts of North America and the world. Another drought in the U.S. such as Texas in the past several years in addition to California's extreme water shortages and management crisis could push political levers in the U.S. toward a national water allocation policy that could result in undermining the Agreement and Compact. While Canada has its own prohibition on bulk water diversions out of the Great

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Management Act. Senate Bill 1168, Assembly Bill 1739, Senate Bill 1319 are a package of bills that allows state government to intervene to require future groundwater plans, allocate groundwater between users, and regulate, limit or suspend groundwater removals. Compare British Columbia's Water Sustainability Act, (Bill 18, 2008) which amends the B.C. Water Act, which previously governed surface The B.C. law reaffirms Crown ownership of groundwater, prohibits any diversion or removal from an aquifer without a license, and allows for "reservations" of water for future use. It must be remembered that both California and B.C. follow an underlying common law appropriation doctrine, which allows for water rights and transfers of surface water based on "first in time" approach. Both laws either require consideration or set standards for stream flows for environmental purposes. See Randy Christensen and Oliver M. Brandes, *California's Oranges and B.C.'s Apples: Lessons for B.C. from California Groundwater Reform.* Victoria, Canada: POLIS Project on Ecological Governance, University of Victoria/Ecojustice. <http://poliswaterproject.org/sites/default/files/OrangesApples_FINALWeb_0.pdf>.

[59] Draft 10-Year Report, p. 4.

[60] *Id*., p. 8.

[61] *Id*., p. 32.

[62] *Id*.

Lakes and other watersheds, pressure in the U.S. and elsewhere for water may in turn cause the U.S. states to put pressure on Canada.

Under the Agreement and Compact, diversions over 20 liters or 5.7 gallons are banned, with straddling, humanitarian and discrete exceptions. Efforts to allocate or divert water to the southwestern U.S. or migration by agricultural business to the Great Lakes could put additional pressures for consumptive uses, diversions, or legal claims under the "interstate commerce clause" in the U.S. or private investor claims under NAFTA as to both the U.S. and Canada. Accordingly, while the Compact and Agreement appear to be solid at this point in time, the precautionary principle would point toward the study and establishment of a supplemental basis or "backstop" to these types of claims.[63]

In addition, the IJC, states and provinces should evaluate their current riparian, stream, lake and groundwater common law and/or statutes to reclaim the traditional common law limitation on diversions or transfers of water for sale out of watersheds.[64] While this is not generally an outright prohibition in every circumstance, under eastern U.S. riparian and groundwater law diversions or off-tract transfers of water are prohibited where the removal of water would measurably diminish or impair the flow or level of a stream or unreasonably interfere with other riparian or groundwater uses.[65] Again, similar to public trust principles, an assertion by a private investor of protected rights or interests to use water under NAFTA or other trade law would be limited where the right to use water is restricted by common law watershed or state sovereignty.[66]

Combining climate change predicted effects and target water levels for the Great Lakes with review of water diversions or consumptive uses under state riparian, groundwater, or public trust law and/or the Compact or Agreement would add a an applicable legal limit on the extent of any such right, because of identifiable protected or baseline levels or flows for the Great Lakes, tributary streams and groundwater.

3. SCIENTIFIC ADVANCES IN MODELING AND ANALYTICS

The Draft 10-Year Report addresses water quantity and quality issues related to groundwater from aquifers in the Great Lakes Basin. Canada and the United States initiated Annex 8 (Groundwater) to the GLWQA in 2012. Annex 8 mandated a report in 2 years (a report every 6

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[63] Scott S. Slater, *"State Water Resource Administration in the Free Trade Agreement Era: As Strong As Ever,"* 53 WAYNE L. REV. 649, 653-655 (2007).

[64] See discussion of water law developments in Sections 5, *infra*.

[65] See Section 7, *infra*, these comments. For riparian law examples, see *Hudson County Water Company v. McCarter*, 209 U.S. 349 (1908) (holding that states retain control over whether and how to manage, use, or transfer water, free from interference from the claim of others); *Kennedy v Niles Water Supply Co.*, 173 Mich. 474, 139 N.W. 241 (Mich 1913). For groundwater law examples, see *Schenk v City of Ann Arbor*, 196 Mich 75; 163 NW 109 (1917); *Smith v. Brooklyn*,18 App. Div. 340 (N.Y. App. Div. 1897); *Collens v New Canaan Water Co.*, 234 A. 2d 825 (Conn. 1967).

[66] *Hudson County Water Co. v McCarter*, 209 U.S. 349 (1908)(based on sovereign commons and state water law, reversed on other grounds in *Hughes v Oklahoma*, 441 U.S. 322 (1979); Scott S. Slater, *"State Water Resource Administration in the Free Trade Agreement Era, supra*, note 63, 53 WAYNE L. REV. at 653-655 (2007).

years thereafter) to evaluate groundwater management protection and remediation, survey of new relevant groundwater science and data or studies, identify information gaps, characterize groundwater, contamination issues, cumulative effects, including climate change, and other factors. The authors of the Draft 10-Year Report determine, however, that unsustainable groundwater use is continuing in some areas of the basin, and that while focus has been on withdrawals, such as the water withdrawal law in Michigan,[67] impacts on groundwater quality and quantity from diversions to straddling local governments, or from or to land uses from consumptive uses must be better addressed.

However, the Draft 10-Year Report also notes with respect to remaining issues regarding "Water Use Data" that "Recent trends in withdrawals indicate that withdrawals are unlike to increase substantially in the next few decades." Standing alone, this statement ignores the increased groundwater uses, removals, climate change, intensified irrigation and withdrawal practices to satisfy increased demand for food and energy demand.

a. Recent Developments in Hydrologic Science and Modeling

A number of new studies, technique or models have identified greater understanding and knowledge about the overall relationship seemingly complex relationship between climate change, human activities, and the hydrologic cycle. These studies and models look at not only groundwater and surface water as a singular hydrologic system, but look further to the entire hydrologic cycle, which is itself a single hydrologic system of which groundwater and surface water represent the visible and meaningful arc for life, human uses and activities on the earth.[68] Because surface water and groundwater diversions and consumptive uses are inextricably intertwined with global and local effects and impacts on water, soil, energy, food, development from climate change and other human factors, more and more is being studied, modeled, and understood by new scientific and meta-data analytics techniques.[69]

In turn science and analytics are finding better ways to evaluate the relationships of local effects and global or macro-information, which allow them to better identify more accurately trends regarding groundwater and surface uses, impacts, and sources through the record of data and effects of human intervention or human-induced effects from urban and rural development, farming, energy production, and mineral and energy extraction on the hydrologic cycle. And the more that is understood about groundwater and surface water as a singular system within the hydrologic cycle, the more that can be studied and understood about the systemic threats to

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[67] MCL 324.32701 *et seq*.

[68] See generally, scientific methods and simulations for agriculture, water, and climate change effects, Bruno Basso, David Hyndman, Anthony Kendall et al., *Can Impacts of Climate Change and Agriculture Adaptation Strategies Be Accurately Quantified if Crop Models Are Annually Re-Initialized*, PLOS ONE/DOI:10:1371/journal.pone.0127333, June 4, 2015; Brasso, Kendall, and Hyndman, *The Future of Agriculture Over the Ogallala Aquifer: Solutions to Grow Crops More Efficiently with Limited Water*, Department of Geological Sciences (Received 21 Jun 2013, Accepted 26 Oct 2013) (AGU Publications, 10.1002/2013EFOOO107); U.S. and Canada Report on Relevant and Available Groundwater Science to Meet GLWQA Commitment, Feb. 23, 2015, http://binational.net/2015/02/23/groundwater-science/ .

[69] Baseline Magazine, "*Circle of Blue Turns Business Intelligence and Analytics Systems to Aid the White House and Other Organizations Achieve Better Management of Water Resources*," (April 30, 2014) http://www.baselinemag.com/analytics-big-data.

water. Since water is so essential to life and human progress or survival, it becomes the limiting factor or lens through which other uses and factors can be viewed and understood. And as this understanding, data, and knowledge increases over the hydrological cycle, new adjustments or approaches can be established in law, policies, guidelines, and adaptation strategies to better respond and mitigate or solve systemic threats such as described at the outset that plague or challenge the Great Lakes and ecosystem.

These studies which focus on the single hydrologic nature of groundwater, surface water, wetlands, springs and climate change have begun to show that farming practices, energy production, land use, urban or sprawling development, clearing of forests and vegetation, and numerous other human activities result in direct effects on the hydrology of groundwater, streams, lakes, wetlands, and large bodies of navigable waters. These effects in turn cause direct and cumulative impacts to wildlife habitat, plants, and ecosystems, in some instances with significant losses, damage and costs.

b. Comments and Recommendations

The Draft 10-Year Report identifies water data and information insufficiency and gaps to adequately ascertain with reasonable certainty the estimates and findings regarding groundwater, surface waters, agriculture and other industries and consumptive uses. In addition, new developments in groundwater and watershed science, including research that looks at the hydrological system and water cycle, expand the methodology and framework to the water cycle or hydrologic cycle as a whole. This new approach demonstrates how human actions and natural forces within the water cycle can impact flows and levels or cause harm to "arcs" of the water cycle such as the single hydrologic connection of groundwater and surface water. Groundwater and surface water forms a foundation for a policy framework that looks at the hydrological science and water cycle as a whole, as suggested in the conclusion and elsewhere in this report. In other words, it is recommended that the commons and public trust principles framework should be used in conjunction with science to better determine effects to water levels, flows and impacts on the Great Lakes ecosystem and watersheds.

4. THE WATER, ENERGY, AND FOOD "NEXUS"

a. Recent Developments

Water is no longer just an afterthought in national and global conversations about energy, food, and climate.[70] And that's because water is viewed as a vital resource subject to greater scarcity, variability, and unpredictability. In the next 15 years, a U.N. report warns the world could suffer a 40 percent shortfall in water by 2030 unless countries dramatically change their use of the

[70] See U.S. Government Accountability Office, Energy-Water Nexus webpage citing several key reports. http://www.gao.gov/key_issues/energy_water_nexus/issue_summary#t=1; *see also* The World Economic Forum Water Initiative, Water Security: The Water, Food, Energy, Climate Nexus (2011) http://www3.weforum.org/docs/WEF_WI_WaterSecurity_WaterFoodEnergyClimateNexus_2011.pdf

resource.[71] Just this year, 2015 marked the first time water crises claimed the top spot in the World Economic Forum's 10th global risk report. Clearly the status quo can no longer stand. As the U.S. Department of Energy recently observed, "We cannot assume the future is like the past in terms of climate, technology, and the evolving decision landscape."[72]

Here in the Great Lakes, there is a growing recognition that water is inextricably linked to everything we do, elevating the "nexus" connection at all decision-making levels.[73] The U.N.'s Food and Agriculture Organization (FAO) defines nexus as an approach that "helps us to better understand the complex and dynamic interrelationships between water, energy and food, so that we can use and manage our limited resources sustainably. It forces us to think of the impacts a decision in one sector can have not only on that sector, but on others. Anticipating potential trade-offs and synergies,[74] we can then design, appraise and prioritize response options that are viable across different sectors."[75]

Diversions and "consumptive uses"[76] of water and climate change affect groundwater, and agriculture, food production, and energy extraction, production, and transport all affect groundwater and connected lakes and streams. To better understand the water-energy-food nexus, comprehensive studies of new emerging consumptive uses are critical so that decision-makers at all levels can implement adequate measures and standards that protect water quality and prevent against cumulative water loss to aquifers and watersheds within the basin. This section explores the following three consumptive uses and their impacts on water resources: (1) high-volume hydraulic fracturing for oil and gas and water resource impacts, (2) agriculture and virtual water and (3) thermoelectric energy and climate change.

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[71] The United Nations World Water Development Report. *Water For a Sustainable World*. 2015 http://unesdoc.unesco.org/images/0023/002318/231823E.pdf

[72] U.S. Department of Energy. *The Water-Energy Nexus: Challenges and Opportunities.* (June 2014) http://energy.gov/sites/prod/files/2014/07/f17/Water%20Energy%20Nexus%20Full%20Report%20July%202014.pdf; *see also* http://waterinthewest.stanford.edu/sites/default/files/Water-Energy_Lit_Review.pdf

[73] See Great Lakes Commission, *Integrating Energy and Water Resources Decision Making in the Great Lakes Basin: An Examination of Future Power Generation Scenarios and Water Resource Impacts.* October 2011. http://glc.org/files/projects/glew/GLEW-Phase-I-Report-FINAL-2011-11.pdf; *see also* Michigan Office of Great Lakes. *Sustaining Michigan Water Heritage: A Strategy for the Next Generation.* (Draft June 5, 2015). http://www.michigan.gov/documents/deq/deq-ogl-Draft_Water_Strategy_and_Appendices__06-04-2015_491266_7.pdf

[74] "Trade-offs" and "equities" of course need standards and principles to make sure decisions promote sustainability of water resources. Riparian and public trust doctrine offer just such a set of background principles.

[75] Food and Agriculture Organization of the U.N., *The Water Energy Food Nexus: A New Approach in Support of Food Security and Sustainable Agriculture.* (June 2014). http://www.fao.org/nr/water/docs/FAO_nexus_concept.pdf

[76] Compact, Sec. 1.2. The withdrawal of water for agriculture is a classic example of consumptive use. So is use of water in traditional or historical oil and gas development within the basin. Horizontal High-Volume Water ("HHVW") fracturing , as noted below, does not fit the normal definition of "consumptive use" because the several million gallons, compared to the 10,000 to 50,000 gallons of water for a more traditional "fracked' well, is removed entirely from the aquifer and the watershed without any evaporation. The fracking fluids remain in the bottom hold, several miles below the earth's surface, presumably in shale formations, or flow back to the surface ("flow-back" liquids) and are transported off-site and disposed of in deep injection wells at a distant location, again, presumably, with the belief that the highly contaminated water will not return to a useable aquifer or other water body.

(1) High-Volume Hydraulic Fracturing and Water Resource Impacts

The Agreement and Compact seek to manage water withdrawals and consumptive uses, and to prevent widespread depletion of the Basin's freshwater resources given increased water demand and climate change impacts. Waters of the basin include groundwater. The Agreement and Compact also govern water use through three primary mechanisms: (1) state conservation and efficiency requirements; (2) state permitting requirements for water withdrawals and consumptive uses; and (3) registration and reporting requirements.

Since the 2008 Great Lakes Compact, new and unanticipated water diversions like high volume hydraulic fracturing or fracking have emerged as a potential threat in the basin given the unprecedented water withdrawals required, the permanent contamination and removal from the water cycle,[77] the potential for surface and groundwater contamination, and the competition with other water users in the Basin. Federal studies caution prudence. According to the U.S. Government Accountability Office's report on this very issue: "Oil shale development could have significant impacts on the quality and quantity of water resources, but the magnitude of these impacts is unknown because technologies are years from being commercially proven, the size of a future oil shale industry is uncertain, and knowledge of current water conditions and groundwater flow is limited."[78]

Significant technological advances in horizontal drilling coupled with the fracking completion technique have opened the door to the unconventional deep shale play boom across the U.S., including the Marcellus shale play in Pennsylvania, Collingwood-Utica shale play in Michigan and Ohio, and frac-sand mining operations in Wisconsin and Minnesota. Central to this energy extraction technique is water needed for releasing tight-rock shale gas in unprecedented volumes. In Michigan, well operators have used up to 21 million gallons of water per frack well, equivalent to the daily amount of water consumed by Grand Rapids' population of 400,000. In addition, freshwater surface and groundwater resources are at risk due to potential surface and groundwater contamination during the extraction, transport, and wastewater disposal processes of fracking.

While the Compact prohibits new diversions like fracking outside the Basin, almost all fracking operators meet the intra-basin transfer exception because their operations use less than 100,000 gallons of water per day averaged over any 90-day period.[79] As a result, without a comprehensive federal regulatory regime, each Great Lakes state or Canadian province has

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[77] In contrast to other industrial water uses that return 75% of 94% of the water withdrawn, fracking operations return 0% of the water withdrawn because of the toxic chemicals used in the initial process to release the shale gas. Great Lakes Commission, *Annual Report of the Great Lakes Regional Water Use Database Representing 2009 Water Use Data* 5 (2011). http://projects.glc.org/waterusedata//pdf/wateruserpt2011.pdf

[78] GAO. *A Better and Coordinated Understanding of Water Resources Could Help Mitigate the Impacts of Potential Oil Shale Development.* GAO-11-35. Nov 29, 2010. http://www.gao.gov/assets/320/311896.pdf

[79] Great Lakes-St. Lawrence River Basin Water Resources Compact § 4.9.2. http://www.greatlakes.org/document.doc?id=144

responded differently to address fracking impacts and risks to water resources. New York, for example, after four years of scientific study, passed a total ban on fracking,[80] while Pennsylvania has allowed prolific drilling. Other states like Michigan and Ohio initially shoehorned their conventional oil and gas permitting systems to include unconventional high volume fracking, but have subsequently passed more stringent regulations.[81]

Although cumulative water impacts from fracking within the Basin are not as large as thermoelectric power generation and other consumptive water uses,[82] the local impacts on water resources are very significant. Even in water-rich states like Michigan, for example, well operators literally ran out of freshwater to complete their fracking operations and had to purchase municipal drinking water supplies.[83]

The 2013 hydrological studies conducted by Michigan State University Professor David Hyndman scientifically demonstrated the dramatic impacts fracking water diversions have on headwater rivers and watersheds, especially where there are groundwater recharge areas with no surface runoff.[84] Specifically, Professor Hyndman's report concluded that (1) Michigan's Water Withdrawal Assessment Tool (WWAT) significantly overestimates stream index flows for the headwater regions of the North Branch of the Manistee and Black Creek watersheds; and (2) proposed and permitted fracking operations are likely to significantly reduce streams flows in the headwaters in these watersheds by an order of magnitude.

Some commentators have suggested that fracking might be considered a consumptive use or even an "illegal diversion" on the basis that this water withdrawal is permanently contaminated and removed from the water cycle once placed in the deep injection wells.[85] They argue that "the Compact and Agreement could potentially be used to enjoin all hydraulic fracturing water withdrawals in the Great Lakes basin."[86] However, even if fracking water withdrawals are not labeled and banned as a diversion under the Compact, at a minimum, such water withdrawals

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[80] New York State Department of Environmental Conservation. High-Volume Hydraulic Fracturing in NYS (June 29, 2015) < http://www.dec.ny.gov/energy/75370.html>. Associated Press, "New York Formalizes Ban on Fracking, Ending 7-Year Review" N.Y. TIMES, June 29, 2015. <http://www.nytimes.com/aponline/2015/06/29/us/ap-us-gas-drilling-new-york-ban.html>

[81] In March 2015, Michigan Department of Environmental Quality promulgated new regulations to specifically address the impacts and risks of high volume hydraulic fracking. MCL 324.1401-1406. http://w3.lara.state.mi.us/orr/Files/AdminCode/1298_2013-101EQ_AdminCode.pdf

[82] Great Lakes Commission. *Integrating Energy and Water Resources Decision Making in the Great Lakes Basin: An Examination of Future Power Generation Scenarios and Water Resources Impacts.* (October 2001). http://glc.org/files/projects/glew/GLEW-Phase-I-Report-FINAL-2011-11.pdf; *see also* Great Lakes Commission, *Annual Report of the Great Lakes Regional Water Use Database Representing 2013 Water Use Data*. May, 2013, p.7 http://projects.glc.org/waterusedata//pdf/wateruserpt2013.pdf

[83] ECOWATCH. Fracking Creates Water Scarcity Issues in Michigan. (June 5, 2013). http://ecowatch.com/2013/06/05/fracking-water-scarcity-issues-imichigan/

[84] Memo from Dr. David Hyndman to Tom Baird, *Preliminary Analysis of Fracking and Flows in Upper Manistee River.* (October 3, 2013).

[85] Nick Schroeck and Stephanie Karisny. *Hydraulic Fracturing and Water Management in the Great Lakes.* CASE WESTERN RESERVE LAW REVIEW. Vol. 63, Issue 4, Summer 2013, p. 1181 http://law.case.edu/journals/lawreview/Documents/63CaseWResLRev4.7.Article.SchroeckKarisny.pdf

[86] *Id.*

should be subject to the Compact's decision-making standard for consumptive uses, which requires: (1) a return of the withdrawn water to the source watershed to be less than the amount consumed; (2) not result in individual or cumulative adverse resource impacts; (3) environmentally sound and economically feasible water measures; (4) compliance with applicable laws and regional agreements; and (5) reasonableness.

(2) Agriculture and Virtual Water

Agriculture remains the largest consumptive use in the Basin. "On average, agriculture consumes 70 times more water than people use for domestic purposes and 40-90% of that water is lost to evaporation or stored in the crops as virtual water, water retained by the crops (SIWI 2004)."[87]

The demand for food and climate change impacts on water resources will have a significant effect on water quantity and quality, particularly in the watershed of origin. An understanding of the total water loss or removed from a watershed in the Great Lakes Basin will be critical in the future because most of the water withdrawn or used is not returned.

Agriculture and food production require large quantities of irrigation water, fertilizers, pesticides, and energy, mostly fossil fuels. During the process significant amounts of water are removed from or loss to the hydrologic system – groundwater, creeks, streams or lakes – of the watershed as a result of growing, production, wastewater processes, or evaporation/evapotranspiration. Because of the increased demand for food from population growth, the pressure for more water has intensified. This often unrecognized loss of water in food or other production has become known as "virtual water," and provides a valuable tool for analyzing hydrological effects and ecological impacts of the agricultural industry world-wide, nationally, or in a state or region like the Great Lakes Basin.[88] Because of the data on the water needed to grow or manufacture a product, it is also useful for measuring the costs or economic efficiency of food production or particular crops in various geographic regions when water is scarce or readily available.[89] Currently, however, virtual water does not qualify as a diversion under the Compact. [90]

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[87] Dr. Tanya Heikkila et al., *The Great Lakes-St. Lawrence River Basin Water Resources Compact*, Columbia University (Aug. 15, 2007) pp. 7 <http://mpaenvironment.ei.columbia.edu/files/2014/06/GreatLakesCFinalReport.pdf>.

[88] The New York Times just authored an interactive piece on virtual water in fruits and vegetables coming from California. "The average American consumes more than 300 gallons of California water each week by eating food that was produced there." Larry Buchanan, Josh Keller, et. al., "*Your Contribution to the California Drought,"* N.Y. TIMES (May 2015) <http://www.nytimes.com/interactive/2015/05/21/us/your-contribution-to-the-california-drought.html>. The graphic highlights the biggest and least water offenders, for example, it takes 15.1 gallons of water to produce 2 ounces of rice – much of which is sold to markets outside the United States.

[89] Melissa Scanlan and Jenny Kehl, *Food and Virtual Water in the Great Lakes States*, 63 DEPAUL L. REV. 771, 775 (2014).

[90] Dr. Tanya Heikkila et al., *The Great Lakes-St. Lawrence River Basin Water Resources Compact*, Columbia University (Aug. 15, 2007) pp. 7 <http://mpaenvironment.ei.columbia.edu/files/2014/06/GreatLakesCFinalReport.pdf>.

Professors Melissa Scanlan and Jenny Kehl in their initial analysis of virtual water have defined it as the "embedded and hidden water" used to produce agricultural commodities."[91] Virtual water is often measured in kilograms of water per kilogram of food produce or product. For example, as the authors point out, it takes 1,500 kilograms of water to produce 1 kilogram of grain.[92] It then becomes useful to compare quantity of water losses among various crops, especially for arid or drought stricken regions. For example, rice takes about twice as much water as wheat, wheat three or four times as much as potatoes, and beef ten to 20 times as much water as wheat or potatoes, respectively.[93] Products are now measured for factors such as climate conditions, precipitation, evapotranspiration, soils, efficiency, production methods, and other hydrologic variables, such as artificial irrigation.[94] Food production costs and impacts can be measured from one locality, country, or region and compared to another.

For the Great Lakes, the authors found that on a purely balance-sheet type approach, most if not all Great Lakes states are net exporters of water.[95] The issues then become what are the quantities removed as the result of virtual water, and given the increasing demand for food and water world-wide, what does it mean for consumptive use or removal of water from the Great Lakes Basin in the future? For example, prolonged or harsh droughts or uncertainty coupled with extreme weather in the southwest U.S. or other parts of the world, such as China's northern plains and overall food demands, will either force increased food imports or a shift to foreign countries to acquire land for growing food or a share of the food production in other regions of the world with that more predictable and reliable water sources like the Great Lakes Basin.[96]

As recognized by the Draft 10-Year Report, agricultural growth and demand in or near the basin has resulted in increased irrigation and water loss, which can have significant local effects or ecological impacts. Climate change will place even greater demands on water food and water, either from food production migration to the region, or increased demand or pressure to export water or food and, of course, exported "virtual water."

(3) Thermoelectric Generation and the Great Lakes

Thermoelectric power plants are fueled by primarily by coal, natural gas, and nuclear power. These plants require large amounts of cooling water from the Great Lakes. In 2013, withdrawals for thermoelectric power plants from the Great Lakes totaled 271.9 billion gallons of water per day[97] 2.3 billion gallons withdrawn is not returned or an existing consumptive use. The water returned increases lake temperature, and fossil-fueled plants, particularly coal-fired, increase greenhouse gases, which contribute to drops in water levels. Nuclear power plants located on or

[91] *Id*. Scanlan and Kehl, ***supra*,** note 89**,** at 774 (2014); Allan, Tony, "Virtual Water – The Water, Food, and Trade Nexus: Useful Concept or Misleading Metaphor, 28 WATER INT'L 106, 107.
[92] Scanlan and Kehl, *supra* note 89; see Larry Buchanan, Josh Keller, et. al., *supra* note 93.
[93] Scanlan and Kehl, *supra* note 89, Table 1, Virtual Water Content Per Product (M3/Ton); Larry Buchanan, Josh Keller, et. al., *supra* note 88.
[94] *Id*., at 777.
[95] *Id*., Table 2. Virtual Water Exports/Imports Summary, p. 779.
[96] Subject to the roving and uncertain nature of drought and precipitation that results from climate change. See *Turn Down the Heat*, note 21, supra.
[97] Great Lakes Commission, *Annual Report of the Great Lakes Regional Water Use Database Representing 2013* (Diversions and Consumptive Uses, pp. 9, 16, 14-51.

near the shoreline of the Great Lakes withdraw large amounts of water. For example, approximately 8 billion gallons of the 10 billion gallons withdrawn in Michigan are for nuclear-fueled plants. While most of the water is returned to the Great Lakes and contributes to overall thermal pollution, which in turn increases evapotranspiration. On the other hand, a larger portion of the water withdrawn for coal fired plants is loss through evaporation. Finally, the 33 nuclear reactors and related nuclear waste issues pose significant risks to public health, water resources, and the ecosystem of the Great Lakes.[98]

Most Great Lakes states have set targets for renewable energy, to reduce greenhouse gases and mitigate climate change effects and impacts. To date, those targets are too low to result in any significant change in water withdrawals and consumptive uses for thermoelectric power plants. There continue to be "large time gaps" in reporting new data, and there are variations in requirement thresholds and compliance in recording and collecting data.[99]

b. Comments and Recommendations

Understanding the complex scientific relationships between water, energy, and food is the first fundamental step toward making meaningful policy changes to protect every arc of the hydrologic cycle. Sometimes, however, even when the science is clear, like the IJC's 2014 recommendation for a 46 percent phosphorus reduction to protect Lake Erie from toxic algal blooms, it does not easily translate into corresponding protective water laws and policies. This gap or lag time underscores why the nexus should be part of the IJC Great Lakes 2000 Report and BWT framework, which also will supplement the goals and decisions of the Compact and Agreement. In addition, this approach can be combined with the recommendation to establish a study based on recent developments in hydrological science discussed in Section 3 of these Comments, and the overarching commons and public trust framework that would help overall policy and decision-making more closely aligned with the BWT and the IJC Great Lakes 2000 Report goals.

High-Volume Hydraulic Fracturing and Water Resource Impacts: Unchecked water use for fracking operations leaves the Great Lakes Basin vulnerable to significant water scarcity and water quality risks. Given the Agreement's and Compact's precautionary nature, water withdrawals for high-volume fracturing or other high-volume consumptive uses should be studied and regulated to obtain better hydrologic data regarding hydrologic effects and impacts on local creeks, springs, streams, and lakes, or the wells by competing water users such as farms, golf courses, and snowmaking for ski areas. In addition, standards and criteria should require collection and disclosure of hydrologic data from before, during, and after the high-volume removal of water.

It is also recommended that the high-volume water wells for fracturing should not be permitted where there are likely local effects on flows and levels or impacts on water quality and ecosystems.

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[98] Gary Wilson, "*Nuclear Power: The Ultimate Near Shore Threat to the Great Lakes*," Great Lakes Echo, December 21, 2012 <http://www.wbez.org/news/nuclear-power-ultimate-near-shore-threat-great-lakes-104539>.

[99] Great Lakes Commission, Annual Report for Great Lakes Water Use Data Base, *supra.*note 97.

Finally, high-volume groundwater removals should take into account competing needs and uses from adjacent owners and communities, including adequate water for hydrologically connected streams, lakes, and wetlands, and take into account effects of climate change within and outside the basin.[100]

Agricultural and Virtual Water: Landowners have the right to reasonable use of groundwater or riparian surface water that move over or through the landscape or soil, while the body of water or aquifer is collectively held by the state as sovereign.[101] The Agreement and Compact have initiated a mechanism for states and the Regional Body to manage these water resources to minimize loss of water to the waters of the Basin. Standards in the Agreement and Compact apply only to large consumptive uses, 5 million gallons over a 90-day period or more. State thresholds are similarly quite high, except for Minnesota, and standards for registering water use for agriculture vary. Further, standards for allowing water use or consumptive use are not uniform or do not exist at all. As a result, the Agreement and Compact framework in conjunction with state or province laws may not adequately account for or control the total loss or removal of water from food exports, including total amounts of water embedded or hidden and not accounted for as part of mechanical withdrawals for consumptive use in food production and processing.

Given the overall water and food crisis and the magnified effects from climate change, including hydrologic and ecological impacts at the local or watershed level, it is recommended that the IJC establish a virtual water measurement and analysis component, in cooperation with the states and provinces, to assure that intensified food production and associated consumptive use and export of virtual water is fully accounted for and made part of a review process. As Professors Scanlan and Kehl point out, virtual water from exports is not accounted for, in total loss of water to the Basin or in terms of overall impacts.

Under public trust law, states have a duty to consider the amounts and effects or impacts on public trust waters resulting from the loss of virtual water such as groundwater or streams.[102] Based on this responsibility, the states and provinces, with the recommendation and assistance of the IJC or the Great Lakes Commission, should include a virtual water data collection and measurement standard.

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[100] The removal of high-volumes of groundwater from a watershed that is part of a single hydrologic system can cause substantial harm to other water bodies. See e.g. the trial court and Court of Appeals findings in in *Michigan Citizens for Water Conservation v Nestle Waters North America*, 709 NW 2d 174 (Mich App 2005), that the defendant's high-capacity wells that pumped near or at 400 gallons per minute caused substantial reductions in flows and levels to a headwater stream, two lakes, and nearby wetlands, which constituted an unreasonable use and transfer of water beyond the watershed.

[101] E.g. *Arnold v Mundy*, 6 N.J.L. 1 (1821); *Queen v. Meyers* [1853] 3 U.C.P. 305, 357 (Can.) (the right of the crown or sovereign is paramount to private uses: "Great Lakes and streams which are in fact navigable … must be regarded as vested in the Crown in trust for the public uses for which nature intended them – that the Crown, as the guardian of public rights, is entitled to prosecute [for the removal of impairment or obstruction] … which it is bound to protect and preserve for public use." *Id*.

[102] See Section 6 *infra*; Scanlan and Kehl, *Food and Virtual Water*, *supra*, note 89.

Thermoelectric Generation and the Great Lakes: As noted previously, climate change is all about water. Protection of the Great Lakes, as already recognized by the Great Lakes 2000 Report and draft 10-Year Report, requires an adaptive approach to address climate change. Addressing climate change and protecting the Great Lakes and its ecosystem will require an energy strategy based on water and targets to reduce consumptive use and greenhouse gases from thermoelectric power in the Great Lakes Basin. This also requires both countries to incorporate the effects and new target water levels into international and national goals, laws, and policies.

Accordingly, the IJC should increase and improve data collection and establish targets to address climate change beyond considerations required by the cumulative impact assessment in Section 4.15 the Agreement and Compact. These waters are recognized as national treasures and the states and provinces have a "shared duty to protect, conserve, and restore"[103] these waters and their ecosystem for current and future generations. There is a public trust in the states[104] and a right of public navigation and fishing, also considered a trust,[105] in the waters and water resources are subject to a public trust. The public trust imposes an affirmative duty on the states and provinces, along with the IJC through its goals in the Great Lakes 2000 Report and BWT, to protect the Great Lakes, including energy production that affects levels and the ecosystem at a time of increased effects and demands for food and water both in and outside the

***Water-Energy-Food Nexus*:** As a threshold matter, there is a clear need for better data collection and monitoring and accounting for consumptive water uses and water removed and diverted from watersheds and the basin. Coupled with this effort to secure better data, the IJC should consider establishing a committee to study and integrate the competing needs of the water, energy, and food nexus into a meaningful framework with standards that the Regional Body and Regional Council could manage under the Agreement and Compact. The intent of this holistic approach is to anticipate likely adverse resource impacts by integrating and balancing the growing and often conflicting demands for water, energy, and food within the basin. Such uncharted territory will clearly require compromise and foresight, but ultimately, this integrative approach will yield a better understanding of our entire water-dependent system and will serve to protect the integrity and health of the Great Lakes as a shared common resource.

5. WATER LAW AND POLICY

a. Recent Developments in Water Law and Policy

The Draft 10-Year Report quite understandably recounts the success of the signing of the Agreement between the states and provinces and the Compact between the eight states to protect the Great Lakes and the integrity of its ecosystems. The Compact as noted previously is for the most part a significant legal development. Similarly, state and provincial laws in place that regulate consumptive uses, withdrawals, or prohibit bulk water diversions or removals, except for water in containers like bottled water, represent a significant step in implementing the policy established in the 2000 Report and institutionalized by the Agreement and Compact.

[103] Compact Sec. 1.3(1).
[104] James Olson, *All Aboard*, *supra* note 10, at 144-148.
[105] *Id.*, at 164-166

Accordingly, the Draft 10-Year Report concludes that "[t]he Agreement and Compact have been successful to date. There have been no new inter-basin or intra-basin diversions," and "the growth in consumptive use has been at least temporarily arrested."[106] As a result, the Draft 10-Year Report recommends: "The existing Agreement and Compact should continue to be rigorously implemented to minimize loss of water from the Basin."[107]

However, the Draft 10-Year Report does not address the removal of water from the basin within the context of law and policy caused or affected by human-induced greenhouse gases and climate change. New legal developments involving transfers and consumptive uses that occur within the Basin and their effects on the flows, levels, or ecosystem of streams, lakes, or wetlands are not addressed.

There have been a number of significant developments in water law and public trust law, which along with a proper concern for common law limitations that limit uses of water by landowners or others outside a watershed or the basin, offer a supplemental basis for evaluating and protecting the waters of the Great Lakes from diversions, withdrawals, consumptive uses, or other removals. In some instances, these recent developments could be used to strengthen the position of states and provinces in defending actions regarding denial or strict regulation of diversions and consumptive uses. In others, these developments may have weakened common law traditional limitations on water transfers off-tract or out of watersheds that protect flows, levels, water quality, and preferred traditional uses of water in connection with riparian or land overlying an aquifer. The next section examines (1) riparian law and (2) groundwater law.

i. Riparian Law

The off-tract limitation or limit on diversions of groundwater that was removed from hydraulically connected lakes and streams may have been relaxed in *Michigan Citizens for Water Conservation (MCWC) v. Nestle Waters,*[108] a case that influenced debate over Annex 2001 and later the diversion ban and the treatment of bottled water as a consumptive use, and consumptive uses and other provisions in the Compact. In the *MCWC v. Nestle* case, the Michigan Court of Appeals ignored the "off-tract" or "out of watershed limitation" in Michigan Supreme Court cases in favor of a new "reasonable use balancing test."[109] Unlike the state Supreme Court's decisions, the Court of Appeals adopted the balancing test without regard to the status of the intermediate or end-user of the water. In short, Nestle was not a riparian owner and admittedly diverted the millions of gallons out of the watershed for bottling and sale to a significant extent out of the Great Basin. Accordingly, the underlying right of a landowner to use water in connection with his or her land may have been expanded to include anyone, anywhere, at any time. However, it is not clear if the case applies to direct removals or diversions from a lake or stream under riparian law, because a subsequent Michigan Court of

[106] Draft 10-Year Report, p. 26.
[107] *Id.* 2015 Recommendation.
[108] *Michigan Citizens for Water Conservation v. Nestle Waters North American Inc.* 709 N.W. 2d 174 (Mich. Ct. App. 2005), reh'g denied, 739 N.W.2d 332 (Mich. 2007).
[109] *Kennedy v. Niles Water Supply Co*., 173 Mich. 474. 139 N.W. 241, (Mich. 1913); *Dumont v. Kellogg*, 29 Mich. 420 18 Am. Rep. 102 (1874); *Schenk v. City of Ann Arbor,* 196 Mich. 75; 163 NW 109 (1917).

Appeals decision that applied *MCWC v. Nestle* to Michigan's famed Au Sable River was vacated.[110]

This could mean, although it is only arguable, that if a foreign landowner or water user like Nestle is denied a right to withdraw and divert or export more water in containers in the future, the company could argue that its newly expanded right to use and sell water anywhere gives it an argument that it has standing to maintain a private investor claim in a private tribunal under NAFTA or other trade law.[111] However, this is countered by the Michigan Supreme Court cases,[112] the provisions in state law when adopting the Compact and water withdrawal legislation that preserve common law limitations like the watershed restriction and the fact that the Compact itself declares that water is "held in trust."[113] Nonetheless, the development in Nestle must be closely watched, or a more uniform effort taken by the states and provinces, should the trend emerge there to maintain and reclaim, if necessary, by statute the watershed limitation. By doing this, states will put themselves on stronger footing, like the provinces that own and control water because it is the Crown's. This would assure that states and provinces would have the final say on authorizing transfers of water for sale or diversion out of watersheds, and be in a stronger position to enforce the Agreement, Compact, and the terms of their own government decisions regarding water management. This would also reduce the risk or threat of claims that would broadside or undermine the Compact.

ii. Groundwater Law

It also appears that groundwater law took a similar turn in Michigan and Ohio. The *MCWC v. Nestle* case may not apply to riparian lands or lakes and streams, but it does apply to groundwater. Again, however, a Supreme Court decision in *Schenk v. City of Ann Arbor* ruled that the city could not pump and divert groundwater off-tract to service its residents if it disrupted or interfered with a neighbors well or measurably diminished the flows or levels of a lake, stream, or wetland.[114]

In Ohio, the Supreme Court adopted the RESTATEMENT OF TORTS, 2d, Sec. 858, for groundwater law. Under Section 858 of the RESTATEMENT, 2d, the diversion or export limitation has been erased in favor of a broad balancing of a number of factors involving interference, harm, and the relative public and private benefit of a withdrawal and diversion or use regardless of whether the use is on-tract or off-tract.[115]

b. Comments and Recommendations

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[110] *Anglers of the AuSable v Department of Environmental Quality,* 793 NW 2d. 596 (2010), vacated on rehearing (the vacated court of appeals decision reinstated the trial court opinion and erased the suggestion that the "reasonable use balancing test" in *Nestle* applied to riparian waters).

[111] The implications and recommendation in connection with these issues are addressed in Section 7, *infra*.

[112] *Kennedy v. Niles Water Supply*, *supra* note 109; *Dumont v. Kellogg*, *supra* note 109; *Schenk v. City of Ann Arbor*, *supra* note 109.

[113] Compact, Sec. 1.3(1)(b).

[114] *Schenk v City of Ann Arbor*, *supra* note 109.

[115] *Cline v American Aggregates Corp.*, 474 N.E.2d. 324 (Ohio 1984).

For the reasons noted above on comments concerning riparian law, it is important to understand the implications and law and policy response that may be required to minimize the risk of claims against a state for denying or restricting an off-tract or out-of-watershed diversion or export of groundwater. The Compact may restrict it if the container or volume is greater than 5.7 gallons or 20 liters, but it does not mean the investor or landowner could not claim a broader right to use water to support a claim with a trade law tribunal, if the claimant acquired land in a state that allowed sale of groundwater off-tract, which of course is occurring, such as in *the MCWC v Nestle* groundwater/riparian hybrid case discussed above. Several states, as well as provinces based on Crown and province ownership can control the taking or removal of groundwater for export elsewhere, because of the tract or out-of-watershed or impairment of flows and levels of a lake or stream. This limitation should be studied, understood, and applied uniformly where possible, which will supplement with a background common law or constitutionally based argument against private investor claims under trade law agreements.

6. PUBLIC TRUST LAW

a. Recent Developments in Public Trust Law

In the past ten years, public trust law has matured in the States as a comprehensive framework and background principle for water management and protection of flows, levels, tributary streams and groundwater, ecosystems and protection and accommodation or balancing of public and private uses. Over this same time period, there has been increasing recognition and discussion in the literature and courts of the United States and Canada.[116]

Traditionally, both the U.S. and state supreme courts, as well as the Canadian provincial supreme courts, extended the public right of navigation and fishing, in the U.S. known as the public trust doctrine, to the Great Lakes and navigable lakes and streams.[117] Under the public trust doctrine, the state or province, or government, hold title to bottomlands and waters of navigable waters in trust for the protection of public trust uses – fishing, boating, swimming, navigation, fowling, recreation – and the waters, wildlife, habitat, and ecosystem that these uses depend on for sustenance and enjoyment.[118] There are three fundamental principles: (1) the public trust land and waters cannot be granted or subordinated for primarily private purposes; (2) the government has an affirmative duty to protect public trust uses, and the bottomlands and waters on which these uses depend; (3) the government and/or third persons are prohibited from materially obstructing, interfering with, or impairing these pubic trust uses, land and waters.[119]

I. The United States

[116] The public trust doctrine applies to the Great Lakes in the eight states and provinces under the analogous paramount trust to protect the public right to navigation, fishing and boating in Canada. Olson, *All Aboard*, *supra* note 10, at pp. 147-166, and references to case law and law review articles; see also Barlow and Olson, *Report on the Public Trust Principles to the IJC, supra* note 51.

[117] Id.

[118] Id.; *Illinois Central Railroad*, *supra*, *Queen v Meyers*, 3 U.C.C.P. at 305, 357 (Can.); *supra*, note 101; Olson, *All Aboard, supra*, note 10.

[119] *Report on the Public Trust Principles*, *supra*, notes 51, 116.

In addition to established case and statutory or constitutional law in both countries at the time of the Great Lakes Report 2000, there are four new trends or developments in public trust law in the United States.[120]

First, there is a strong recognition, as in science and the Agreement and Compact, that groundwater, surface water, lakes, and streams are a single hydrologic system. There is also some beginning recognition of the relationship of the entire water or hydrologic cycle, the activities that affect it, and the flows, levels, and quality of traditionally recognized public trust waters that are "navigable."

The extension of public trust protection to groundwater is not surprising given the hydrological connection to public trust lakes or streams. In Wisconsin, the Supreme Court held that the public trust in a navigable lake required the DNR to consider the effects of a nearby high-capacity municipal groundwater well.[121]

Second, in 2000, the Hawaii Supreme Court first declared the groundwater component of a canal or channel to be subject to the public trust doctrine both under the common law and state constitution. The court reaffirmed its decision in a more detailed factual application of public trust principles in a 2012 case. [122] In a more recent decision in 2014, the court held that a local land use planning board, like the DNR in the Wisconsin case, must consider the effects and impacts on connected public trust waters as part of its review of a request for a special use permit for a major land development.[123]

Third, Vermont enacted a new groundwater law, supported by farmers and residents who were concerned about water exports or diversions from the state, that declared groundwater protected by the public trust doctrine. In its first test case, a lower court ruled that the traditional public trust principles applied to surface and groundwater, and that state agencies had a legal duty to consider the effects and impacts before it could approve permits that were alleged to involve effects to groundwater or lakes and streams.[124]

Fourth, courts in Arizona and California have also imposed a legal duty on a state agency to protect groundwater as part of a state's public trust water resources. Arizona found a public trust in all waters of the state, including groundwater, based on the hydrologic connection, recognition

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[120] There is actually a fifth development in the Great Lakes states, but it is not within the scope of these comments on diversions, consumptives use, and other human land or water uses and activities. Consistent with previous cases, *Illinois Central Railroad v Illinois*, 146 U.S. 387 (1892), Michigan and Ohio reaffirmed the public trust in the Great Lakes and ruled that the right of access, as distinct from more possessory use interests, for walking along beach to public trust waters included the beach up to the natural ordinary high water mark as determined by physical characteristics that distinguished a beach from permanent characteristics of upland. *Glass v. Goeckel*, 703 N.W.2d 58, 64–65, 73–74 (Mich. 2005); *Merrill v. Ohio Dep't of Natural Resources*, 955 N.E.2d 935 (Ohio 2011).

[121] *In re* ʻĪao Ground Water Mgmt. Area High-Level Source Water Use Permit Applications, 287 P.3d 129, 190 (Haw. 2012).

[122] *Kelly v. 1250 Oceanside Partners*, 111 Hawaii 205. 140 P.3d 985, (Haw. 2006).

[123] *Kauai Springs Inc. v. Planning Comm. of the County of Kaua'i*, 324 P.2d 951 (Haw. 2014).

[124] See VT. STAT. ANN.tit.10, Sec. 1390(5) (2008); *In re Omya*, No. 96-10Vtec, at 3-5. .

of a "trust" in natural resources or water in the state constitution, then applied public trust principles to restrict a diversion of water.[125] The courts in California have found a public trust in all navigable and tributary waters, holding that all allocations and appropriation rights to use or divert water are subject to the principles of public trust law.[126] The court noted three basic principles: "(1) prevents any party from acquiring a vested right in a manner harmful to the interests protected by the public trust; (2) The Legislature [acting through an authorized agency] has the power to grant usufructuary licenses…; and (3) the state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses wherever feasible."[127] It is only logical that traditional public trust law would restrict activities within a watershed or tributary stream that impair public trust uses or ecosystems connected with navigable waters, like the Great Lakes.

The four developments of public trust law summarized above all involve protecting water resources, including tributary streams and lakes and groundwater connected to or part of navigable public trust waters.[128] Accordingly, for purposes of these Comments and the IJC Draft 10-Year Report on the Great Lakes 2000 Report, the public trust doctrine developments in the U.S. strongly support background or supplemental public trust principles.

Another important aspect of public trust law in the United States involves the application of public trust principles in law review articles and papers.[129] In the past ten years, there have been hundreds of legal and academic articles analyzing, explaining, and arguing for new applications of the public trust doctrine principles.[130] Only a few of them are mentioned here.

ii. Canadian Public Trust or Public Right to Navigation and Fishing

It has already noted in these Comments and footnote references that the public right of navigation, fishing, and boating in Canada is held in trust by the Crown or federal government and provinces as guardians with the duty to protect this paramount public trust from interference or subordination by private persons.[131]

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[125] ARIZ. REV.STAT.ANN. Sec. 37-11130 (1992).

[126] *Light v. State Water Resources Control Bd*, 226 Cal. App. 4th 1463 (2014); CAL.CONST.art.X,Sec. 4.

[127] *Id.* at 226 Cal. App. at 1480-1482; *Audubon v. Superior Court*, 33 Cal. 3d. 419, 434, 437 (1983) extended the geographical scope of the doctrine to nonnavigable streams that feed navigable waterways, and it expanded the purpose of the doctrine to the preservation of water's function as natural habitat." *Id.* "An important purpose of the public trust over bodies of water is to protect habitat for wildlife." *Id.*

[128] Jack Tuholske, *Trusting the Public Trust: Application of the Public Trust Doctrine to Groundwater Resources*, 9 Vt. J. Env. L. 189 (2008).

[129] For a complete review of cases and law review articles and papers on public trust law in the U.S. and internationally, see Michael C. Blumm and Mary Christina Wood, *The Public Trust Doctrine in Environmental and Natural Resources Law* (Carolina Academic Press 2014) (a textbook for a law school or university curriculum)

[130] One need only run a search on Westlawnext, LexisNexis, or simply google "public trust" or "public trust" & "water" or "climate change" or "public trust" & "parklands" to pull up long lists of articles, cases, reports, and papers.

[131] See Barlow and Olson, *Report to IJC on Public Trust Principles*, *supra*, note 51; Olson, *All Aboard*, note 10, at pp. 164-166, and the constitutional acts, statutes, and case law cited therein.

As stated by the Court in *Queen v. Meyers*,

> The Great Lakes and the streams which are in fact navigable, and which empty into them in the provinces, must be regarded as vested in the Crown in trust for the public uses for which nature intended them – that the Crown, as the guardian of the public rights, is entitled to prosecute and to cause the removal of any obstacle which obstruct [interfere] the exercise of the public right and cannot by force of its prerogative curtail or grant that which it is bound to protect and preserve for public use.[132]

b. Comments and Recommendations

Both the Canadian and U.S. courts recognize a public right to use navigable waters for fundamental uses for sustenance and enjoyment. As the Canadian Supreme Court noted, the public navigable waters and bottomlands are held "in trust for the public uses for which nature intended them." The U.S. and state supreme courts have recognized the same through a dynamic list of uses, changing to meet public need and sustenance. The public trust principles, especially the affirmative duty to protect and preserve from harm or private grant public trust uses and water or related natural resources on which these uses depend, have equal if not greater importance today to address the systemic threats that have overwhelmed more fragmented, or specific regulatory regimes to address water, air, and natural resource pollution or harm

Because of these more tailored or special regimes, such as the Agreement and Compact, yet broader goals in the IJC Great Lakes 2000 Report to protect Great Lakes quantity and quality from diversion and consumptive uses, the public trust doctrine offers a set of background principles that inhere in navigable waters and bottomlands of the Great Lakes. These principles provide impetus to exercise governments' affirmative duties to protect the public trust from harm. The principles operate as a backstop to claims to ownership or control of these waters contrary to the prohibition against transfer or subordination of the Crown or state government reservation of power in and over these waters and bottomlands. The standards provide an umbrella or backstop set of standards to prevent or guard against material impairment, obstruction, or interference.

The Draft 10-year report recommends exploration of these principles for inclusion in the final 10-year report. The BWT recognizes an overarching public right or interest of navigation and access for public trust uses. The Compact recognizes the Great Lakes are "held in trust."

The IJC couldn't do more to undergird its goals of its 2000 Report with these common law public trust principles. Accordingly, it is recommended that the 10-Year Review Report include a recommendation that these public trust principles be adopted or incorporated into the

[132] 3 U.C.C.P. at 305, 357 (Can.); Const. Act 1867, Secs. 30 & 31, Vict. C. 3 (U.K.). Queen v Myers is strikingly similar in prohibition on transfers or grants for private purposes and obstruction or impairment to Illinois Central Railroad and other state court decisions in the U.S. Similarly, the Canadian court describes the duty and role of the government and courts as "guardian" "to protect and preserve for public use."

background principles that empower government and protect the integrity of both the quantity and quality of the Great Lakes and ecosystems.

7. INTERNATIONAL TRADE LAW AND DEVELOPMENTS UNDER NAFTA

The public trust or public right to navigate and fish provide a strong backstop or umbrella principle for making sure international trade law claims are placed in proper context. Under a commons and public trust framework, diversions for private purposes are generally prohibited, and diversions for a proper public purpose, if a court construed an out-of-basin diversion a "public purpose," are nonetheless subject to a no significant impairment standard that includes cumulative or small incremental effects that would impair water levels, fishing, boating, swimming, navigation, or other public uses.[133] By adding a public trust framework as background or backstop principles, the states and provinces, in the case of NAFTA or trade law claims, would strengthen their position because the public trust inherently adheres to the common nature and control of the water by the provinces and states, limits or qualifies diversions, and limits if not prevents a private claimant from asserting an expectation of a property or legal interest that would provide standing or is even protected by international trade law or the commerce clause

a. Recent Developments

Since the 2004 and 2000 Great Lakes Reports, private investor claims under NAFTA and other trade laws have more than tripled.[134] While the legal policy and approach behind the diversion ban and consumptive use regulations is generally sound and defensible, as noted by the Draft 10-Year Report, the increase and success of a few of these private investor claims for money damages for discrimination or expropriation of water use rights create uncertain, confusion an concern. The countries reserved sovereign power in the NAFTA and water is not mentioned. Moreover, the countries signed a side agreement that water "in its natural state" is not covered by NAFTA.[135] However, issues and concerns remain because of increased demand for water in North America from drought, increased food and energy production, and climate effects. The side agreement contains a provision that insulates water in its natural state "unless water, in any form, has entered into commerce or produced, it is not covered by the provisions of any trade

[133] All eight Great Lakes states recognize these public trust protected uses, which cannot be impaired or subordinated to private uses; private riparian uses on navigable waters are those connected to use and enjoyment of riparian land, such as docks, wharves, fishing, drinking and domestic water, irrigation for growing food, and commercial use of water, so long as it is reasonable. While private uses are not property rights, the right to use is subject to 'reasonableness" and the public trust and protected uses in the navigable water. Maude Barlow and James Olson, *Report to the International Joint Commission on the Principles of the Public Trust Doctrine*, *supra*, note 51, at 8-25, 28-31; see also James Olson, *All Aboard*, *supra*, note 10, at 151-163.

[134] See *NAFTA Chapter 11 Investor-State Disputes (to October 1, 2010)*, Scott Sinclair, Trade and Investment Research Project, Canadian Centre for Policy Alternatives/Centre Canadien de Politiques Alternatives; *Table of Foreign Investor-State Cases and Claims under NAFTA and Other U.S. 'Trade Laws,'* Public Citizen, April 2015.

[135] Declaration on Water Resources and NAFTA, signed by Canada, Mexico and United States, Dec. 2, 1992, 32 I.L.M. 289 (1993); *see* Olson, *All Aboard*, *supra* note 10, at 187 and accompanying footnotes.

agreement, including NAFTA."[136] The question of when and what triggers the moment in time when water "enters commerce" or is "produced" has not been answered, and the answer has been clouded by shifts in groundwater law that relax or erase common law restrictions on water from watersheds.[137] When water is "produced," under the Compact or Agreement, it is "withdrawn by human or mechanical means."[138] A "product" is not subject to the diversion ban. If water is withdrawn and placed in a container and intended for a consumer, it could be argued that it is a "product" the moment it is withdrawn from the water source. Thus, while the basis of the Compact and Agreement may be solid, other factors outside the control of the Council or states and provinces have raised enough questions and disputes, utmost caution is required.

Private investment claims under Chapter 11, NAFTA, are different than nation against nation challenges to regulations that violate fair treatment and free trade provisions. Although a challenge between nations as to the authority and power to maintain and enforce laws to protect health, exhaustible natural resources, and the environment, a private investor may file notice and pursue an individual claim in a essentially private tribunal for damages. These claims, especially if they are settled because of threat of high damages or uncertainty in result, have a chilling effect on otherwise reserved sovereignty over natural resources and water. For example, when Newfoundland rejected AbitibiBowater's claim to water rights that were tied to the termination of its timber contract, the company filed a NAFTA claim for $467.5 million, and rather than risk a ruling, the federal government settled for $122 million.[139]

b. Comments and Recommendations

The point is straightforward: There have been new arguments and an increase in claims under NAFTA that strongly suggest that states and provinces and the IJC carefully explore what other supplemental or "backstop" defenses can be expressly articulated to prohibit or minimize the risk of potential investor-state claims.[140]

The states and provinces, or the IJC under its 2000 Great Lakes Report and related Reference, can put potential claimants on express notice to remove ideas of entitlement or expectations that their water use is a vested interest sufficient to leverage damages because a state or province seeks to protect its sovereign lakes, streams, groundwater or natural resources. Two ways to do this are (1) to expressly declare and serve notice to all that the Great Lakes and tributary navigable waters are subject to and protected by the sovereign authority and power reserved to

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[136] *Id.*
[137] See Section 5, these Comments; James M. Olson, *All Aboard, supra* note 10, at 187.
[138] Compact, Sec. 1.2, definition of "product."
[139] Public Citizen, *Table of Foreign Investor-State Cases, supra;* AbitibiBowater Inc., p. 19; The Toronto Star. *"Ottawa pays Abitibi $130M to settle claim."* (August 25, 2010); Kathryn Leger. *"AbitibiBowater wins NAFTA case vs. Ottawa."* THE GAZETTE (MONTREAL), (August 27, 2010)
[140] M.A. Salman, *International Trade Law Disputes: New Breed of Claims, Claimants, and Settlement Institutions*, International Water Resources Association, 31 Water International pp. 2-11 (March 2006), with David Johnson, *Water and Exports under NAFTA, Law and Government Division*, 8 March 1999, PRB 99-5E <http://publications.gc.ca/collections/Collection-R/LoPBdP/BP/prb995-e.htm>, who lays out the government position and arguments about water as a "good" or "product" under international trade laws, including NAFTA.

the states and provinces under the public trust or trust in the public's right to navigation and fishing, or other related public resources and other public interests and uses; and (2) to establish a baseline on principles that restrict diversions or exports under the common law of riparian and groundwater as described and recommended above.[141]

8. CONCLUSION: TOWARD THE ADOPTION OF A SUPPLEMENTAL PUBLIC TRUST FRAMEWORK AND PRINCIPLES TO PROTECT AND SUSTAIN THE GREAT LAKES

A SUMMARY OF OVERARCHING PUBLIC TRUST RECOMMENDATION AND SPECIFIC RECOMMENDATIONS FOR THE 10-YEAR REVIEW REPORT

The Great Lakes are threatened with significant current and future systemic harms, some of potentially devastating although uncertain magnitude, others chronically and incrementally interfering with or impairing public and private uses of water and shorelines, and obstructing or thwarting the sustainability of the Great Lakes, their ecosystem and watersheds. The Great Lakes Report of the IJC in 2000 set a goal of protecting the lakes and waters of the Basin from diminishment as a result of diversions, consumptive uses, and to protect the integrity and sustain these waters and ecosystems. The Agreement and Compact address out-of-basin diversions and in-basin consumptive uses to minimize impairment and harm from new or increased existing or future diversions and consumptive uses. It set a standard for decisions by a regional body and imposes a duty on states to do the same. It contemplates assessments of cumulative impacts and consideration of inevitable effects of the uncertain dimensions of climate change.

However, the Agreement and Compact and other laws do not address systemic harms or threatened interference that often fall outside more narrowly focused regulatory frameworks. It has been seen that climate change results in a massive diversion or consumptive use of these waters, and significant harm to the ecosystem. Nutrient runoff and phosphorous, invasive species, widely varying or extreme waters result in similar systemic harms. Increased droughts, storm events, and the "nexus" of intense competition for water sources for food, energy, and population and development threatened to override commitments to protect the Great Lakes, its natural systems, public and private uses, and heavy public investments in harbors, navigation, recreation facilities, drinking supply systems, and habitat projects.

Accordingly, in order to fulfill and critically need for background principles that apply or supplement existing regulatory frameworks or other regimes in a time of uncertainty and potentially high magnitude of systemic harms or threats, the IJC is urged to adopt or incorporate a the public trust doctrine as a backstop or supplementary framework and set of principles. It is recommended that the IJC adopt and encourage states and provinces to exercise a commons or

[141] See Sec. 5, these Comments, Water Law Recent Developments, Comments and Recommendations.

hydrological or water cycle framework and apply public trust principles and standards to address, study, and make decisions and/or recommend laws and policies consistent with these principles. To do so, both countries, the states and provinces, and the IJC will significantly advance the goals and purposes of the Great Lakes 2000 Report, and at the same time strengthen the design and goals of the Agreement and Compact and more fully address or solve the systemic effects and impacts that harm or threatened the Great Lakes, ecosystems, and the public and private uses, quality of life, and economies that depend on them.

In addition to the above overarching framework, the following specific recommendations are made to strengthen the goals of the IJC Great Lakes 2000 Report. Each of these recommendations, in turn, is uniquely related to the application of a public trust framework and principles; in turn, overarching public trust framework and principles would enhance the effectiveness of these recommendations.

a. Climate Change

The IJC 10-Year Review of the 2000 Report should recommend a reference or other actions to implement protection of Great Lakes water levels, habitat, watershed ecosystems, and the public and private uses that depend on them as follows:

> (i) Recommend a study to implement a standard and protocol to account for the effects and impacts of any diversion, consumptive use, and/or removal of water from the Basin as a result of climate change that are not subject to regulation under the Agreement or Compact or other state licensing or permitting regulations;
> (ii) Incorporate and account for the climate change effects and impacts in the approval of any diversion, consumptive use, or withdrawal of waters of the Great Lakes Basin that are subject to the Agreement or Compact or other state and provincial licensing, permitting or other regulatory actions;
> (iii) Implement as expeditiously as possible a water level/target policy that would act as a benchmark for energy policy within and outside of the Great Lakes Basin. While energy policies and requirements concerning greenhouse gases are outside the scope of the IJC 2000 Report and Reference, activities like climate change that affect water levels, flows, and sustainability are not. Water level targets and a public trust benchmark for the Great Lakes would form the basis for the IJC within the 2000 Report and Reference to educate the public, governments, provinces, and states on the relationship of climate change to the waters of the Great Lakes Basin, and urge energy policies, goals and targets that are consistent with protection of the Great Lakes and ecosystems. A new or supplemental protocol or compact for "Great Lakes Sustainable Water, Food, and Energy Agreement" could considered.

b. IJC Study of Increasing Demand and Shrinking Sources for Freshwater

The 10-Year Review of the 2000 Report should recommend study and application of the precautionary principle to take into account the threats on waters of the Great Lakes Basin as the result of drought, storm and extreme hydrological effects, and the lack of sufficient water supply to meet the demand in various areas of North America or beyond; based on such study the IJC should recommend a continuous IJC study board review as part of the countries and IJC cumulative impact assessment on water levels, flows, and the integrity of the Great Lakes and their ecosystems; such a study board would report to the IJC on changes in demand, supply, water sources, from human consumption and activities and natural causes, and recommend proactive changes or actions by the IJC, the governments, states or provinces to strengthen protection of the Great Lakes from diversions, uses, and other removals.

c. Scientific Information Based on Hydrologic Cycle

The 10-Year Review of the 2000 Report should recommend study and incorporation of new science methods, tools, and modeling to collect information and conduct analyses based on an integrative or holistic framework that looks at and accounts for the effects and impacts on the connected or common groundwater/surface waters within the Great Lakes Basin from all human uses and activities affecting water and land and other natural processes within and the entire hydrologic cycle.

d. Water, Food, Energy, and Development "Nexus"

It is recommended that the IJC implement a protocol that takes into the competing uses and future demand for freshwater, particularly the waters of the Great Lakes Basin, from agriculture, energy production and fossil-fuel extraction, and thermoelectric facilities, and their effect on water levels, flows, or the ecosystems and watersheds of the Great Lakes Basin; such protocol would include an integrative approach that accounted for the entire or virtual water loss or removal from these uses, and balance these competing demands and uses consistent with the overarching goal that protects the water levels, flows, and ecosystems of the Great Lakes Basin.

e. Water Law and Policy

The 10-Year Review report should recommend the establishment of an independent "Law and Policy Study Board" that assesses and reports to the IJC and the governments on significant changes in water law, such as riparian and groundwater law standards and criteria regarding water use and diversions within and outside watersheds, lakes, or streams, with a goal to maintaining common law and statutory principles that supplement the overall goals regarding diversions, consumptive uses, and protection of the flows, levels, and ecosystems set forth in the IJC Great Lakes 2000 Report.

The IJC should also consider, consistent with the approach taken in the IJC 2000 Report, establishing a "Law and Policy 'Study Board'" that would advise the IJC and its scientific study boards and references on a continuing basis.

f. Public Right to Navigation, Boating and Fishing and Public Trust Principles

The 10-Year Review Report should add a section that recommends the adoption of public trust duties and principles as an overarching framework to protect the integrity of natural flows, levels, ecosystems, and the public and private uses of the navigable waters of the Great Lakes, from human uses and activities within and outside the Great Lakes basin and its watersheds. This will provide a "backstop" to the present 2000 Report and its goals, as well as supplementing existing laws and regulations, and the Agreement and Compact. These principles will also empower governments to implement and apply the recommendations addressed in these Comments. The public trust principles would call for::

(i) Fulfillment of state and provincial and governmental duties to protect and preserve the public rights and trust in these public trust navigable waters;

(ii) Consideration in governmental decisions and actions of the effects and impairment from human uses and activities on these waters and their public uses;

(iii) Prohibit or restrict diversions, consumptive uses, removal of waters of the Great Lakes, or other effects and impacts on quantity and quality of these waters, that would materially impair flows, levels, their ecosystems, and the public trust uses that depend on them.

As noted, in recommendation e. above, the IJC should also consider, consistent with the approach taken in the IJC 2000 Report, establishing a "Law and Policy Study Board'" that would advise the IJC on its actions, references, recommendations, and studies consistent with the goals of the 2000 Report.

g. International Trade Agreements

Because of the increased competition and pressure and demand for water in North America and elsewhere in the world, and the uncertainty of rulings under trade agreements like NAFTA, it is recommended that the 10-Year Review Report urge the adoption of a declaration, resolution, or new guiding principle that puts the public, foreign governments, and investors on "notice" that the two countries, states, and provinces hold and have:

> (i) Inherent sovereign, ownership, and/or control as the Crown, in Canada, and sovereign governments, in U.S., over the waters of the Great Lakes Basin, including lakes, streams, groundwater, and hydrosphere, and their ecosystems;
> (ii) Hold and manage these waters of the basin within their respective jurisdictions and between them their shared common international boundary waters subject to a paramount public right of navigation, boating, and fishing, and as a public trust for the protection of navigation, fishing, boating, swimming, sustenance, and other public uses and needs associated with these waters;(iii)Hold and manage these waters as a trust that prohibits the transfer, grant, or subordination or impairment of these public trust waters.

As in specific recommendations e. and f., above, new developments and trends in international trade law agreements, decisions, or claims would be included in the work of the "Law and Policy Study Board."

Name: Emma Lui

Date of Submission: June 30, 2015

Location: Vancouver, British Columbia

Comments:

Hello, Please find attached the Council of Canadians submission to the Ten Year Review of the IJC's report on "Protection of the Waters of the Great Lakes". Thank you for this opportunity. See attachment.

THE COUNCIL OF CANADIANS LE CONSEIL DES CANADIENS

June 30, 2015

Dear Commissioners of the International Joint Commission:

The Council of Canadians thanks the International Joint Commission (IJC) for commissioning the Ten Year Review of the International Joint Commission's Report on "Protection of the Waters of the Great Lakes" (the report). We also thank you for creating a process for public comment. We applaud the work of Ralph Pentland, President of Ralbet Enterprises, and Dr. Alex Mayer, Professor of Environmental and Geological Engineering at Michigan Technological University for the very thorough review of advancements and what is happening around the Great Lakes Basin.

The report recommendations are:

RECOMMENDATION 1: The existing Agreement and Compact should continue to be rigorously implemented to minimize loss of water from the Basin.

RECOMMENDATION 2: The precautionary approach regarding diversions should continue to guide the States and Provinces in order to protect the Great Lakes from an ever increasing number of larger-scale removals.

RECOMMENDATION 3: The Great Lakes States and Provinces, in collaboration with the two federal governments, should continue to investigate methodologies for improving the accuracy of water use and consumptive use estimates.

RECOMMENDATION 4: Further refinement of water balance components should continue to occur through federal agencies such the USGS, NOAA, US Army Corps of Engineers, and Environment Canada. Assuming that the science will continue to evolve rapidly,the Regional Body/Council should continuously review new knowledge regarding lake-wide hydrology and incorporate new advancement in decision-making processes.

RECOMMENDATION 5: Considering the large uncertainties surrounding climate change and other human impacts on the hydrologic cycle, federal, provincial and state governments should continue to take an adaptive management approach in decision-making. Advancements in the state of science on climate change impacts in the Great Lakes should be encouraged by federal, state and provincial governments through further funding and a synthesis of the state of the science.

RECOMMENDATION 6: Great Lakes States and Provinces should fully factor the adverse ecological and water quality impacts of groundwater withdrawals into both water use permitting procedures and decisions regarding consumptive use. Federal, state and provincial research should focus on predicting where groundwater supplies may be degraded in the future and identify management methods for avoiding these problems.

RECOMMENDATION 7: The IJC recommends broad-based collaboration among public and private sectors to fix leaking water infrastructure, support innovation, and increase funding to close the region's water infrastructure deficit and unlock water conservation potential region wide.

The report covers important advances and related information on consumptive use, legal and policy considerations, diversions and other removals, water use data, cumulative impacts, climate change, groundwater and conservation. We agree with most of the recommendations in the report and would like to add the following points to the recommendations.

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Recognize the Great Lakes as a commons, public trust and protected bioregion

We were glad to see the report acknowledge the trend of US states applying public trust laws to protect water sources and recognize that the continuation and expansion of this trend would reinforce the objectives of the Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement and the Great Lakes Compact.

The report mentions the Aral Sea and Lake Chad as examples where human mismanagement has depleted these water systems. From California to São Paulo to Taiwan, there are increasing stories of communities literally running out of water. The alarm bells have long been sounding and governments around the world need to dramatically shift their relationship to water and the way in which they govern, manage and allocate water.

NASA released a report recently that warned that twenty-one of the world's 37 largest aquifers have passed their "sustainability tipping points," which means more water is being removed than replaced.

The authors of the IJC report call for a cultural shift and challenge "citizens to envision how their water use and/or conservation can make a meaning difference in water supply..." We echo this call and further challenge citizens of the Great Lakes and governments to recognize water as a commons, public trust and protected bioregion.

In *Our Great Lakes Commons - A people's plan to protect the Great Lakes forever*, Maude Barlow calls for the Great Lakes to be designated "as a lived Commons, to be shared, protected, carefully managed and enjoyed by all who live around them." She notes, "The Great Lakes Basin Commons would need to be protected by a legal and political framework based on Public Trust Doctrine, underpinning in law that the Great Lakes are central to the very existence of those people, plants and animals living on or near them and therefore must be protected for the common good from generation to generation. This means that the Lakes could not be appropriated or subordinated for private gain. It is also our determination that the Great Lakes will be designated as a Protected Bioregion, recognizing that while there are many political jurisdictions governing the Great Lakes Basin, it is, in fact, one integrated watershed and needs to be seen and governed as such."

The droughts around the world are a call for Great Lakes citizens and governments to pave a new and exemplary model of managing model that ensures water for ecosystems and generations to come.

The UN has passed several resolutions recognizing the human right to water and sanitation. Governments must develop plans of action that ensure adequate funding, equitable access to clean, safe water and redress mechanisms.

In her 2011 presentation with Michigan attorney Jim Olson to the International Joint Commission, Barlow pointed out that despite all the wonderful and tireless work of elected officials and environmental groups the Great Lakes are still in peril. She explained it is because "there are competing visions of what the Lakes are for and who they serve, and one vision – the wrong one - is winning. Some see the Great Lakes as a watershed that gives us all life and livelihood and is a living ecosystem to be nurtured, protected and preserved for future generations. But too many others, including some governments, see the waters of the Great Lakes as a huge resource for our convenience, pleasure and profit."

Olson stated, "Under public trust principles, the IJC can comprehensively unify its authority and role under the Boundary Waters Treaty as the watch dog of the integrity of the boundary waters from private control and physical, biological and chemical threats, particularly the Great Lakes and ecosystem."

The examples of California, the Aral Sea and Taiwan show that the vision of water as a resource for convenience, pleasure and profit has taken these regions down a dangerous path. But around the Great

Lakes, there is a growing movement to have the Basin recognized as a commons, public trust and protected bioregion that will be the other path to truly protecting the Great Lakes. We need a governance model that does not mirror the market framework that is the root cause of the abuse, misuse and privatization of the waters of the Great Lakes.

The IJC is well-equipped to lead Great Lakes communities down this other path and it would further inspire these communities by taking such leadership in implementing public trust principles in the Agreement and Compact.

Strengthening environmental legislation and water programs

The report mentions in several instances that there are gaps in Canada's data on water resources including insufficient data on ground water and significant gaps in Canada's data for the Great Lakes Regional Water Use Database. We strongly agree that the federal government must work with Great Lakes states and provinces to "investigate methodologies for improving the accuracy of water use and consumptive use estimates."

The Canadian government has been gutting environmental legislation and funding for water departments and research over the years which results in lack of accurate and thorough information on the Great Lakes. Cuts to the Canada Centre for Inland Waters, mandated to research climate change, pollution and toxicity in the Great Lakes Basin and beyond, weakens Canada's ability to manage its water sources.

The muzzling of scientists in Canada has made international headlines and calls into question the federal government's data on groundwater and surface water as well as water impacts of mining, oil, gas and other projects.

Protections for 99 per cent of lakes and rivers in Canada were removed under the Navigable Waters Protection Act. The Fisheries was gutted in a way that no longer protects fish habitat. Changes to the Canadian Environmental Assessment Agency cancelled 3000 environmental assessments. All of these changes have impacted water ways in the Great Lakes and St. Lawrence River Basin.

We call upon the Canadian government to reinstate and strengthen water protections and funding for water research and programs.

Protect the Great Lakes-St. Lawrence River Basin from bulk water exports and bottled water withdrawals

The report notes that basin-wide consumptive water issue is 0.4% of the basin-wide renewable supply. The Agreement and Compact prohibit new or increases to inter-basin transfers. There are several exceptions including one that allows removal of water in containers of twenty litres or less.

While Canada's Bill C-383 covers interbasin transfers into international rivers, it does not cover non-boundary waters or water resources in the North. It is still highly problematic that the Act narrows the definition of water removals and diversions to bulk removals of 50,000 litres or more and exempts water in manufactured goods including beverages. Canada needs a comprehensive ban on bulk water exports including on bottled water withdrawals.

In 2000, the Commission found that more bottled water is imported into the basin than exported. Updated information on whether this is currently still the case is important to protecting the Great Lakes. However, the report does note data deficiencies with the Canadian government. Regardless, the long term impacts of bottled water withdrawals are still a grave concern.

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In Southern Ontario, there are at least 11 bottled water companies with over 30 permits withdrawing well over 20, 000 litres per day. Collectively, these companies withdraw nearly 5 billion litres of water a year – the equivalent to what roughly 50,000 Ontarians use in a year. The companies together pay roughly $17, 570 per year for the 5 billion litres that they pump out and most of the permits are for seven to ten years. This is just a snapshot of bottled water withdrawals in one region of the Great Lakes Basin.

Nestle's withdraws over 400 million litres per year in its Hillsburgh well. In 2012, the Ontario government placed drought restrictions on their permit renewal requiring that they reduce their water takings by ten to twenty per cent during times of drought. Wellington County is a rural area with its local economy based mostly on agriculture and has experience six major droughts since 1998. Prior to the 2012 restrictions put on Nestle, the way in which drought warnings are issued in Ontario resulted in municipalities asking residents to reduce their water takings while Nestle and other industries were still able to withdrawal water. The droughts serve as a reminder that we cannot take our water supply for granted, and further underscores the need for Great Lakes governments to prioritize community rights to water above a private company's thirst for profit.

We recognize the Ontario government's enacting regulations that implements the Agreement and believe it is particularly important to consider consumptive use when reviewing applications for new or increased transfers of water. Nevertheless, the Council of Canadians is calling for a ban on bottled water withdrawals in the Great Lakes Basin as part of putting commons and public trust principles into practice.

We urge that this bottled water loophole be closed in the Compact to keep water in the Great Lakes basin for ecosystems as well as for current and future generations.

Protecting Great Lakes governments from trade lawsuits

There have been many NAFTA challenges against public health measures, water protections and environmental regulations by companies. The Canada-Europe Comprehensive Economic and Trade Agreement and other trade agreements have Investor State Dispute Settlement clauses that allow companies to sue national governments when a regulation or decision results in a loss of profit, including projected profits.

Lone Pine Resources is suing the Canadian government for Quebec's move to protect the St. Lawrence River Valley including a moratorium on fracking.

We call on both the Canadian and US governments for transparent and democratic negotiations for fair trade agreements that benefit people, respect human rights and protect the environment. We urge governments to support fair trade agreements that enable governments to act in the public interest and that protect community interests over corporate rights.

Free, prior and informed consent of Indigenous Peoples

Over 100 Indigenous nations signed the Tribal and First Nations Great Lakes Water Accord as a parallel process to the Great Lakes Compact.

Both the US and Canadian governments have endorsed the UN Declaration of the Rights of Indigenous People. Several causes related to water protection but particularly Article 32-2 which states:

"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources."

We urge the all levels of government in the Great Lakes as well as the IJC to ensure free, prior and informed consent is obtained in the recommendations of this report and with all decisions affecting the Great Lakes-St. Lawrence River Basin.

Launch a study on extreme energy impacts in the Great Lakes

The IJC report notes human activities and intervention and their impacts on climate change. We are glad to see the report raises the concern of water use associated with hydraulic fracturing.

In *Liquid Pipeline: Extreme energy's threat to the Great Lakes and the St. Lawrence River*, Maude Barlow warns that, "If the shale gas reserves in the land areas of just four Great Lakes states are developed, total water withdrawals to service these operations could exceed 37 billion gallons (148 billion litres) a year. The chemicals used in these fracking operations pose a direct threat to the water of the Great Lakes as well as the health of millions people who depend of them for drinking water."

Oil refineries are not only energy intensive but also water intensive. The federal government's push to expand the Alberta tar sands will affect the Great Lakes Basin because of the many pipeline and transport projects of bitumen.

While we agree with Recommendation 5, we urge governments to stop projects that exacerbate climate change like tar sands expansion and associated transport projects, fracking and other extreme energy projects.

In the meantime, we call upon the IJC to initiate a study on extreme energy projects in the Great Lakes including water use and impact of fracking and tar sands oil refineries, fracking wastewater disposal methods and costs of tar sands oil spills.

Invest in public water and wastewater

Adequate Infrastructure is a barrier to clean drinking water in some communities and critical to realizing the human right to water and sanitation. We agree that there should be broad-based collaboration among the public to "fix leaking water infrastructure, support innovation, and increase funding to close the region's water infrastructure deficit and unlock water conservation potential region wide." However, we have concerns about private sector management and delivery of water and wastewater services. The Canadian government has implemented a Public-Private Partnership (P3) fund that makes funding for infrastructure projects conditional upon entering into an agreement with private company. P3s around the world have resulted in rate increases, a decrease in water quality and job losses.

The City of Hamilton faced a decade of environmental disasters and financial troubles after awarding a contract to Philips Utilities Management Corporation for water and wastewater treatment in 1995. In addition to the workforce being cut in half within eighteen months, millions of litres of raw sewage spilled into the Hamilton Harbour, homes were flooded and major additional costs were incurred. Ontario Ministry of the Environment laid a number of charges against the contractor for failing to meet effluent standards. And as is common with P3s, the private water contract changed corporate hands four times. In 2004, Hamilton ended the private contacts for good and brought its water and wastewater systems back under community control.

Pricing water alone will not result in adequate protection of the waters of the Great Lakes. Water must be governed as a human right, commons and public trust in order to ensure community rights to water over private interests.

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Waukesha: The first test case of the Great Lakes Compact

The Wisconsin Department of Natural Resources recently gave a preliminary green light to Waukesha's request to pipe water from Lake Michigan to the city. The IJC report outlines very well the issues and challenges of what is to be the first test case of the Great Lakes Compact.

Decades of suburban and industrial growth have tapped out and polluted Waukesha's deep groundwater aquifers.

A Circle of Blue article notes that Dave Dempsey, a long-time environmental advocate and the award-winning author of "Great Lakes for Sale," reasons that the "Waukesha's application doesn't meet the requirements for exceptions provided in the Great Lakes Compact. The amount of water Waukesha seeks is 45 percent more than it uses now and is designed to allow the city's sprawling growth pattern to expand."

The Waukesha case is yet another example of why Great Lakes governments as well as the IJC need to take leadership in implementing commons and public trust principles to ensure clean water supplies for communities around the basin. This can be done by:

- Strengthening environmental legislation and water programs
- Protect the Great Lakes-St. Lawrence River Basin from bulk water exports and bottled water withdrawals
- Protecting Great Lakes governments from trade lawsuits
- Obtaining free, prior and informed consent of Indigenous Peoples on Great Lakes matters
- Launch a study on extreme energy impacts in the Great Lakes
- Invest in public water and wastewater

There is still water in the basin but in some regions, it is steadily being used up and polluted. We hope this report is a touchstone for further debate and discussion and a springboard to shift to a governance model that puts water, communities and human rights first. This change is already happening and it is being lead by grassroots groups and local communities. What better way for Great Lakes governments and the IJC to support these inspiring initiatives than to implement commons and public trust principles that will support these local efforts.

Again we thank you for this thorough report on the current state of the Great Lakes and for highlighting steps to further advance Great Lakes protection and appreciate this opportunity to provide input into the recommendations.

Respectfully,

Emma Lui
Water Campaigner
Council of Canadians

The Council of Canadians is Canada's leading social action organization, mobilizing a network of 60 chapters across the country. We have 16 Council chapters around the Great Lakes and have been working to protect water nationally and internationally for the last 30 years. Maude Barlow, the National Chairperson of the Council of Canadians, also served as Senior Advisor on Water to the 63rd President of the United Nations General Assembly (2008-2009).

Name: David Sweetnam

Date of Submission: June 30, 2015

Location: Caledon, Ontario

Comments:

Attached please find our comments for the Commission's consideration.

GEORGIAN BAY FOREVER

Protecting your water.

Georgian Bay Forever Comments on the 10 Year Report of the IJC

Protection of the Waters of the Great Lakes.

Georgian Bay Forever has been privileged to work with the International Joint Commission over the past decade on Great Lakes water issues. It has been our charitable role that allowed us to look at and provide input to the Commission in its important work in some cases expanding the scope of study and our understanding of this precious system.

Georgian Bay Forever has commissioned research and studies on a variety of issues examining the ecosystems, energy flows, biodiversity, water quality and water quantity of Georgian Bay and by extension Lake Michigan-Huron. Georgian Bay Forever also underwrote the recent Council of the Great Lakes Region / Mowat Centre study of the economic impact of water level declines modelled in the International Upper Great Lakes Study on the Great Lakes Regional economy.

One theme has repeatedly arisen in our research. The environmental status quo has shifted and action is now required to protect these aquatic treasures in the face of a number of stressors including climate change and invasive species.

We are pleased to provide the following comments on the draft 10 year report.

2015 Recommendation 1

Despite the positive news on intra-basin and inter-basin diversions and consumptive uses, there is a new and ongoing corollary loss of water through evaporative processes induced due to fossil fuel induced climate change and the resulting water temperature increases. While the precise magnitude of this impact on a litre-of-fuel-induced change would be difficult to calculate, the strength of the thermodynamic connections make it arguable that this direct loss of water should be accounted for as a consumptive loss resulting from fossil fuel use.

Further, while existing configurations of the Long Lac and Ogoki diversions into Lake Superior currently more than offset diversion through the CAWS, initiatives to potentially return the northern watershed flows to their natural state could gain traction and significantly impact the water balance calculations. In addition, the inter-basin diversion to the Mississippi leaves an open bi-directional pathway for cross invasions of AIS including the devastating Asian carps. New consideration of “straddling” community diversions under the Great Lakes Compact may also lead to increasing demands for Great Lakes waters to be impacted. Therefore, the sanitary diversion at Chicago should be re-examined and all efforts made to identify and implement contemporary solutions including enhanced conservation efforts called for in the Compaq that would reduce or eliminate the need for this historic diversion.

Therefore, we would encourage the Commission to modify the recommendation as follows:

2015 Recommendation 1: The existing Agreement and Compact should continue to be rigorously implemented to minimize loss of water from the Basin and using adaptive management principles, including enhanced conservation efforts, all existing diversions should be reviewed each reporting cycle with all efforts made to identify and implement solutions that would eliminate the need for these historic diversions. Existing diversions should also be subject to reapplication on a 50 year cycle to ensure that future best practices are implemented.

2015 Recommendation 2

The ecosystem of the Great Lakes is already not able to contribute the significant economic benefits it could if it were in a healthy state, therefore, we would encourage the Commission to modify the recommendation as follows:

2015 Recommendation 2: The precautionary approach regarding diversions must continue to guide the States and Provinces in order to protect the Great Lakes from an ever-increasing number of larger-scale removals.

2015 Recommendation 3

We agree with recommendation 3:

2015 RECOMMENDATION 3: The Great Lakes States and Provinces, in collaboration with the two federal governments, should continue to investigate methodologies for improving the accuracy of water use and consumptive use estimates.

2015 Recommendation 4

We agree with recommendation 4:

2015 RECOMMENDATION 4: Further refinement of water balance components should continue to occur through federal agencies such the USGS, NOAA, US Army Corps of Engineers, and Environment Canada. Assuming that the science will continue to evolve rapidly, the Regional Body/Council should continuously review new knowledge regarding lake-wide hydrology and incorporate new advancement in decision-making processes.

2015 Recommendation 5

Climate Change

The Null hypothesis inherent in this section is that we can't assume that climate change impacts are attributed to human factors. A new paper published in Nature Climate Change, by Kevin Trenberth

and John Fassulo of the National Center for Atmospheric Research in New Zealand and Theodore Shepherd from the University of Reading in the UK suggests that we should be starting from the reality that we have a new normal and that all weather events are different.

New actions will be required to address this new reality and have not been studied to date. Georgian Bay Forever is currently funding a new study to inject climate resilient designs in to the discussion of structural mitigation options. Therefore, we would encourage the Commission to modify the recommendation as follows:

2015 Recommendation 5: Considering the large uncertainties surrounding climate change and other human impacts on the hydrologic cycle, federal, provincial and state governments should, in addition to continuing to take an adaptive management approach in decision-making and as is common in other parts of the world, incorporate climate resilience into designs of regulations, structures, policies and management practices. Advancements in the state of science on climate change impacts in the Great Lakes should be encouraged by federal, state and provincial governments through further funding and a synthesis of the state of the science.

2015 Recommendation 6

Ground Water

There are a number of Great Lakes community population growth targets that have been established in the absence of local ground-water supply considerations including “Places to Grow” in Ontario. Additions of infrastructure investments are required to supply water to these communities. As we see in our Great Lakes cities today, these infrastructure designs create significant financial and energy issues for future generations.

We would encourage a slight modification to the recommendation:

2015 Recommendation 6: Great Lakes States and Provinces should fully factor the adverse ecological and water quality impacts of groundwater withdrawals into both water use permitting procedures and decisions regarding consumptive use. Federal, state and provincial research should focus on predicting where groundwater supplies may be degraded in the future and identify management methods for avoiding these problems, including population growth directives that are based upon water supply limitations.

2015 Recommendation 7

Conservation

GBF also applauds conservation efforts. The issues of water supply are also closely tied to energy use. Therefore benefits can be realised through the elimination of greenhouse gas producing energy sources.

In light of potential positive local aquifer recharge impacts in urban centres due to leaking infrastructure and possible repairs adversely impacting this recharge, green infrastructure should be also be incorporated into these remedial reviews.

Georgian Bay Forever would encourage the following addition:

2015 RECOMMENDATION 7: The IJC recommends broad-based collaboration among public and private sectors to fix leaking public water infrastructure, support innovation, and increase funding to close the region's water infrastructure deficit and unlock water conservation potential region wide with consideration of energy source reduction and local watershed recharge issues.

Conclusion

Georgian Bay Forever also agrees with the guidance statement:

> *"Moving forward, it is important to remember that there really is no "surplus" water in the Great Lakes Basin. From an ecosystem perspective, it is all in use, even in periods of high supply. There continue to be large voids between our knowledge regarding levels and flows, and the impact they have on the ecosystem of the basin. Due to prevailing uncertainties such as those posed by climate change and the sheer threat of the unexpected, the precautionary principle needs to be continually applied by basin jurisdictions to ensure, to the extent possible, adequate supplies for all socio-economic and ecosystem uses for the long term."*

However, this does not mean that we take a passive approach to the management of climate change impacts. Like the success achieved in reversing the thinning of the "Ozone hole", it is possible that proper regulation of products, avoidance and remediation practices and economic incentives can all be implemented for some period of time until the impacts of fossil fuel carbon loading are reversed. At that future point, it would be reasonable to suggest that interventions mitigating impacts could be removed.

It is clear in Lake Ontario that the historic over-regulation of water levels dampening natural fluctuations has resulted in the degradation of over 60,000 acres of coastal wetlands with the associated depletion of biodiversity, habitat and species. It is also equally clear that a modification of the regulation regime as proposed in Regulation 2014 can have direct and immediate impacts on returning these same areas to a healthy state.

In the Upper Great Lakes, similar mitigation tools are needed to protect the lakes and the $5.8 trillion regional economy from potential future climate change induced adverse impacts. Not providing these tools will lead to unnecessary environmental and economic losses.

Name: David Ferrie

Date of Submission: June 30, 2015

Location: Milwaukee, Wisconsin

Comments:

I am strongly urge you not to allow diversion outside of the great lakes basin. I am specifically against diversion to the City of Waukesha, WI. For close to 50 years, that city had been warned to conserve their ground water. Those warnings were met with scorn and hubris. To bail them out now would not only reward them for their profligacy, it would set a dangerous precedent for future diversion requests.

Name: Roseann Vitale

Date of Submission: June 30, 2015

Location: Milwaukee, Wisconsin

Comments:

Under no circumstances should any water diversions be allowed or acceptable. Remove the language that allows counties that straddle the continental divide, such as Waukesha here in Wisconsin, to be approved for diversion requests. The long term protection of such important resources as Great Lakes water vastly outweighs any potential economic benefits. Further, the short term humanitarian needs can be absolved by the individuals affected moving to area's with safer and more abundant potable water, with possible governmental assistance where needed.

Name: Daniel Puhek

Date of Submission: June 30, 2015

Location: Milwaukee, Wisconsin

Comments:

Under no circumstances should any water diversions be allowed or acceptable. Remove the language that allows counties that straddle the continental divide, such as Waukesha here in Wisconsin, to be approved for diversion requests. The long term protection of such important resources as Great Lakes water vastly outweighs any potential economic benefits. Further, the short term humanitarian needs can be absolved by the individuals affected moving to area's with safer and more abundant potable water, with possible governmental assistance where needed.

Name: Roger Lachance

Date of Submission: June 30, 2015

Location: Montréal, Québec

Comments:

See attachment.

Montréal

Service de l'environnement
Division de la planification et du suivi environnemental

Les initiatives et les programmes déployés par la Commission mixte internationale (CMI) dans le sens d'une gestion concertée et participative sont importants. L'information qui est ainsi recueillie et partagée, les propositions qui sont soumises, permettent de prendre conscience des enjeux qui nous concernent tous, de cibler et d'améliorer les impacts environnementaux de nos collectivités et de s'assurer d'une gestion responsable de l'eau.

Le « *rapport 10 ans*» soumis actuellement à une consultation publique, présente une analyse des progrès que les 8 États et 2 provinces riverains du *bassin des Grands Lacs* ont faits depuis 2004 quant à la conservation de l'eau et quant aux dérivations, exportations massives et prélèvements d'eau à grande échelle.

Considérant que la ressource en eau est d'une importance capitale pour l'agglomération de Montréal, la Ville de Montréal transmet à la CMI les quelques commentaires qui suivent.

Des efforts importants ont été consentis par les gouvernements pour empêcher que la situation se détériore et pour mettre en place un encadrement d'autorisation des nouveaux projets de dérivation. Les auteurs du rapport évaluant le progrès des 10 dernières années dressent un portrait positif et encourageant.

Certaines lacunes constatées sont préoccupantes et il serait sage et responsable de s'engager à les résoudre globalement et localement, en s'assurant de la participation de toutes les organisations directement visées :

- Les bilans de prélèvement d'eau, d'utilisation et de retour au bassin, ne balancent pas et ils ne sont pas effectués selon un protocole uniforme à travers le bassin, ce qui peut porter à atténuer la confiance du public face aux conclusions qu'on en tire. Il apparaît essentiel de s'assurer d'une solide évaluation des faits, d'en actualiser les données à une fréquence suffisante pour permettre de discerner des tendances et prendre action, et d'augmenter les connaissances quant aux enjeux environnementaux critiques, afin de gérer et protéger adéquatement la ressource;

- Bien que plusieurs principes de gestion durable très pertinents soient considérés avant l'autorisation de nouveaux retraits ou usages, dans le cadre du *Pacte* entre les États et de *l'Entente* entre les provinces, il serait approprié de les utiliser aussi pour diagnostiquer / améliorer / vérifier les retraits, usages et retours existants, en développant de manière concertée un cadre d'implantation et des outils uniformisés. On évaluerait ainsi tant les usagers riverains, que les usagers de l'ensemble du *bassin hydrographique des Grands Lacs* et les usagers limitrophes recevant les dérivations (antérieures et postérieures au *Pacte Great Lakes Compact* entre les 8 états américains et à *l'Entente sur les ressources en eaux durables du bassin des Grands Lacs et du Saint-Laurent* entre l'Ontario et le Québec).

- Il apparaît important et nécessaire de développer un ensemble de critères à considérer afin de porter un jugement éclairé sur ce qui constituerait un «effet ou une détérioration significatifs» dans le cadre de l'application du *Pacte* et de l'*Entente*, d'autant plus que les premiers projets approuvés ou refusés créeront des «précédents» sur lesquels s'appuiera l'évaluation des prochains projets soumis.

- Au chapitre de la conservation de l'eau et de la réfection des infrastructures, il demeure encore d'immenses progrès à réaliser;

- La cartographie et la compréhension des aquifères souterrains du *bassin hydrographique des Grands Lacs* et des bassins limitrophes ont peu évolué. On en soutire de plus en plus d'eau, au risque de perturber les apports vers les Grands Lacs (quantité et qualité) et de générer de nouvelles demandes de diversion des Grands Lacs, et ce, parfois sans avoir mis en place des efforts soutenus de conservation de cette ressource.

C'est avec intérêt que nous prendrons connaissance du rapport que la CMI présentera aux gouvernements à l'automne 2015, suite à cette consultation publique de l'ébauche du «rapport 10 ans».

Name: Kathryn A. Buckner and Dale K. Phenicie

Date of Submission: June 30, 2015

Location: Ann Arbor, Michigan

Comments:

Attached are comments of the Council of Great Lakes Industries. Thanks for the opportunity to provide this input.

June 30, 2015

Mr. Gordon Walker, Chair Canada Section
International Joint Commission
234 Laurier Avenue West, 22nd Floor
Ottawa, ON K1P 6K6

Ms. Lana Pollack, Chair U.S. Section
International Joint Commission
2000 L Street, NW, Suite #615
Washington, DC 20440

Re: **Comments on *Ten Year Review of the International Joint Commission's Report on "Protection of the Waters of the Great Lakes" (draft, May 19, 2015)***

Dear Commissioners Walker and Pollack:

Thank you for the opportunity to provide comments on the *Ten Year Review of the International Joint Commission's Report on "Protection of the Waters of the Great Lakes"(draft, May 19, 2015).* These comments are provided on behalf of the members of the Council of Great Lakes Industries (CGLI). CGLI is a binational non-profit organization representing the common policy interests of Canadian and US industrial organizations that have significant assets in the Great Lakes region. The mission of CGLI is to promote the growth and vitality of the region in harmony with its human and natural resources (sustainable development).

Continued dependable access and reliance on Great Lakes water resources is a critical Great Lakes industry need. CGLI has coordinated industry stakeholder cooperation and participation throughout the development and implementation of the Great Lakes – St. Lawrence River Basin Sustainable Water Resources Compact and Agreement, The resulting governance structure regarding Great Lakes water resources management provides important oversight while maintaining the flexibility needed to allow regulatory jurisdictions to respond to local water use needs. As indicated in the draft Ten Year Review report, this structure provides a critical framework that serves the region's needs.

Continuing implementation of the Compact/Agreement consistent with the draft report's 2015 Recommendation 1 will protect the resource. While vigorously implementing the Compact, however, it is important for resource managers and decision makers to have available and to utilize high quality data and information to assess potential impacts on Great Lakes ecosystems. When they do so, as is highlighted by 2015 Recommendation 2, the Compact/Agreement Decision Making Standard does provide the precautionary approach needed to support jurisdictional water management actions.

As demonstrated in the report, the numbers associated with the region's water resources are huge, which means that collecting and managing water use data and related information is a huge, but critical, undertaking for Great Lakes water resources managers. Expectations regarding the estimation of "consumptive use" quantities need to be interpreted in the context of the precision capable in the measuring and reporting of quantities of the magnitude represented in the Great Lakes system. As stated in Recommendation 3, the Great Lakes states and provinces

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should continue to investigate improved water balance methodologies in terms of both measurement and intrepretation. However, it is equally important to apply standard statistical analysis methodologies appropriate to the magnitude of the system and not try to force conclusions from the numbers beyond the precision afforded by whatever methodology is applied.

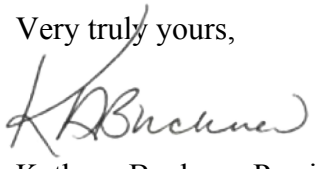
As indicated in 2015 Recommendation 4, the multiple agencies involved in collecting and managing water use information and analyses—especially the federal agencies listed in the recommendation--must continue to coordinate and share new knowledge about the Great Lakes system to inform decision-making under the Compact. Moreover, scientific advancements should be encouraged and incorporated, as suggested by 2015 Recommendation 5. It is critical for federal agencies to collaborate with state and provincial jurisdictions and stakeholders in these efforts. The Regional Body and Compact Council must seek to enhance opportunities for full scale collaborative events that update and seek input to policy decisions and the science and data that support such decisions. Events should include agency, academic, jurisdictional and stakeholder consultations. Report authors should consider adding the need for the convening periodic water resource science forums to these recommendations.

Groundwater is an important part of Great Lakes water resources. 2015 Recommendation 6 highlights the need to focus on groundwater protection within the Great Lakes basin. However, it is important to consider that the concerns regarding supply quantity and quality that are reflected in this recommendation most likely apply only in localized areas. These situations must be managed at the local jurisdictional level and should not be considered to be a systemwide or Great Lakes-basin level issue.

The region's infrastructure is the backbone of the regional economy. As noted in 2015 Recommentation 7, broad-based public and private sector collaboration is an important element in addressing infrastructure improvement needs. However, the focus in this recommendation on "water conservation potential" is too restrictive. The key to well-managed water use in the Great Lakes region is enhanced water stewardship. It is not the quantity of water withdrawn for use that is important, it is the stewardship of water use that leads to sustainability. A slight revision of this recommendation would satisfy this need (i.e. "… increase funding to close the region's water infrastructure deficit and support/encourage a water stewardship focus region wide").

CGLI appreciates the opportunity to provide these comments and looks forward to working with IJC commissioners and staff as this review moves forward. Please contact us for any needed additional information or clarification.

Very truly yours,



Kathryn Buckner, President

cc: Ms. Tris Morris, Director
International Joint Commission
Great Lakes Regional Office
100 Ouellette Ave., 8th Floor
Windsor, ON N9A 6T3

Name: Olivia Green

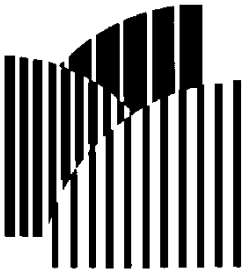
Date of Submission: June 30, 2015

Location: Syracuse, New York

Comments:

Comment of Olivia Green for the Atlantic States Legal Foundation 658 W. Onondaga St, Syracuse, New York 13204 Climate Change The Basin should not rely on a climate forecast that does not account for climate refugees and increased agricultural production as a result of climate-driven water scarcity in other regions of the United States and Canada. The climate change scenario that assumes a relatively constant population in the Basin fails to account for climate refugees, including those from drought stricken regions of the US and Canada. Refugee populations may include those employed in water-dependent sectors (e.g., agriculture, electricity generation), those suffering from climate-induced health problems (e.g., asthma), and those that can no longer afford increased utility rates for domestic water use should domestic rates become prohibitively expensive (e.g., Southwest United States, Southern California). Assuming that climate change exacerbates water shortages in the West Coast of the United States, agricultural production in the Basin may increase as that sector migrates to more water-rich regions. This will increase demand for irrigation. Thus, though the Basin may experience a wetter climate and withdrawal volume/unit of agriculture produced may not change (or may decrease, as the forecast states), actual withdrawals may increase due to increased production. Adaptive Management Adaptive management is more than setting up protocols that can be adapted if physical conditions change, which seems to be the interpretation of adaptive management used in this report. Adaptive management can take many forms, such as "race horse", and is frequently used to act in the face of uncertainty. For example, if the ecological impact of a particular action is not fully known, taking an adaptive management approach—the action is taken much like an experiment, where the ecological response to the action is heavily monitored, and the action can be adjusted/adapted as the data indicates harm or improvement to the ecosystem—permits the action to take place. This approach runs counter to the precautionary approach—restrict action in the face of uncertainty—that is lauded elsewhere in the report. Ecological Impact of Withdrawals for Thermoelectric Cooling It should be noted that the ecological impact of withdrawing massive volumes of Great Lakes waters for thermoelectric cooling purposes goes beyond thermal discharges. Cooling water intake structures entrain (i.e., suck up) and impinge (i.e., trap and squash) vast amounts of aquatic organisms and are subject to §316(b) of the Clean Water Act, which requires intake structures to utilize the "best technology available for minimizing adverse environmental impact." Upgrading cooling systems to use less water, via either closed looped or hybrid approaches, would result in less entrainment and impingement. Thus, the statement in the report "…the magnitude of withdrawals for thermoelectric purposes suggests opportunities for conservation for the purpose of reducing ecological impacts of thermal discharges" should be expanded to include conservation opportunities for reducing the number of aquatic organisms directly killed by the intake structures by impingement and entrapment.

See attachment.



ATLANTIC STATES
LEGAL FOUNDATION, INC.

Protection of the Waters of the Great Lakes
Ten-year Review of the International Joint Commission's Report on
Protection of the Waters of the Great Lakes

Comment of Olivia Green for the Atlantic States Legal Foundation
658 W. Onondaga St, Syracuse, New York 13204

Climate Change

The Basin should not rely on a climate forecast that does not account for climate refugees and increased agricultural production as a result of climate-driven water scarcity in other regions of the United States and Canada. The climate change scenario that assumes a relatively constant population in the Basin fails to account for climate refugees, including those from drought stricken regions of the US and Canada. Refugee populations may include those employed in water-dependent sectors (e.g., agriculture, electricity generation), those suffering from climate-induced health problems (e.g., asthma), and those that can no longer afford increased utility rates for domestic water use should domestic rates become prohibitively expensive (e.g., Southwest United States, Southern California).

Assuming that climate change exacerbates water shortages in the West Coast of the United States, agricultural production in the Basin may increase as that sector migrates to more water-rich regions. This will increase demand for irrigation. Thus, though the Basin may experience a wetter climate and withdrawal volume/unit of agriculture produced may not change (or may decrease, as the forecast states), actual withdrawals may increase due to increased production.

Adaptive Management

Adaptive management is more than setting up protocols that can be adapted if physical conditions change, which seems to be the interpretation of adaptive management used in this report.

Adaptive management can take many forms, such as "race horse", and is frequently used to act in the face of uncertainty. For example, if the ecological impact of a particular action is not fully known, taking an adaptive management approach—the action is taken much like an experiment, where the ecological response to the action is heavily monitored, and the action can be adjusted/adapted as the data indicates harm or improvement to the ecosystem—permits the action to take place. This approach runs counter to the precautionary approach—restrict action in the face of uncertainty—that is lauded elsewhere in the report.

Ecological Impact of Withdrawals for Thermoelectric Cooling

It should be noted that the ecological impact of withdrawing massive volumes of Great Lakes waters for thermoelectric cooling purposes goes beyond thermal discharges. Cooling water intake structures entrain (i.e., suck up) and impinge (i.e., trap and squash) vast amounts of aquatic organisms and are subject to §316(b) of the Clean Water Act, which requires intake structures to utilize the "best technology available for minimizing adverse environmental impact." Upgrading cooling systems to use less water, via either closed looped or hybrid approaches, would result in less entrainment and impingement.

Thus, the statement in the report "…the magnitude of withdrawals for thermoelectric purposes suggests opportunities for conservation for the purpose of reducing ecological impacts of thermal discharges" should be expanded to include conservation opportunities for reducing the number of aquatic organisms directly killed by the intake structures by impingement and entrapment.

658 West Onondaga St. Syracuse, NY 13204-3711 (315) 475-1170 FAX (315) 475-6719 Atlantic.States@aslf.org

Name: James Snider

Date of Submission: June 30, 2015

Location: Toronto, Ontario

Comments:

Thank you for the opportunity to comment on the recent Protection of the Waters of the Great Lakes 10 year review report. Please see the attached document for comments.

WWF-Canada
World Wildlife Fund Canada
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International Joint Commission
234 Laurier Avenue W 22nd Floor
Ottawa ON K1P 6K6

June 30, 2015

Re: WWF-Canada's Submission on the Ten Year Review of the International Joint Commission's Report on "Protection of the Waters of the Great Lakes"

WWF is one of Canada's largest and oldest conservation organizations, with staff and offices across the country including, Toronto and Montreal, providing us with a strong presence in the Great Lakes region.

Our work is science-based and solutions oriented. Our freshwater program is aimed at protecting and restoring the health of Canada's aquatic ecosystems so that we, and future generations, can benefit from the many values they provide – from clean water and recreational opportunities to habitat for fish and waterfowl. WWF-Canada's vision is to see all Canadian freshwater is in good health by 2025.

Our organization has followed recent legislative changes aiming to protect the health of the Great Lakes (e.g., new GLWQA, renewed Canada-Ontario Agreement, and Ontario's proposed Great Lakes Protection Act) with substantial interest since we profiled the St. Lawrence River in our report "Canada's Rivers at Risk" in 2009. Since that time WWF-Canada has provided supportive submissions and testimony on the IJC's Plan 2014. We have also developed a suite of freshwater health and threat assessment tools and are assessing the health of watersheds across Canada, including the Great Lakes watershed. To date WWF-Canada has assessed 50% of Canada's watersheds and we aim to assess 100% by 2017 to develop a picture of national water health. The results of these assessments suggest that while some indicators of health in the Great Lakes are improving, overall there is not enough accessible data to confidently report the health of the entire watershed. The watershed is data deficient. The Great Lakes threats assessment reveals that the watershed as a whole is facing very high threat levels. Specifically, the threat from pollution, habitat loss, and water use is very high for the entire basin.

WWF-Canada would like to thank the IJC for the opportunity to comment on the Ten Year Review of the International Joint Commission's Report on "Protection of the Waters of the Great Lakes" and commend the authors of the report on their thorough analysis of actions to protect the Great Lakes.

Our organization agrees with the report's overall characterization of actions taken to protect the Great Lakes; however, we feel that the language of the recommendations needs to be stronger

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and more direct. We suggest that the IJC final report use stronger, pointed language to increase the impact of the recommendations to reflect the specific issues addressed in the text of the report. Importantly, the final IJC report should call on governments to quickly adopt Plan 2014 as a major milestone to protect, enhance, and restore habitat features and ecosystem services of the basin. Adopting Plan 2014 will advance the principles of the 2005 Agreement/Compact. Finally, WWF-Canada notes that "integrity of the basin ecosystem" is not defined in the 2005 Agreement/Compact, nor are measures to assess "integrity" defined. WWF-Canada suggests that the final report call on governments to develop a definition which includes "good ecological condition" and set measureable targets in order to assess progress towards to sustaining the integrity of the basin ecosystem.

Below, we address the each recommendation from the report and note specific occurrences where stronger wording is required.

Protection of the Great Lakes region, its water quality, quantity, biodiversity, habitats, and services requires all citizens to be engaged and supportive of a holistic, long-term and sustainable vision for the Great Lakes. We must ensure legislation is enacted as it was intended in order to ensure full protection of the Great Lakes including addressing population growth, urbanization, threats to water quality and quantity, eutrophication, and climate change.

Sincerely,

James Snider
Acting Vice President, Freshwater Program
WWF-Canada

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WWF-Canada Comments:

2015 RECOMMENDATION 1: The existing Agreement and Compact should continue to be rigorously implemented to minimize loss of water from the Basin.

WWF-Canada Response: Recommendation 1 should call on governments to fully implement existing legislation to ensure that the Great Lakes basin is protected as intended. For example, the report must recommend that Governments adopt and implement *Plan 2014* to halt and reverse significant habitat loss in Lake Ontario and the St. Lawrence River. Adopting *Plan 2014* would support goal *b* of Article 304 of the 2005 Agreement/Compact to "protect and restore the hydrologic and ecological integrity of the basin." The integrity of the Great Lakes basin will not be wholly protected unless all legislation and best practices are implemented as intended.

WWF-Canada agrees with the report's assessment that the policy gaps needed to protect the Great Lakes basin have been largely addressed with the full implementation of the 2005 Agreement/Compact - as of 2015 when Ontario completed necessary regulations. However, the report notes many instances where the Great Lakes are still experiencing cumulative impacts including withdrawal and ecological stress suggesting that implementation of Great Lakes policies and legislation is not sufficient to ensure protection of the integrity of the basin.

2015 RECOMMENDATION 2: The precautionary approach regarding diversions should continue to guide the States and Provinces in order to protect the Great Lakes from an ever-increasing number of larger-scale removals.

WWF-Canada Response: WWF-Canada supports the use of the precautionary approach in guiding water management opportunities in the Great Lakes basin. The report's recommendations should specifically call on governments to adopt the definition of precautionary approach as set forth in the Rio Declaration on Environment and Development stating "*Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*." This definition is used in the Great Lakes Water Quality Agreement 2012, but is not defined in the 2005 Agreement/Compact. WWF-Canada further believes that given both climate change and consumptive use coefficients are inherently difficult to quantify, strict enforcement of the precautionary approach is necessary to protect Great Lakes waters.

2015 RECOMMENDATION 3: The Great Lakes States and Provinces, in collaboration with the two federal governments, should continue to investigate methodologies for improving the accuracy of water use and consumptive use estimates.

WWF-Canada Response: Consumptive use coefficients have been called unreliable and inaccurate in the report. WWF-Canada supports the report's recommendation that governments should continue to refine the coefficients to reduce the resulting uncertainty of total consumptive use. However, the final IJC report should clearly state that the resulting "total consumptive use

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represent[s]…0.4% of renewable supply" – is uncertain, and clearly state the level of uncertainty. This factor is important because it demands water managers implement, very strictly, a precautionary approach.

While WWF-Canada applauds recent moves by the Ontario government to bring the Agreement/Compact into full effect, the report states Ontario has been delinquent in reporting to the Regional Body and GLRWUD. The report also states that there is no standard data quality control practice across the basin. The IJC final report and recommendation must strongly call on the federal governments, Governors, and Premiers to address the need for consistent, standardized information management practices, as the Governs and Premiers themselves called for better data and quality control in a joint statement in 2013. Information management practices should be transparent and available to the public in a user-friendly format. This will improve government accountability and encourage timely and accurate reporting.

2015 RECOMMENDATION 4: Further refinement of water balance components should continue to occur through federal agencies such the USGS, NOAA, US Army Corps of Engineers, and Environment Canada. Assuming that the science will continue to evolve rapidly, the Regional Body/Council should continuously review new knowledge regarding lake-wide hydrology and incorporate new advancement in decision-making processes.

WWF-Canada Response: WWF-Canada believes that the lack of agreement on what ecological impacts may occur due to changes in water level should not preclude broad assessments of potential impacts. WWF-Canada's own assessments of threats to the Great Lakes watershed suggests locally significant risk from climate change and water use. If water use decisions (e.g., for a straddling community) are made at the basin level without regard to locally at risk watersheds it could lead to water use conflicts and ecological damage.
If ecological impacts are not identified, then they cannot be mitigated. For example, indicators from the recent LOSLR[1] report could be adopted for the entire basin. WWF-Canada also suggests that local concerns about cumulative impacts be identified and addressed. That is, the IJC should recommend that consideration of cumulative impacts be assessed at both the basin scale and smaller unit of analysis for high risk watersheds. This is imperative because consumptive use, withdrawals, and climate model forecasts are evaluated at the basin level and may obscure local issues.

Importantly, the IJC should recommend that in order to fully protect and enhance the Great Lakes and reduce cumulative impacts that both Canada and the U.S. adopt and immediately implement *Plan 2014.*

2015 RECOMMENDATION 5: Considering the large uncertainties surrounding climate change and other human impacts on the hydrologic cycle, federal, provincial and state governments should continue to take an adaptive management approach in decision-making. Advancements in the state of science on climate change impacts in the Great Lakes should be encouraged by

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federal, state and provincial governments through further funding and a synthesis of the state of the science.

WWF-Canada Response: WWF-Canada supports the report's recommendation that governments support climatic studies to reduce the uncertainty of impacts from climate change in the Great Lakes basin. Additionally, the final report should affirm the definition of adaptive management as stated in the 2005 Agreement/Compact "*Adaptive Management means a water resources management system that provides a systematic process for evaluating, monitoring and learning from the outcomes of operational programs and adjustment of policies, plans and programs based on experience and the evolution of scientific knowledge concerning water resources and water dependent natural resources.*"

2015 RECOMMENDATION 6: Great Lakes States and Provinces should fully factor the adverse ecological and water quality impacts of groundwater withdrawals into both water use permitting procedures and decisions regarding consumptive use. Federal, state and provincial research should focus on predicting where groundwater supplies may be degraded in the future and identify management methods for avoiding these problems.

WWF-Canada Response: WWF-Canada agrees with the report recommendation that groundwater withdrawals should be fully factored into permitting procedures and that research must address the impact of consumptive use, withdrawal, and contamination of groundwater as a priority area of research for all levels of government. Two recent reports[2,3] have highlighted the limited knowledge of groundwater resources and impacts of pollution on groundwater in Canada. Proper basin-wide water management cannot be conducted due to existing knowledge gaps around groundwater which is a fundamental component of the Great Lakes region water resource.

2015 RECOMMENDATION 7: The IJC recommends broad-based collaboration among public and private sectors to fix leaking public water infrastructure, support innovation, and increase funding to close the region's water infrastructure deficit and unlock water conservation potential region wide.

WWF-Canada Response: Ontario was the final party to develop and adopt water conservation and efficiency goals and objectives which were published in 2014. WWF-Canada applauds the Ontario government on addressing this part of the Agreement and notes that reporting requirements should now be implemented.

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End Notes:

[1] International Lake Ontario-St. Lawrence River Study Board, 2006. Options for Managing Lake Ontario and St. Lawrence River Water Levels and Flows. http://www.losl.org/reports/finalreport-e.htm

[2] McLaughlin, D. 2015. Security Underground: Financing Groundwater Mapping and Monitoring in Canada. University of Toronto.

[3] Pentland, R. 2015. Destined to Fail? Ground Water Management in Canada. University of Toronto.

Name: Roger Gauthier

Date of Submission: June 30, 2015

Location: Cheboygen, Michigan

Comments:

Please confirm receipt of this submission.

See attachment.

Restore Our Water International

June 30, 2015

To: The International Joint Commission

U.S. Section
2000 L Street, NW Suite #615,
Washington, DC 20440
and
Canadian Section
234 Laurier Ave. West, 22nd Floor
Ottawa, ON K1P 6K6

Dear Commissioners:

Re: **Draft "10-year Review of the Protection of the Waters of the Great Lakes"**

Thank you for providing an opportunity for public comment on this important document. In general, it is a timely and well thought out review. We applaud the IJC for undertaking this endeavor.

Restore Our Water International, a consortium of shoreline property owners, small businesses and environmental organizations, would like to provide the following comments:

1. On page 44, in a quote from the IUGLSB, the report states ***"The study also concluded that there has been no significant erosion of the channel in the upper reach of the St. Clair River since at least 2000.***" This statement can only be seen as a conclusion the IUGLS wanted to draw, but did not have sufficient data to do so. Preliminary analysis of the latest 2012 bathymetry data conducted by the U.S. Army Corps of Engineers (USACE), when compared with 2001, 2005, 2007 surveys, shows that erosion of the St. Clair River bottom has indeed occurred over the last 15 years. Although, full analysis of these data by the USACE are not yet complete, the IJC should emphasize the importance of conducting repetitive bathymetric surveys of the river, minimally every 5 years.

2. On page 47 is the following quote, "***With this objective, the study encouraged the installation of new acoustic velocity meters by the U.S. Geological Survey and Environment Canada to better measure flows in the St Marys, St. Clair, Detroit and Niagara rivers."*** ROWI supports the operation and maintenance of the USGS acoustic velocity meter on the U.S. side of the river near the Blue Water Bridge. Unfortunately this meter does not read across the entire width of the river, with inadequate attempts being made so far to "extrapolate the rest of the flows". This is a very complex and turbulent high flow

reach of the river. A similar installation is needed for the Canadian side of the river. Outflows from Lake Huron through the St. Clair River are not controlled and all evidence points to the fact that the glacial till riverbed is continuously moving downstream. There needs to be constant/regular conveyance change monitoring of the river as it affects levels throughout the upper Great Lakes. Greater emphasis needs to be placed by the IJC on monitoring changes in the St. Clair River until funding is provided to stabilize the riverbed and flexible compensation measures can be installed.

3. Coordinated Great Lakes water level and water supply data have been collected and analyzed back to 1865. But beginning in 2007 the U.S. and Canadian governments decided to only publish and analyze these data from 1918 to present. Data collected from 1865 through 1917 are ignored since they may be inconsistent with modern standards, which ignore anthropogenic changes in the water balance of the Great Lakes prior to 1918. The IJC should direct governments to include these earlier datasets in all future publications with ample provisos about the uncertainty associated with this information. Anything less, supports conspiracy theories about the government's motives.

4. Under the Great Lakes St. Lawrence Sustainable Water Resources Agreement, the Province of Ontario redefined the Great Lakes watershed boundaries connecting Lake Huron to Lake Erie to allow a large city like London, Ontario to increase their intra-basin transfer of outflows by twinning their intake pipe from Lake Huron. This should be noted as a breach of the very intent of this Agreement.

We provide these comments in the hope that these important issues will be addressed in the IJC's final document..

Thank you,

Roger Gauthier, Chair
Restore Our Water International
7749 Cordwood Shores Drive
Cheboygan, Michigan 49721

Name: Karen Vigmostad

Date of Submission: June 30, 2015

Location: Ann Arbor, Michigan

Comments:

I fully support all recommendations. I further urge the removal of the "adjacent watersheds" clause from the Great Lakes-St. Lawrence River Basin Water Resources Compact. As I had argued in many forums when the compact was being developed, this in effect is an urban-sprawl accelerator clause. Unless the difficult effort is made to remove it, this clause will continue to be an ongoing source of conflict and divisiveness requiring valuable time and resources of governments.

Name: Lyman Welch

Date of Submission: June 29, 2015

Location: Chicago, Illinois

Comments:

The attached comments of the Alliance for the Great Lakes and National Wildlife Federation address the following key points:

- State implementation of Compact provisions is not yet complete; the IJC should encourage states to reach full implementation
- IJC's recommendation No. 5 correctly identifies climate change as an important issue, but more aggressive action is needed
- IJC should encourage the states and provinces to more closely consider conservation measures in regards to all permits, both new and existing

Due to its size, the attachment to these comments will be uploaded separately.

Alliance for the Great Lakes | National Wildlife Federation

VIA ONLINE SUBMISSION

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Windsor, ON N9A 6T3

International Joint Commission
Great Lakes Regional Office
PO Box 32869
Detroit, MI 48232

Re: Comments on the Ten Year Review of the International Joint Commission's Report on "Protection of the Waters of the Great Lakes"

Dear International Joint Commission:

The Alliance for the Great Lakes (Alliance) and National Wildlife Federation (NWF) thank the International Joint Commission (IJC) for this opportunity to comment on the draft of the Ten Year Review. As organizations dedicated to protecting the Great Lakes watershed and its wildlife, we value what the states and provinces have achieved in protecting this region. Our comments address the following key points:

- **State implementation of Compact provisions is not yet complete; the IJC should encourage states to reach full implementation**

- **IJC's recommendation No. 5 correctly identifies climate change as an important issue, but more aggressive action is needed**

- **IJC should encourage the states and provinces to more closely consider conservation measures in regards to all permits, both new and existing**

Should you have any questions about our comments, please contact Lyman Welch, Legal Director at the Alliance, at 312-445-9739 or lwelch@greatlakes.org or any of the undersigned.

Sincerely,

Lyman C. Welch, Legal Director, Alliance for the Great Lakes
A. Marie Salter, Public Interest Law Initiative Fellow, Alliance for the Great Lakes
Marc Smith, Senior Policy Manager, National Wildlife Federation

Comments

As organizations dedicated to restoring and protecting the waters and wildlife of the Great Lakes, the Alliance and NWF applaud the Compact states and provinces for their development and implementation of a shared agreement to protect the Great Lakes. We are thankful for this opportunity to provide input to the IJC's ten year review. We support the majority of the IJC's recommendations and provide the comments below to suggest clarifications and improvements that should be made to strengthen the recommendations in the final version of the report.

1. State implementation of Compact provisions is not yet complete; the IJC should encourage states to reach full implementation

Recommendation 1 states that "the existing Agreement and Compact should continue to be rigorously implemented to minimize loss of water from the basin." While this is a laudable goal, the recommendation misstates the actual status of states' implementation of the Compact. Several states have not fully implemented the Compact, both in its legal requirements and its practices. Our understanding is that the IJC did not undertake a complete analysis of state-by-state compliance. The IJC should adjust **recommendation 1** to reflect the actual status of the Compact states and to encourage swift creation of measures designed to reach full implementation of the Compact, as well as clarification of sections which are unclear. The states discussed here serve as examples of incomplete compliance, and are not a comprehensive list. Attached are more detailed analyses of each state's compliance with the Compact. These are preliminary and will be refined after the Regional Council issues a draft finding under Section 3.4.2 of the Compact. The IJC should recommend that states carefully review their code and programs to ensure more careful implementation and take all needed steps to reach full Compact implementation.

A. Michigan

Michigan is largely in compliance with the Compact, and should be congratulated for the excellent work that has been done. There are several minor changes which would allow Michigan to reach full compliance. For example, Michigan does have reporting requirements which comply with the Compact, but does not apply them to allowable diversions.[1] Likewise, Michigan's decision-making standard exists, but is not clearly in compliance with the Compact. Michigan's standard has a different method of determining what is "reasonable" than the six

[1] *See* MICH. COMP. LAWS § 324.32707. *See also* MICH. COMP. LAWS §§ 324.32703a, 324.32704 (allowing certain diversions without also mandating registration).

factors considered by the Compact.[2] Michigan also exempts certain withdrawals such as those "undertaken for hydroelectric generation."[3] This is not an allowable exception under the Compact. Michigan's law surrounding diversions also differs somewhat from the Compact. It allows some exemptions beyond the Compact.[4] In order to rigorously implement the Compact like IJC has recommended, Michigan must change its exceptions to mirror those allowed under the Compact.

Regarding monitoring and enforcement, Michigan is largely in compliance with the Compact and has passed legislation allowing DEP to request civil actions for relief in the case of violations.[5] However, these measures do not address the obligation to monitor withdrawals and Michigan has not described any such measures in their reports to the Compact Council. Michigan also needs to formalize several of the Compact's requirements, such as public hearings and public access to documents, or at least make clear to the Compact Council and the public how Michigan approaches these requirements. These minor changes would make Michigan an exemplar state in Compact compliance.

B. Ohio

Ohio is indicative of many of the Compact states. While it implements many parts of the Compact through its Revised Code, its implementation is an incomplete patchwork. Ohio's implementation is deficient in several ways.

First, Ohio does not mandate the collection of information for withdrawals, consumptive uses, and diversions in the method required under Compact Section 4.1. Ohio's Revised Code Sections 1521-2, which currently governs water use, largely mirrors the Compact's requirements.[6] However, it does not require an inventory of location, type, and quantity of withdrawals. It also does not require withdrawal permits to estimate the volume of withdrawals in terms of a gallons-per-day requirement, as mandated by the Compact.[7] Additionally, Ohio does not currently comply with the requirement that the state report information to a publicly available database repository.[8] While all these variances in implementation may appear minor, ensuring that each state records and reports water use data in a standard format would allow the IJC and the Compact Council to fully account for water usage in the Great Lakes Basin.

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[2] *Compare* Compact § 4.11(5) *with* MICH. COMP. LAWS § 324.32723(6).
[3] MICH. COMP. LAWS § 324.32727(1)(c).
[4] MICH. COMP. LAWS § 324.32703a.
[5] MICH. COMP. LAWS § 324.32713(2008).
[6] Ohio Rev. Code § 1521
[7] Compact § 4.1.3.
[8] Compact § 4.1.5.

Ohio also differs from the Compact in its standards surrounding permitting. Ohio's decision making standard is unclear, since the code references the permitting standards provided in the Compact but also provides different criteria.[9] This difference may lead to confusing or inconsistent application. The IJC should encourage Ohio and other states facing inconsistencies to revise their codes with consistent implementation in mind.

Ohio does not require the state to monitor the implementation of proposals, as Compact Section 4.3.4 requires. Monitoring is important for rigorous implementation of the Compact because it ensures enforcement actions are taken when necessary. Active monitoring, such as periodic inspections, is more appropriate under the Compact than the passive monitoring Ohio has in place (which allows the Chief to investigate but provides no affirmative duty to do so).[10]

Other parts of Ohio's implementation are unclear, and the IJC should request that these are clarified. For example, Ohio's Water Management Report makes no mention of Section 6.2 of the Compact, which requires public participation. Ohio should create a clear, formal system for public participation in the application and permitting process. Similarly, Ohio is unclear in how it intends to implement Compact Section 1.4.1, which requires cooperation with regional partners to create a sound scientific basis for water management decision making.

Finally, Ohio's enforcement of the Compact is not consistent with the goals of the Compact. For example, the Compact states that any aggrieved person has a right to a hearing or judicial review. [11] However, Ohio's definition of aggrieved is quite narrow and requires an economic or property interest.[12] This narrow definition is contrary to the federal definition of aggrieved and leaves many users of the Basin without recourse.

C. Wisconsin

Wisconsin, like Ohio, has made many positive changes to implement the Compact, but needs to take several steps to reach full compliance. For example, it is unclear whether Wisconsin has implemented a water resources inventory which complies with the Compact. Wisconsin mandates by statute the development and maintenance of a water resource inventory[13], but it has not reported to the Compact Council that this system is actually completed and active.

Wisconsin has taken many positive steps in registration and reporting. Wisconsin's registration requirements not only meet but exceed the Compact's requirements. Wisconsin's reporting system also complies with or exceeds the Compact in all regards but one; its

[9] Compare Compact § 4.11.5 with Ohio Rev. Code § 1521.17 (A) & (B).
[10] Ohio Rev. Code § 1522.18
[11] Compact §7.3
[12] Ohio Rev. Code § 1522.21(A) (defining "aggrieved").
[13] Wis. Stat. § 281.346(11)(a).

exceptions for public availability of information allow for more disclosures to be kept from the public than the Compact specifies.[14]

Wisconsin generally follows the Compact decision-making standard as described in Compact Sections 4.11 and 4.12. However, Wisconsin only applies this standard to proposals which will result in an increased "water loss,"[15] which narrows the scope of the Compact's decision-making standard to diversions and consumptive uses. In order to reach full compliance, Wisconsin should expand this to include all withdrawals that average 100,000 gallons per day or more in any 30-day period.

One area in which Wisconsin does not comply with the Compact is management and regulation of diversions. Wisconsin's statute defines terms differently than the Compact, bringing cost into play as a major factor in regulating diversions to communities within straddling counties.[16] This means that Wisconsin's evaluation of diversions happens within a framework which is in violation of the Compact, since the Compact does not authorize the consideration of cost either in determining whether potable water supplies are adequate or as a basis for evaluating water supply alternatives.

Finally, minor changes to Wisconsin's monitoring requirement for withdrawals and diversions would help the state reach full compliance. While Wisconsin does require annual reporting of various withdrawal measurements, it should also add specific monitoring requirements for certain types of diversions to reach full compliance. Overall, Wisconsin has taken many steps towards compliance and can reach full compliance if these few remaining issues are addressed.

2. IJC's recommendation No. 5 correctly identifies climate change as an important issue, but more aggressive action is needed.

Climate change is an important issue in the Great Lakes Region, and will continue to grow in importance. Climate Change is likely to affect the water levels In the Great Lakes. [17] In a warmer climate, evaporation in the lakes will increase, affecting availability of drinking water, shipping channels, and other customary uses of the Great Lakes. The effects of climate change will stretch beyond the water levels in the Great Lakes Basin. Increased precipitation (and/or changes in timing and intensity of precipitation), a likely effect predicted by the EPA, may lead to flood damaged infrastructure and damage to drainage systems.[18] Damaged drainage systems will be unable to cope with the increase in water levels caused by precipitation. Researchers have identified a number of other potential impacts from climate change in the Great Lakes,

[14] *Compare* Wis. Stat. § 281.346(3)(cm) *with* Compact § 8.3.
[15] Wis. Stat. § 281.346(6).
[16] Wis. Stat. § 281.346(1) (defining "reasonable water supply alternative" and "without adequate supplies of potable water").
[17] http://www.epa.gov/climatechange/impacts-adaptation/midwest.html
[18] http://www.epa.gov/climatechange/impacts-adaptation/midwest.html

including to native fish species, increased aquatic invasive species, and increased harmful algal blooms.[19] Changes in growing seasons may affect water needs in the region, as well as heat waves of increasing intensity which will reduce water demand and water quality.

Any study of the effects of climate change should also take into account the effects of human activity on climate. The EPA notes that "while climate change influences water levels, human activities such as dredging can also play a role."[20] Decisions made under the Compact such as allowing diversions or withdrawals should take into account the effect these decisions will make on the basin as a whole and how they will interact with the effects of climate change.

The Alliance and NWF are pleased to find that IJC's ten year review addresses climate change. IJC correctly notes that "the climate in the Great Lakes Basin is changing."[21] IJC's recommendation for an adaptive management approach in decision-making is a positive step in approaching changes in climate science which will inevitably occur. However, the region must take more aggressive steps to be prepared for climate change, and should explore more proactive steps instead of waiting for the effect of climate change to further manifest itself. While the effects of climate change are not certain, it is clear that the Midwest region and specifically the Great Lakes Basin will need to adapt to changes in climate in the near future. It is important that all planning involving aquatic resources appropriately considers current thinking on adaptation. For example, NWF recently produced guidance on incorporating adaptation planning into coastal habitat restoration, including seven detailed case studies.[22]

We urge the IJC to recommend more aggressive action, both through its own explorations and by the Compact states and provinces, including but not limited to legislation addressing future water quantity and quality issues. The IJC should consider a summit or special report on this topic in order to provide more detailed recommendations. Better preparation is essential to protect the Great Lakes Basin from the certain effects of climate change.

3. IJC should encourage the states and provinces to more closely consider conservation measures in regards to all permits, both new and existing.

The Compact states and provinces have made great strides in water conservation for the Great Lakes Region. The Compact's policies in regards to new diversions and withdrawals will have an enormous positive impact on the future of the Great Lakes Basin. However, we agree with the IJC's review that many of the Basin's citizens do not see conservation as a priority.

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[19] Pryor S. et al. 2014. Synthesis of the Third National Climate Assessment for the Great Lakes Region, available from http://glisa.umich.edu/media/files/Great_Lakes_NCA_Synthesis.pdf.

[20] http://www.epa.gov/climatechange/science/indicators/ecosystems/great-lakes.html

[21] Ten Year Review of the International Join Commission's Report on "Protection of the Waters of the Great Lakes," p. 8.

[22] Koslow, M., J. Berrio, P. Glick, J. Hoffman, D. Inkley, A. Kane, M. Murray and K. Reeve. Restoring the Great Lakes' Coastal Future - Technical Guidance for the Design and Implementation of Climate-Smart Restoration Projects with Seven Case Studies. 2014. National Wildlife Federation, Reston, VA and National Oceanic and Atmospheric Administration, Silver Spring, MD. http://www.nwf.org/~/media/PDFs/Global-Warming/Climate-Smart-Conservation/2014/Restoring-the-Great-Lakes-Coastal-Future-032114.pdf.

Beyond the public and private sector cooperation encouraged in **recommendation 7**, the Great Lakes states could and should implement far more effective conservation methods to preserve the waters of the Basin as part of their compliance with the Compact's goals.

The state of Michigan is an exemplar in this field, and the IJC should encourage other states to look to Michigan's programs when creating their own. Michigan's water withdrawal assessment process is an award winning innovation, including a 2009 Council of State Governments Innovations Award. The Water Withdrawal Assessment tool "estimate[s] the likely impact of a water withdrawal on nearby streams and rivers,"[23] and is required for all new or increased large quantity withdrawals. The tool is based in conservation science and peer-reviewed, and easily accessible to potential users. Proactive, science-based analysis of withdrawals before they occur achieves the goals of the Compact and helps protect the integrity of the Basin. Other states should use Michigan's approach as a model to improve their own withdrawal assessments. Similarly, as noted in the ten year review, Minnesota has implemented wide-reaching mandatory and voluntary conservation and efficiency programs which may serve as a model for other states in more closely meeting the Compact's conservation goals. The IJC should modify its recommendations to strongly urge other states to model their programs after these exemplar states and to turn a more serious eye to the conservation mandates of the Compact.

The Compact recognizes the value of the Great Lakes Basin as both a water source and a natural resource, and recognizes a shared duty "to protect, conserve, restore, improve and manage the renewable but finite waters of the Basin."[24] Compact Section 4.2 identifies the Compact's overarching conservation goals and compels each state and province to develop its own conservation and efficiency goals and objectives consistent with the Compact's goals. Compact Section 4.2 also compels states to promote "environmentally sound and economically feasible water conservation measures."[25] The Compact specifically requires that each state "implement … a voluntary or mandatory Water conservation program for all, including existing, Basin Water users." [26]

In order to assure that the Basin is completely protected as the Compact intends, it is important for the states to continue to monitor and re-evaluate diversions and permits to ensure that they comply with the goals of the Compact. The IJC has noted that trends for both withdrawals and consumptive uses indicate that demand will decrease in future years "due to a combination of projected wetter climate, relatively flat population, and increases in water use

[23] Access Michigan's Water Withdrawal Assessment Tool *at* http://www.deq.state.mi.us/wwat/(S(y1f05qckoobdxncl3qhzgkis))/default.aspx .
[24] Compact §1.3(1)(f).
[25] Compact § 4.2(4).
[26] Compact § 4.2(5)

efficiency". [27] A decrease in consumptive uses and withdrawals is certainly a positive trend. However, this forecasting points to a larger issue which is not addressed by the IJC's recommendations. As the need for consumptive uses, withdrawals, and diversions decreases, existing permits or allowed uses may no longer be necessary or may be larger than necessary.

In order to ensure that existing uses are not at odds with the current science and conservation methodologies required under the Compact, states and provinces should actively monitor existing permits and adjust them as necessary to mirror current demand and the needs of the Great Lakes Basin. **Recommendation 4** correctly states that "assuming that the science will continue to evolve rapidly, the Regional Body/Council should continuously review new knowledge regarding lake-wide hydrology and incorporate new advancement in decision-making processes."[28] This process of review must include existing permits in order to completely reflect new advancements. The Compact calls for "The development, transfer and application of science and research related to water conservation and Water use efficiency. "[29] Whether or not the states are applying this direction to existing permits and withdrawals is a significant policy gap the IJC should address. In order to fully achieve its goals, the Compact must be comprehensive in its application.

Overall, application of conservation methodology is an important, and mandatory, component of implementing the Compact. Beyond encouraging collaboration and scientific exploration, we urge the IJC to strengthen its recommendations and ask the states and provinces to enact conservation programs which are harmonious with the conservation goals clearly listed in the Compact.

Conclusion

The IJC's review of the Compact is an extremely helpful resource for policymakers and stakeholders in the Basin. It correctly celebrates the many accomplishments of the Compact states and provinces in protecting this region. In order to fully address the needs of the Great Lake Basin and insure the efficacy of the Compact, the IJC should modify the report to address gaps in implementation, climate change as a significant Great Lakes issue, and the potential impact of existing permits and withdrawals as conservation science advances.

The Alliance and NWF thank the IJC staff for their hard work on this very comprehensive review of the Compact, their candid responses to questions during the public webinar, and the opportunity to meaningfully contribute to the final draft of the ten year review.

[27] *Id.* at. 38-9.
[28] *Id.* at 49
[29] Compact §1.4(2)(e)

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Date of Submission: June 29, 2015

Location: Chicago, Illinois

Comments:

Higher resolution scan of the attachment to the comments of the Alliance for the Great Lakes and the National Wildlife Federation is attached.

ILLINOIS COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

Under the limited requirements set forth in § 4.1, Illinois' existing reporting requirements meet the requirements of the Compact. Illinois does fail to mention how the information gathered under § 4.1 will "be used to improve the sources and applications of scientific information regarding the Waters of the Basin."[1] To assure compliance with the Compact, Illinois should describe how the state works with regional partners to achieve aims of the Compact. However, it is not clear, from the language of the Compact, whether any individual member party is required to act on their own to promote science and research.

II. Water Conservation and Efficiency Program

Illinois' existing program requirements, captured in legislation implemented as a result of the Supreme Court decree in *Wisconsin*, 388 U.S. at 427,[2] and the State's promulgation of conservation and efficiency objectives, largely bring Illinois into compliance with the Compact. Illinois must clarify how its conservation programs "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact.[3]

Water Management Program

I. Water Resources Inventory, Registration, and Reporting (§ 4.1)

The state of Illinois requires "[a]ll Lake Michigan water allocation permittees" to submit annual reports "accounting for how Lake Michigan water is used within a public water supply system."[4] Additionally, all other permittees are required to submit annual and monthly reports outlining their Basin water usage.[5] This reporting program has been in place since before the development of the Compact, and it meets the inventory, registration, and reporting requirements of §4.1. The only additional requirement that Illinois had to implement was to make mandatory its voluntary reporting program for surface and groundwater withdrawals that exceed an average of 100,000 gallons/day.[6] The mandatory reporting requirements relating to the use of surface and groundwater have been implemented.[7]

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[1] Great Lakes—St. Lawrence River Basin Water Resources Compact Pub. L. No. 110-342, § 4.1.1, 122 Stat. 3739, 3739 (2008) [hereinafter Compact].
[2] 615 Ill Comp. Stat. 50/5 (1993).
[3] Compact § 4.2.5.
[4] ILL. DEP'T OF NATURAL RES., FIVE YEAR REVIEW OF ILLINOIS' WATER MANAGEMENT AND CONSERVATION AND EFFICIENCY PROGRAMS – REPORT TO THE COMPACT COUNCIL AND REGIONAL BODY 4 (2014) [hereinafter REPORT] (citing 615 Ill. Comp. Stat. 50/4 (2010)).
[5] Ill. Admin. Code tit. 17, § 3730.309 (2014).
[6] REPORT at 4.
[7] 525 Ill. Comp. Stat. 45/1 (2010).

A. Water Resources Inventory

Due to the Illinois' existing water management requirements under *Wisconsin*, 388 U.S. at 427, the state had already maintained a water resources inventory prior to the passage of the Compact.[8] This inventory exceeds the requirements of § 4.1.1 of the Compact.

B. Registration

Illinois' existing registration system is adequate to meet the requirements of § 4.1.3 of the Compact.[9] All entities that wish to use water from Lake Michigan must apply, through the Illinois Department of Natural Resources (DNR), for a water allocation permit.[10] The states allocation registration system is more restrictive than the minimal requirements imposed by § 4.1.3, and therefore, Illinois is in compliance with this section.

C. Reporting

Illinois' Water Management Program meets the reporting requirements of § 4.1.4 of the Compact. DNR regulations require all permittees to annually account for total water usage, average daily water use by month, and maximum and minimum daily pumpage, in addition to other requirements.[11] Additionally, any permittee who has an intake structure on Lake Michigan must report water usage monthly.[12] Finally, "[t]o ensure consistent reporting of water use data" the DNR requires use of a standardized form known as the "annual Water Use Audit form."[13] These requirements meet the provisions of the Compact concerning water withdrawal reporting.

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

Pursuant to § 4.14 of the Compact, as a result of *Wisconsin v. Illinois*, 388 U.S. 426 (1967), as modified, 449 U.S. 48 (1980), this section is not applicable to the State of Illinois.

III. Management and Regulation of Diversions (§ 4.9)

Pursuant to § 4.14 of the Compact, as a result of *Wisconsin v. Illinois*, 388 U.S. 426 (1967), as modified, 449 U.S. 48 (1980), this section is not applicable to the State of Illinois.

IV. Proposal Monitoring (§ 4.3.4)

Pursuant to § 4.14 of the Compact, as a result of *Wisconsin v. Illinois*, 388 U.S. 426 (1967), as modified, 449 U.S. 48 (1980), this section is not applicable to the State of Illinois.

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[8] 525 Ill. Comp. Stat. 45/5.3 (2010).
[9] 615 Ill. Comp. Stat. 50/5 (1993).
[10] *Id.*
[11] Ill. Admin. Code tit. 17, § 3730.309 (2014).
[12] *Id.*
[13] REPORT at 3.

V. Regional Review (§§ 4.5.1(e), 4.5.2, 4.5.4)

Pursuant to § 4.14 of the Compact, as a result of *Wisconsin v. Illinois*, 388 U.S. 426 (1967), as modified, 449 U.S. 48 (1980), this section is not applicable to the State of Illinois.

VI. Public Participation (§ 6.2)

This section governs public participation "for the review of Proposals subject to the Standard of Review and Decision."[14] Since the Standard of Review and Decision is not applicable to the State of Illinois, this section does not apply.[15]

VII. Promotion of Science and Research (§§ 1.4, 4.1.6)

Illinois' report fails to mention how the information gathered under § 4.1 will "be used to improve the sources and applications of scientific information regarding the Waters of the Basin."[16] Throughout the entire state report, there is no mention of science or any scientific data analysis. To ensure compliance with the Compact in this area, Illinois's report should describe how the state works with regional partners to achieve aims of 1.4.

Although there is no specific mention of how Illinois uses scientific data to further the goals in Section 4.1, the state does include scientific considerations in the following two ways: First, Illinois, in its permitting process, does allow for the introduction of "[r]elevant scientific or technical articles, treaties or materials."[17] Second, when considering the issuance of a water allocation permit, Illinois requires that "all means reasonably available…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."[18]

Separate from the report, it does appear that Illinois has at least minimal procedures in place to ensure science and research are utilized. However, the state's implementation falls short of promotion. Nevertheless, it is not clear, from the language of the Compact, whether any individual member party is required to act on their own to promote science and research.

Conservation and Efficiency Program

Compact § 4.2 applies to Illinois and is the major program requirement binding on the state under the Compact. According to the Report, Illinois maintains that its existing water conservation program, implemented following the Supreme Court's decree, meets the requirements of the Compact, with the exception of the adoption of goals consistent with the Council's basin-wide conservation and efficiency objectives, released in Resolution #5 and

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[14] Compact § 4.14.
[15] *Id.*
[16] Compact § 4.1.
[17] Ill. Admin. Code tit 17, § 3730.211(c)(5) (2014).
[18] 615 Ill Comp. Stat. 50/5 (1993).

reaffirmed on June 13, 2014 by Resolution #30. Based on the information contained within the Report, it is impossible to determine the adequacy of Illinois' conservation and efficiency program. However, through the review of prior submissions to the Council, enough information is available to determine Illinois' compliance.

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

The state of Illinois has identified objectives that are consistent with the Council's goals developed in accordance with § 4.2.1. Under that section the Council committed to identifying "Basin-wide Water conservation and efficiency objectives to assist the Parties in developing their Water conservation and efficiency program."[19] The objectives, which were later released by the Council in Resolution #5, were based on the following five goals, contained within the Compact in §§ 4.2.1.a-e.

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.

Following from these goals, Attachment A to Resolution #5, contains the Council's objectives for efficiency and conservation in the Basin. These objectives are simply meant to "assist the Parties" in their development of their respective conservation and efficiency programs.

In 2010, Illinois developed and posted a water conservation goal and series of objectives. As the State acknowledged, "the goal of Illinois' Lake Michigan water conservation program is taken directly from Illinois state law."[20] The document contained on the website titled *Illinois' Lake Michigan Water Conservation Goals and Objectives*, lists 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)."
- "Establish standards for good water system management and leakage control by the owner/operator of a water supply system."
- "Ensure that Lake Michigan water diverted directly into 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."

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[19] Compact § 4.2.1.

[20] ILLINOIS DEP'T OF NATURAL RES., ILLINOIS' LAKE MICHIGAN WATER CONSERVATION GOALS AND OBJECTIVES (2010) *available at* http://www.dnr.illinois.gov/WaterResources/Documents/LakeMichiganWaterConservationGoals2010.pdf.

- "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 WaterSense 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."

These objectives are consistent with the Council's Basin-wide goals and objectives, and therefore meet the requirements of § 4.2.2 of the Compact.

An additional requirement of § 4.2.2, is the development of a voluntary or mandatory water conservation and efficiency program that is consistent with the adopted state goals and objectives. Illinois' report does not detail how the conservation and efficiency program has been implemented in the state. While the report does mention several areas of program activity, it fails to explain the manner in which the program has been implemented or how these different areas of program activity fit together. The DNR does require all permittees to implement conservation practices as a condition of being granted and maintaining their water use permits,[21] meeting the requirements of § 4.2.2. However, it is important to note that while Illinois has developed a conservation and efficiency program, it failed to fully catalog the program in the § 3.4 report, as required.[22]

II. Implementation (§ 4.2.5)

The conservation and efficiency program developed under § 4.2.2 is required to be implemented under § 4.2.5. This implementation is required by § 3.4 to be detailed in the state reports. The Supreme Court's decree in *Wisconsin*, 449 U.S. 48, required Illinois to implement a water conservation program.[23] This requirement is reflected in statutory and regulatory requirements imposed on water allocation permittees.[24] The principle sources used for implementing Illinois' mandatory conservation program are the regulations promulgated by the DNR,[25] which were recently updated.[26]

It is not clear how the State's water conservation program "adjust[s] to new demands and the potential impacts of cumulative effects and climate,"[27] as required by the Compact. When the State addresses this section of the Compact, it will be in full compliance with the implementation requirements of Compact § 4.2.5.

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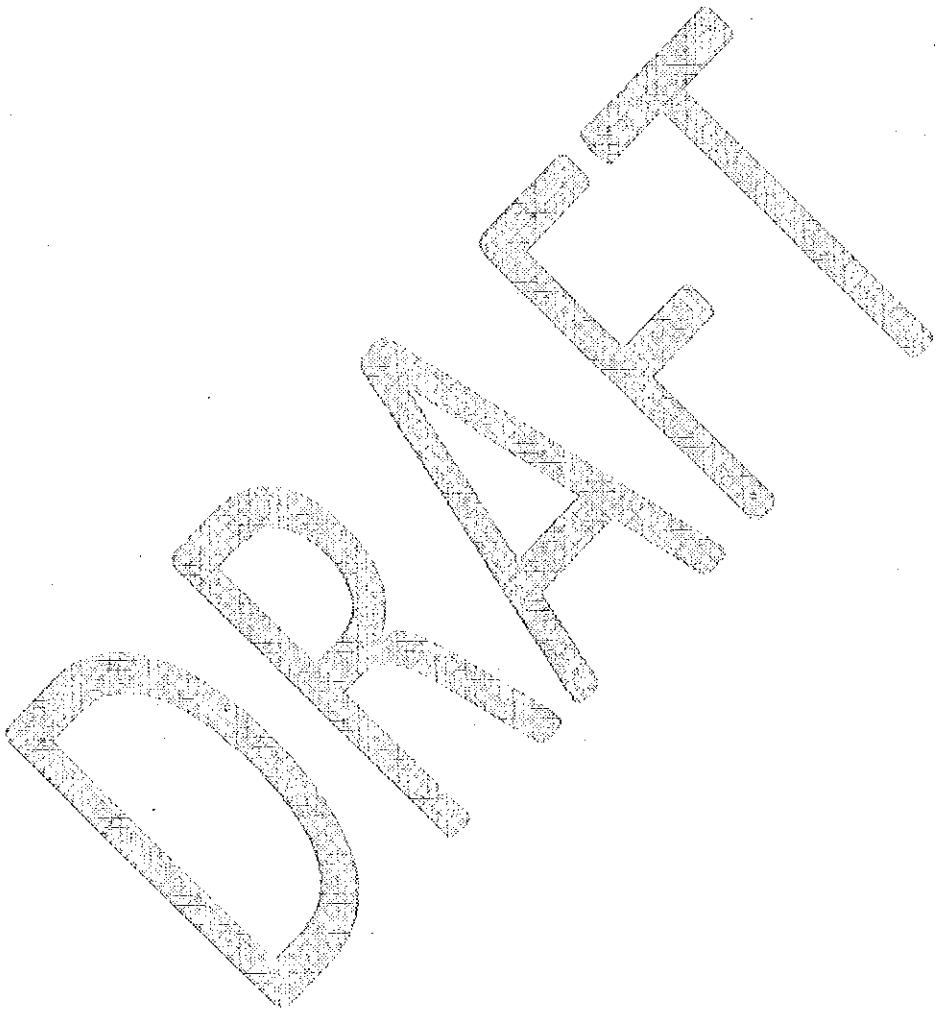
[21] Ill. Admin. Code tit. 17, § 3730.307 (2014).
[22] Compact § 3.4.
[23] *Id.*
[24] *See* 615 Ill Comp. Stat. 50/5 (1993). *See also* Ill. Admin. Code tit. 17, § 3730.307 (2014).
[25] Ill. Admin Code tit. 17, § 3730.307 (2014).
[26] Ill. Admin. Code tit. 17, § 3730.307 (2015).
[27] Compact § 4.2.5.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INDIANA COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

Indiana must take action to achieve full compliance with the Compact. The following points summarize deficiencies in Indiana's program along with steps Indiana must take to come into compliance with the Compact:

A. While Indiana has many of the components that belong in an inventory, it must complete a comprehensive water resources analysis for the Basin. The inventory could incorporate or adopt the Indiana Chamber of Commerce's recent water resources study.
B. Indiana includes a waiver from registration that violates the Compact. Indiana must remove this waiver.
C. Indiana's registration requirements for diversions are insufficient to cover low-volume diversions. Indiana needs to modify its registration requirements to cover diversions of *any* volume, not just those over 100,000 gallons.
D. Indiana's aggregate data reports fail to comply with Resolution 21. Indiana needs to divide its aggregate water use data based on the sector categories listed in Resolution 21.
E. Indiana's water management plan does not specify all of the appropriate tributaries for the Basin. Indiana must modify its definition of salmonid stream to include *all* tributaries to the Basin.
F. The withdrawals section currently allows for an unacceptable third exemption from permitting requirements. Indiana must remove this third exemption.
G. The program fails to provide sufficient assurance of monitoring and compliance with permit conditions. Indiana must codify monitoring requirements that will ensure applicants will continue to comply with the terms of their permits after the permit has been granted.
H. The language of Indiana's decision-making standard is unclear and potentially violates the Compact because it might be read to allow a baseline volume to be transferred independent of a transfer of the facility. This could undermine the registration and permitting system, particularly if the baseline volume is transferred outside the Basin. Indiana should modify this language to ensure that a baseline volume is only transferred along with the sale of a facility.
I. Indiana only provides for public participation in those applications that it determines require Regional Review. Indiana must codify public participation requirements that satisfy Section 6.2, including: public notification of and opportunity to comment on *all* applications; make all documents relevant to an application accessible to the public; provide guidance on standards for deciding whether a public meeting or hearing is appropriate; and ensure the record of decision is available for public inspection.
J. Indiana's statutes and regulations fail to specify the process for ensuring Regional Review. Indiana must specify the process that the Natural Resources Commission (NRC) will follow for Regional Review, including identifying who within the NRC is responsible for coordinating with the Council.

K. Indiana has failed to specify how it will comply with the Compact's scientific understanding requirements. Indiana needs to adopt provisions detailing how it will implement these provisions.

II. Water Conservation and Efficiency Program

A. Indiana has not identified appropriate objectives, preventing Indiana from achieving compliance with Section 4.2. Indiana must adopt its own objectives, consistent with the Council's goals.
B. While Indiana has identified and adopted a number of provisions to develop and implement a water conservation and efficiency program, it has not identified how these components fit together into an actual program.
C. Indiana must identify how its conservation program adjusts to new demands and the potential impacts of climate change.

Water Management Program

I. Water Resources Inventory, Registration and Reporting (§ 4.1)

A. Water Resources Inventory

The Indiana Code authorizes the NRC to collect and disseminate information relating to water resources in the state.[1] In addition, the Water Resource Management Act (WRMA) directs the NRC to conduct an inventory of all water resources (including ground and surface water) in the state.[2]

The information collected pursuant to the WRMA might comply with the Compact if it were up-to-date.[3] In order to complete the inventory, the Division of Water divided the state into 12 regions. The Division completed reports relevant to the Great Lakes Basin between 1987 and 1996.[4] However, these reports have not been updated since they were first produced. Beyond being out-of-date, the Lake Michigan Region report also discussed the Mississippi River Basin within Indiana. While Indiana did submit some baseline data to the Council,[5] the baseline data alone does not provide sufficient information about the sources themselves. The baseline merely locks in the pre-existing significant water withdrawal facilities (SWWFs) to their pre-Compact

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[1] Ind. Code § 14-25-7-12(1) (2015).
[2] Ind. Code § 14-25-7-13(b) (2015).
[3] *Compare* Ind. Code § 14-25-7-13(b) (2015) *with* Section 4.1.1 of the Compact, which requires an inventory to include "information on the location, type, quantity, and use of those resources and the location, type, and quantity of Withdrawals, Diversions and Consumptive Uses." Great Lakes—St. Lawrence River Basin Water Resources Compact Pub. L. No. 110-342, § 4.1.1, 122 Stat. 3739, 3747 (2008) [hereinafter Compact].
[4] IND. DIV. OF WATER, WATER RESOURCE AVAILABILITY IN THE ST. JOSEPH RIVER BASIN, INDIANA - EXECUTIVE SUMMARY (1994), *available at* http://www.in.gov/dnr/water/files/stjoseph_basinsums.pdf; IND. DIV. OF WATER, WATER RESOURCE AVAILABILITY IN THE LAKE MICHIGAN REGION, INDIANA - EXECUTIVE SUMMARY (1994), *available at* http://www.in.gov/dnr/water/files/lakemich_basinsums.pdf. A more detailed version of the report is available upon request; IND. DIV. OF WATER, WATER RESOURCE AVAILABILITY IN THE MAUMEE RIVER BASIN, INDIANA - EXECUTIVE SUMMARY (1996), *available at* http://www.in.gov/dnr/water/4110.htm;
[5] *Great Lakes Regional Water Use Database*, GREAT LAKES COMM'N, http://projects.glc.org/waterusedata/ (last visited Feb. 15, 2015).

water use levels. As such, the baseline is only a piece of raw data necessary to the inventory required by the Compact.

The Indiana Chamber of Commerce just commissioned a private contractor to conduct a thorough water resource study for the state, which summarizes water availability, current uses, and future demands.[6] If Indiana chose to adopt this study as its water resource inventory, it might satisfy the Compact.

B. Registration

Indiana's WRMA requires any significant water withdrawal facility (SWWF) to register with the DNR.[7] The WRMA defines SWWF (which includes withdrawals and diversions)[8] to include "water withdrawal facilities of a person that, in the aggregate from all sources and by all methods, has the capability of withdrawing more than one hundred thousand (100,000) gallons of ground water, surface water, or ground and surface water combined in one (1) day."[9] While this trigger has slightly different language than the Compact, it is consistent with the Compact for withdrawals.

However, the trigger is insufficient for diversions. While the Indiana Code requires any diversion after the effective date of the Compact to comply with the Compact,[10] the statute directs the NRC to adopt rules to implement that restriction. However, as discussed above, the registration rules only apply to withdrawals or diversions that are greater than 100,000 gallons.[11] Because the Compact specifically requires diversions of *any* size to register with the state, Indiana's registration requirement is not in compliance for diversions. To come into compliance, Indiana needs to modify its registration requirements to cover diversions of any volume, not just those over 100,000 gallons.

Indiana also allows the DNR to waive registration requirements for temporary SWWFs.[12] However, the Compact specifically requires that facilities register and provide certain information "without limitation."[13] The only exception to registration provided under the Compact is if a person has already registered under an existing state program.[14] Indiana's waiver provision limits the information required for registration beyond the Compact's allowed exception. As such, the waiver provision is not in compliance with the Compact and must be amended to only allow exceptions that comply with the Compact.

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[6] IND. CHAMBER OF COMMERCE, WATER AND ECONOMIC DEVELOPMENT IN INDIANA: MODERNIZING THE STATE'S APPROACH TO A CRITICAL RESOURCE (2014), *available at* http://www.indianachamber.com/media/WaterStudyReport2014LoRes.pdf.

[7] Ind. Code § 14-25-7-15(c) (2015).

[8] 312 Ind. Admin. Code 6.2-2-4(a) (2015). 312 Ind. Admin. Code 6.2-1-2(13) (2015).

[9] Ind. Code § 14-25-7-15(a) (2015).

[10] Ind. Code § 14-25-1-11(b) (2015).

[11] Compact § 4.1.3.

[12] Ind. Code § 14-25-7-15(f) (2015).

[13] Compact § 4.1.3.

[14] Section 4.1.3 provides that "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, shall register . . . unless the Person has previously registered in accordance with an existing State program." *Id.*

C. Reporting

Indiana's reporting to the Council is insufficient. Once users make their annual report of monthly usage data, the Department of Natural Resources (DNR) reviews each usage report for accuracy.[15] Indiana posts the usage data online.[16] This website is nicely organized, with an interactive map feature. However, this database alone does not satisfy the Compact's reporting requirements.

Section 4.1.5 of the Compact requires each state to "annually report the information gathered" and "aggregated information shall be made publicly available … ." The Council has interpreted this requirement to require each party to report aggregate use data by: sector, source, watershed, and total volumes of Withdrawals, Consumptive Uses, Diversions, and Diversion Return Flows.[17] The Council encourages states to also report data by individual user, but the minimal reporting requirement is the aggregate data.[18]

While Indiana includes Indiana's aggregate data for each year, it only divides the data into six categories: energy, industry, agriculture, public supply, miscellaneous, and rural.[19] These categories do not map on to the sector divisions required by the Council.[20] Because Indiana's report fails to specify aggregate data for each of the sectors, it is not in compliance with the Compact's reporting requirements. Further, Indiana has failed to provide aggregate data on the total volumes of withdrawals, consumptive uses, diversions, and diversion return flows. To comply with the Compact, Indiana must provide all required aggregate water use data, and must divide it based on the sector categories identified by the Great Lakes Council.[21]

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

A. Threshold Regulation Level (§ 4.10)

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[15] STATE OF IND., WATER MANAGEMENT PROGRAM REVIEW ¶ 5. (2014) [hereinafter REVIEW].
[16] *Significant Water Withdrawal Facility Data*, IND. DEPT. OF NAT. RES., http://www.in.gov/dnr/water/4841.htm (last visited March 13, 2015).
[17] GREAT LAKES—ST. LAWRENCE RIVER BASIN WATER RESOURCES COUNCIL, RESOLUTION #21—MODIFICATION OF WATER USE REPORTING PROTOCOLS, 2 (2011), *available at* http://www.glslcompactcouncil.org/Docs/Resolutions/GLSLRBWRC_Resolution_21--Modified_Water_Use_Reporting_Protocols.pdf [hereinafter RESOLUTION 21].
[18] RESOLUTION 21 at 2 ("While aggregate data will be reported by Source Watershed, Parties are encouraged to assemble the data on a finer scale").
[19] *See, e.g.*, IND. DEPT. NAT. RES., WATER AMOUNTS BY COUNTY / CATEGORY FOR 2013, *available at* http://www.in.gov/dnr/water/files/2013WUSumry.pdf.
[20] Resolution 21 requires the report to provide aggregate data for: public water supply, self-supply commercial and institutional, self-supply irrigation, self-supply livestock, self-supply industrial, self-supply thermoelectric power production (for each once-through cooling and recirculated cooling), off-stream hydroelectric power production, in-stream hydroelectric water use, and other self supply. RESOLUTION 21 at 2.
[21] *See*, RESOLUTION 21.

Indiana sets thresholds for permitting new and increased withdrawals, averaged over any ninety consecutive days, at (1) 100,000 gallons from any salmonid stream,[22] (2) 5 million gallons from Lake Michigan,[23] and (3) 1 million gallons from other sources.[24]

"Other sources" would not include all salmonid streams,[25] including the West Branch of the Little Calumet River and all its tributaries, including, but not limited to, Deep River and Turkey Creek; Deep River and its tributaries above its confluence with Little Calumet River; Grand Calumet River and its tributaries; Little Elkhart River and its tributaries, including, but not limited to, Cobus Creek and its tributaries, and Solomon Creek and its tributaries. Because these tributaries are not included in the "salmonid stream" category, Indiana has failed to set an appropriate threshold regulation level for all waters in the Great Lakes Basin. To fix this deficiency, Indiana must modify its definition of salmonid stream to include all tributaries to the Basin.

The Compact allows states to set threshold levels for the regulation of withdrawals that exceed 100,000 gallons per day or greater average in any 90-day period, but a state must set such thresholds "through a considered process."[26] The Compact requires the use of a considered process "to assure an effective and efficient Water management program that will ensure that uses overall are reasonable, that Withdrawals overall will not result in significant impacts to the Waters and Water Dependent Natural Resources of the Basin, determined on the basis of significant impacts to the physical, chemical, and biological integrity of the Source Watersheds, and that all other objectives of the Compact are achieved."[27]

Indiana's Water Management Report fails to demonstrate that the threshold levels for withdrawals that exceed 100,000 gallons per day or greater average in any 90-day period were set through a considered process. It also fails to demonstrate that the threshold levels assure the effective and efficient water management program required by the Compact. Until Indiana makes these demonstrations, the Council cannot find whether Indiana meets the Compact's water management program provisions, as the Compact requires.[28]

Indiana also allows an exemption from registration and permitting requirements that is not allowed by the Compact. Specifically, "[t]he owner of a facility is not required to register under Indiana Code 14-25-7-15, or to obtain a water withdrawal permit under this rule, if the facility is installed and used exclusively for . . . [t]esting or evaluating the ground water resource for a period not greater than seventy-two (72) hours in one (1) calendar year."[29] The Compact, however, exempts withdrawals for only two purposes: (1) "To supply vehicles, including vessels and aircraft, whether for the needs of the persons or animals being transported or for ballast or other needs related to the operation of the vehicles;" or (2) "To use in a non-commercial project

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[22] Ind. Code § 14-25-15-7(a)(2); 312 Ind. Admin. Code 6.2-2-5(b)(2), (c)(1).
[23] Ind. Code § 14-25-15-7(a)(1); 312 Ind. Admin. Code 6.2-2-5(b)(1), (c)(1).
[24] Ind. Code § 14-25-15-7(a)(3); 312 Ind. Admin. Code 6.2-2-5(b)(3), (c)(1).
[25] *See* Ind. Code § 14-25-15-7(b); 312 Ind. Admin. Code 6.2-1-2(11). *See also* 327 Ind. Admin. Code 2-1.5-5(3).
[26] Compact § 4.10.1.
[27] *Id.*
[28] *Id.* § 3.4.2.
[29] 312 Ind. Admin. Code 6.2-2-5(g) (2014).

on a short-term basis for firefighting, humanitarian, or emergency response purposes."[30] Because the Compact specifically includes these two exemptions, the drafters clearly knew how to create exemptions, and could have provided for other exemptions if they deemed them appropriate. This means that Indiana's third exemption is not in compliance with the Compact and must be repealed.

B. Compliance with Decision-Making Standard (§ 4.10)

Indiana adopted the decision-making standard in whole from the Compact. Title 6.2 references Section 4.10 as the trigger for applying Section 4.11's decision-making standard requirements.[31]

However, Indiana has adopted a provision that creates confusion. Article 6.2-2-3(d) allows a buyer to benefit from the transfer of a baseline volume, but may be interpreted to empower an existing user to transfer a "right" in a baseline amount of water to another user without simultaneously transferring the facility itself.[32] The state should not allow existing users to treat the baseline exemption as a property right in a set amount of water that can be bought and sold independent of the facility. Otherwise, diversions may occur without the application of the decision-making standard.

III. Management and Regulation of Diversions (§ 4.9)

Indiana has adopted the Compact language regarding Diversions in its entirety. Diversions after the effective date of the Compact are prohibited unless they satisfy Compact requirements.[33] Additionally, any exception to a diversion subject to Section 4.9 of the Compact must satisfy the specific exception requirements (from Sections 4.9.1 through 4.9.3).[34]

IV. Proposal Monitoring (§ 4.3.4)

As discussed in the reporting section above, Indiana requires all registered users to report their monthly usage annually. The Indiana Code authorizes the NRC to require metering and reporting for all SWWFs.[35] Any "person who uses ground water or surface water shall, when requested by the commission, report to the commission the volume of water used by the person in a specific period."[36] Even facilities that do not exceed their baseline must comply with all monitoring and reporting requirements.[37] However, the NRC has not exerted its authority to actually require consistent monitoring to ensure compliance with the terms of permits, either by the facilities themselves or by the NRC.

The Compact requires that "[e]ach Party shall monitor the implementation of any

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[30] Compact § 4.13.
[31] 312 Ind. Admin. Code 6.2-2-5(f).
[32] 312 Ind. Admin. Code 6.2-2-3(d).
[33] Ind. Code § 14-25-1-11(b)(2) (2015 update).
[34] 312 Ind. Admin. Code 6.2-2-5(e)(1)-(3) (2015).
[35] Ind. Code § 14-25-7-12.
[36] Ind. Code § 14-25-1-9.
[37] 312 Ind. Admin. Code 6.2-2-2 (2014).

approved Proposal to ensure consistency with the approval . . . ." [38] Indiana requires any facility that is subject to the Decision-Making Standard to meet certain criteria for a permit, including the creation of a monitoring plan for water conservation measures.[39] The creation of such a monitoring plan is insufficient to satisfy the Compact because Indiana does not require facilities to implement the plan. Furthermore, Indiana does not require monitoring to ensure compliance with the many other requirements imposed on withdrawals, consumptive uses, or diversions.[40] Indiana may restrict approvals to those where "the applicant demonstrates adequately the ability to perform . . . [m]easurement of water use,"[41] but it does not ensure water use will actually be monitored. As such, Indiana is not in compliance with Section 4.3.4's monitoring requirement. To fix this deficiency, the NRC must codify monitoring requirements that will ensure applicants will continue to comply with the terms of their permits after the permit has been granted, such as periodic inspections of Withdrawals after they are approved.

IV. Regional Review (§§ 4.5.1(e), 4.5.2, 4.5.4)

Based upon a review of the statutes and regulations listed in Indiana's report, Indiana does not appear to have any specific provisions in place to allow for Regional Review. Each of the sections in the Compact that require Regional Review for specific proposal approvals (under the Exception Standard and the Decision-making Standard) do incorporate aspects of regional review.

In addition to identifying proposals that require regional review, the Compact also sets forth requirements for the regional review process. Section 4.5.1(e) requires Indiana to act as the intermediary between the applicant and the Regional Body throughout the Regional Review process. Section 4.5.2 requires that the Originating Party provide notice to the Council and other states when regional review is either required or requested by Indiana.

Indiana's statutes and regulations do not provide any insight into how Indiana will achieve these requirements. While the NRC is empowered to implement all aspects of the Compact, Indiana has not created any hook to implement the notice and coordination required under Sections 4.5.1 and 4.5.2. As such, Indiana has failed to demonstrate that it is in compliance with these Sections. To come into compliance, Indiana must Indiana specify the process that the Natural Resources Commission (NRC) will follow for Regional Review, including identifying who within the NRC is responsible for coordinating with the Council.

V. Public Participation (§ 6.2)

There are no provisions within the legislation and regulations that Indiana mentioned in its report regarding public participation, nor does Indiana provide for public participation in applications for withdrawals; Indiana will only allow for public participation when the application will

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[38] Compact § 4.3.4.
[39] 312 Ind. Admin. Code 6.2-2-8(b) (2014).
[40] *See* Compact §§ 4.9.4.c.-f., 4.11.1.-4.
[41] 312 Ind. Admin Code 6.2-2-8(d)(1).

require Regional Review.[42] This violates Section 6.2's requirements. Indiana needs to codify processes that satisfy the public participation requirements in Section 6.2, including: public notification of and opportunity to comment on all applications; making all documents relevant to an application accessible to the public; providing guidance on standards for deciding whether a public meeting or hearing is appropriate; and ensuring the record of decision is available for public inspection.

VI. Promotion of Science and Research (§ 1.4, 4.1.6)

To indicate its compliance with Sections 1.4 and 4.1.6 requirements for science and research, Indiana points to its inventory and mapping projects. However, Indiana does not point to any provisions that indicate how the information might be used "to further develop a mechanism by which individual and Cumulative Impacts of Withdrawals, Consumptive Uses and Diversions shall be assessed."[43] The mere provision of information does not seem to satisfy the requirement; the requirement to engage in scientific information gathering extends beyond the inventory and reporting requirements.[44]

While the Compact is not specific about the exact type of scientific information that states must collect, it does provide a list of five research objectives that the collected data must support.[45] Although Indiana has some flexibility in determining exactly what information to collect, it must demonstrate that its information gathering will support the Compact goals. Moreover, Indiana should describe how it furthers the Compacts goals through work with regional partners. Because Indiana's report did not do these things, Indiana is not in compliance with the Compact's science requirements.

Conservation and Efficiency Program

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

Indiana's rule claims to identify objectives, but merely identifies measures applicants should take to achieve conservation and efficiency.[46] The rule should be amended to actually identify the State's conservation and efficiency objectives.

Indiana does not identify an actual conservation program, although subsection (c) of 6.2-2-7 also establishes that Indiana will annually assess "the extent to which conservation and

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[42] Telephone Interview with Mark Basch (Mar. 12, 2015).

[43] Compact § 4.1.6.

[44] Compact §§ 1.4, 4.1.6.

[45] Section 1.4.2 specifies the following:

> a. An improved understanding of the individual and Cumulative Impacts of Withdrawals from various locations and Water sources on the Basin Ecosystem and to develop a mechanism by which impacts of Withdrawals may be assessed; b. The periodic assessment of Cumulative Impacts of Withdrawals, Diversions and Consumptive Uses on a Great Lake and St. Lawrence River watershed basis; c. Improved scientific understanding of the Waters of the Basin; d. Improved understanding of the role of groundwater in Basin Water resources management; and, e. The development, transfer and application of science and research related to Water conservation and Water use efficiency.

Compact § 1.4.2.

[46] 312 Ind. Admin. Code 6.2-2-7(c).

efficiency programs meet goals and objectives."[47] The DNR will submit these assessments annually to the Council and the Regional Body.[48] Additionally, the DNR will post the assessment "[o]n the department's website and as otherwise practicable to the public."[49]

However, without an actual program identified, with clear goals and reporting objectives, it would be extremely difficult, if not impossible, for DNR to make the assessments required by its own legislation. For example, facilities "are encouraged to consider..."[50] the implementation of "measures such as the following..."[51] "Components may include..."[52] Users may select best management practices from surveys done by the Department in 2009 of different user classes, including irrigation,[53] industry,[54] public water suppliers,[55] and rural and other users.[56] Users can also look to a number of other organizations and government agencies for general information and best management practices.[57] Indiana must identify an actual program and clarify what water users are encouraged or required to report.

II. Implementation (§ 4.2.5)

As identified above, Indiana has identified many of the components of a conservation and efficiency program, but it has not actually established a program. Without an established program, there is no way to evaluate whether Indiana has implemented its program in a way that is consistent with Compact Section 4.2.5.

It is also not clear how the State's water conservation efforts "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact. Indiana should include an explanation of how the cited programs and legislative measures will achieve this goal and adjust to changing environmental circumstances unfolding in an age of rapid and volatile shifts in climate.

[47] *Id.*
[48] 312 Ind. Admin. Code 6.2-2-7(c)(1).
[49] 312 Ind. Admin. Code 6.2-2-7(c)(2).
[50] 312 Ind. Admin. Code 6.2-2-7(b)(1).
[51] 312 Ind. Admin. Code 6.2-2-7(b)(1).
[52] 312 Ind. Admin. Code 6.2-2-7(b)(1)(A).
[53] IND. DEP'T OF NATURAL RES., INDIANA IRRIGATORS: VOLUNTARY CONSERVATION AND EFFICIENCY EFFORTS—SUGGESTED BEST MANAGEMENT PRACTICES CHECKLIST (undated), *available at* http://www.in.gov/dnr/water/files/wa-Irrigation.pdf.
[54] IND. DEP'T OF NATURAL RES., INDIANA INDUSTRIAL WATER USERS: VOLUNTARY CONSERVATION AND EFFICIENCY EFFORTS—SUGGESTED BEST MANAGEMENT PRACTICES (undated), *available at* http://www.in.gov/dnr/water/files/wa-Industrial.pdf.
[55] IND. DEP'T OF NATURAL RES., INDIANA PUBLIC WATER SUPPLIERS: VOLUNTARY CONSERVATION AND EFFICIENCY EFFORTS—SUGGESTED BEST MANAGEMENT PRACTICES CHECKLIST (undated), *available at* http://www.in.gov/dnr/water/files/wa-PublicWaterSupply.pdf.
[56] IND. DEP'T OF NATURAL RES., RURAL & MISCELLANEOUS WATER USE: VOLUNTARY CONSERVATION AND EFFICIENCY EFFORTS—SUGGESTED BEST MANAGEMENT PRACTICES, (undated), *available at* http://www.in.gov/dnr/water/files/wa-RuralAndOthers.pdf.
[57] 312 Ind. Admin. Code 6.2-2-7(b)(3).

MICHIGAN COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

A. Michigan must subject diversions to some sort of registration requirement.
B. The name of the registrant and amount Withdrawn or Diverted from each source must be required in the registration process.
C. Michigan's various agencies must combine their water inventory databases into one central database.
D. Michigan's reporting Measures must mention allowable Diversions.
E. Michigan's Report should discuss the assessment tool with which the online application works or the model that drives the assessment tool.
F. Michigan must demonstrate that it set threshold levels for the regulation of withdrawal types exceeding 100,000 gallons per day or greater average in any 90 day period through a considered process to assure an effective and efficient water management program that will ensure that uses overall are reasonable, that withdrawals overall will not result in significant impacts to the waters and water dependent natural resources of the basin, determined on the basis of significant impacts to the physical, chemical, and biological integrity of the source watersheds, and that all other objectives of the Compact are achieved.
G. Michigan must use the reasonableness standard described by the Compact in deciding whether to approve a Withdrawal or Consumptive Use rather than the common law principles of water law in Michigan.
H. Michigan's use of self-certification is not sufficient to satisfy the Compact's Environmentally Sound and Economically Feasible Water Conservation Measures criterion under the Decision-Making Standard. Michigan must include some form of monitoring and certification by the state.
I. Michigan improperly exempts various Withdrawals from all requirements, such as those undertaken for hydroelectric generation.
J. Diversion exceptions expressed under Michigan Law are not consistent with those contemplated by the Compact.
K. There is nothing in the Report or the Measures referenced by the Report that address the obligation to monitor the implementation of approved proposals; Michigan must enact measures to require monitoring.
L. Neither Michigan's Report nor the Measures it references mentions Regional Review obligations. Michigan must enact Measures to ensure its compliance with these obligations and, to the extent such Measures already exist, the Report should be amended to reflect that they exist.
M. Michigan's compliance with the Public Participation obligation does not appear in the Report. Michigan should enact Measures to ensure its compliance with this obligation and, to the extent such Measures already exist, the Report should be amended to reflect that they exist.
N. Specifically, Michigan must extend one of the two existing public comment Measures to encompass all Proposals.

II. Water Conservation and Efficiency Program

A. Michigan must develop its own Water conservation and efficiency goals that are distinct from those listed in the Compact.
B. Michigan's Report must substantively describe the implementation of Michigan's Conservation and Efficiency Program.
C. Michigan's voluntary water conservation program must demonstrate how it addresses new demands on water supplies and adjusts to climate change impacts.

Water Management Program

I. Water Resources Inventory, Registration and Reporting (§ 4.1)

A. Water Resources Inventory

In response to the water resources inventory obligation,[1] Michigan's Water Management Program Report describes "[s]eparate databases of Withdrawals, Consumptive Uses and Diversions [] maintained by the agencies responsible for each branch of the Michigan water management program . . . ."[2] The Report further clarifies that the Michigan Department of Environmental Quality (MDEQ) Community Water Supply Program is responsible for public water supplies, the Michigan Department of Agriculture and Rural Development is responsible for agricultural water uses, and the MDEQ Water Use Program is responsible for all other Withdrawals.[3] Additionally, the Report mentions a "separate database . . . maintained by the DEQ Water Use Program for tracking the cumulative impact of new or increased [large quantity withdrawals] relative to the environmental impact standard for each sub-watershed in the state."[4]

While the agencies purportedly collect and maintain the information called for by the Compact maintaining separate databases does not satisfy the obligation to "maintain *a* Water resources inventory . . . ."[5] To ensure compliance with the Compact, the agencies must combine their databases into one central database. Additionally, it would be helpful for the report to list information about where the separate databases can be found. However, Michigan is in compliance with the Compact[6] in that the state requires that the MDEQ "[c]ollect and maintain information regarding the locations, types, and quantities of water use, including water withdrawals and consumptive uses . . . ."[7]

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[1] Great Lakes—St. Lawrence River Basin Water Resources Compact Pub. L. No. 110-342, § 4.1.1, 122 Stat. 3739, 3739 (2008) [hereinafter Compact].
[2] STATE OF MICH., OFFICE OF THE GREAT LAKES, GREAT LAKES-ST. LAWRENCE RIVER BASIN WATER RESOURCES COMPACT FIVE-YEAR PROGRAM REVIEW REPORT 3 (2014) [hereinafter REPORT].
[3] *Id.*
[4] *Id.*
[5] Compact § 4.1.1 (emphasis added).
[6] *Id.* § 3.4.1.
[7] MICH. COMP. LAWS § 324.32710(1)(b) (2008). *See also* § 324.32701 (2008) (defining department to mean the department of environmental quality); REPORT at 2-3.

B. Registration

In response to the Compact's Registration obligations,[8] Michigan's Report asserts that "virtually all large quantity withdrawals (LQWs)" are subject to registration requirements.[9] The Report then defines LQWs to include "all water withdrawals with the capacity to withdraw over 100,000 gallons per day average in any consecutive 30-day period."[10]

While Michigan's water management program correctly subjects those withdrawing large quantities of water to registration requirements, there are two deficiencies with the Report and the Measures to which it refers. First, Michigan does not subject those who "Divert[] Water of any amount"[11] to any sort of registration requirement.[12] Second, certain of the pieces of information required by the Compact[13]—the name of the registrant and the amount Withdrawn or Diverted from each source — are not required by the Michigan statute.[14] Michigan must amend its laws and regulations to fix both of these deficiencies to comply with the Compact.

C. Reporting

In response to the registrant reporting obligation,[15] Michigan has mandated that all registrants "shall file a report annually with the department . . . ."[16] Among other things, this annual report must include the "amount and rate of water withdrawn on an annual and monthly basis."[17] In response to the state's reporting obligation,[18] Michigan has sent along data that is accessible at the Council's website.[19]

Michigan's Report does well to describe the ways in which the state complies with the Compact's reporting obligations. However, Michigan's reporting Measures do not mention allowable Diversions.[20] To comply with the Compact, Michigan must apply its reporting requirements to allowable Diversions. Moreover, Michigan should include information about its compliance in its Report in addition to the Council website.

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[8] *See* Compact § 4.1.3.
[9] REPORT at 2 (internal citations omitted).
[10] *Id.* (citing MICH. COMP. LAWS § 324.32701 (2008)).
[11] Compact § 4.1.3.
[12] *See* REPORT at 2; MICH. COMP. LAWS § 324.32705 (2008) (subjecting those who "make a new or increased large quantity withdrawal" to the registration requirement without any mention of those making Diversions). *See also* §§ 324.32703a and 324.32704 (allowing certain Diversions without also mandating registration).
[13] *See* Compact § 4.1.3.
[14] *See* MICH. COMP. LAWS § 324.32706 (2008).
[15] *See* Compact § 4.1.4.
[16] MICH. COMP. LAWS § 324.32707 (2008).
[17] *Id.*
[18] *See* Compact § 4.1.5.
[19] *See Great Lakes Regional Water Use Database*, GREAT LAKES COMM'N, http://projects.glc.org/waterusedata/ (last visited Feb. 15, 2015).
[20] *See* MICH. COMP. LAWS § 324.32707. *See also* MICH. COMP. LAWS §§ 324.32703a, 324.32704 (allowing certain Diversions without also mandating registration).

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

In response to the Compact's Withdrawals obligations,[21] Michigan has established an online data assessment tool.[22] The assessment tool attempts to classify the Withdrawal by the expected impact it will have based on a multitude of factors.[23] Additionally, Michigan has implemented an internet-based registration tool to "work in conjunction with the assessment tool."[24] Finally, in certain cases, a registrant is able to "submit to the department a request for a site-specific review" following an unfavorable determination by the assessment tool.[25]

The approach of combining a model-based assessment tool with an online registration tool won national awards after it was launched.[26] While there has been some concern with how the assessment tool makes use of the Compact-imposed standards,[27] a concern which will be addressed below, the program framework does conform to the general obligations of the Compact. Michigan's Report does provide a link to the online application;[28] however, it would be helpful and informative if the Report discussed the assessment tool with which the online application works, or even the model that drives the assessment tool.

A. Regulation Level (§ 4.10)

Michigan sets a threshold of a more than 100,000 gallons per day average over any 90-day period for new or increased withdrawals that will result in an intrabasin transfer.[29] However, Michigan does not regulate other withdrawals until they exceed higher thresholds. For instance, Michigan does not require a person who proposes to supply a common distribution system to obtain a permit for withdrawals unless the new or increased withdrawal capacity exceeds more than 2,000,000 gallons of water per day.[30] Michigan also provides for several exceptions to the permit requirement generally applicable to such withdrawals.[31]

The Compact does not require a state to follow a "considered process"[32] when setting threshold levels for the regulation of new and increased withdrawals, so long as the state applies a threshold level for management and regulation of "*all* New or Increased Withdrawals of

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[21] *See* Compact § 4.10.1.
[22] *See* MICH. COMP. LAWS § 324.32706a (2008).
[23] *See Id.*
[24] MICH. COMP. LAWS § 324.32706 (2008). The registration tool can be found at http://www.deq.state.mi.us/wwat/start.aspx.
[25] *See* MICH. COMP. LAWS § 324.32706c (2008).
[26] Sara Gosman, *The Good, The Bad, and The Ugly: Implementation of the Great Lakes Compact*, NATIONAL WILDLIFE FEDERATION 2 (July 2011), *available at* http://www.nwf.org/pdf/Great-Lakes/TheGoodtheBadandtheUglyImplementationoftheGreatLakesCompactv5.pdf (praising the approach as "a novel means of predicting resource impacts and providing users with a quick determination").
[27] *Id.* at 12.
[28] *See* REPORT at 4.
[29] MICH. COMP. LAWS § 324.32723(1)(d) (2008).
[30] *Id.* § 324.32723(1)(a) & (b).
[31] *Id.* § 324.32723(13).
[32] Compact § 4.10.1.

100,000 gallons per day or greater average in any 90 day period."[33] Since Michigan did not set the threshold at that level for all types of new or increased withdrawals, it was obligated to set its higher thresholds for other types of withdrawals "through a considered process."[34] The Compact requires the use of a considered process "to assure an effective and efficient Water management program that will ensure that uses overall are reasonable, that Withdrawals overall will not result in significant impacts to the Waters and Water Dependent Natural Resources of the Basin, determined on the basis of significant impacts to the physical, chemical, and biological integrity of the Source Watersheds, and that all other objectives of the Compact are achieved."[35]

Michigan's Report fails to demonstrate that the threshold levels for all withdrawal types exceeding 100,000 gallons per day or greater average in any 90 day period, or the exceptions to the permit requirement, were set through a considered process. It also fails to demonstrate that the higher threshold levels assure the effective and efficient water management program required by the Compact. In the absence of these demonstrations, the Council cannot find whether Michigan meets the Compact's water management program provisions, as the Compact requires.[36]

B. Decision-Making Standard (§§ 4.11, 4.12)

In response to the obligation to use the Compact's Decision-Making Standard,[37] Michigan's Report asserts that "the Compact's Standard of Review and Decision [will be applied] to all new or increased withdrawals greater than 2 million gallons per day (MGD) capacity."[38] The Report also declares that "each criterion of the Decision-Making Standard [is] to be addressed by the applicant . . . ."[39] The statute to which the Report refers lists six criteria, which somewhat loosely correspond to those in the Compact, which must be satisfied before certain Withdrawals are to be approved.[40]

While Michigan has implemented something very close to the Decision-Making Standard found in the Compact, Michigan's standard is not in compliance with the Compact. First, the two standards have different methods of determining what is "reasonable." The compact lists six factors to consider.[41] Michigan instead uses the "common law principles of water law in Michigan."[42] To comply with the Compact's requirements, Michigan must amend its laws to clarify that Compact's criteria control.

Second, Michigan's approach to the Compact's criterion that Withdrawals "be implemented so as to incorporate Environmentally Sound and Economically Feasible Water

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[33] *Id.* at § 4.10.2 (emphasis added).
[34] Compact § 4.10.1.
[35] *Id.*
[36] *Id.* § 3.4.2.
[37] *See id.* § 4.11.
[38] REPORT at 3 (citing MICH. COMP. LAWS § 324.32723).
[39] *Id.*
[40] *Compare* MICH. COMP. LAWS § 324.32723(6) *with* Compact § 4.11.
[41] Compact § 4.11(5).
[42] MICH. COMP. LAWS § 324.32723(6)(d).

Conservation Measures"[43] does not comply with the Compact. By Michigan's Measures, this criterion is satisfied if the applicant has merely "*self-certified* that he or she is in compliance with environmentally sound and economically feasible water conservation measures . . . ."[44] In contrast, the Compact predicates approval on a determination by the state that the withdrawal will be implemented to incorporate Environmentally Sound and Economically Feasible Water Conservation Measures.[45] Michigan must amend its laws to do more to ensure compliance with the Compact in this area, such as monitoring and certification by the state.

Third, Michigan exempts various Withdrawals in ways not allowed by the Compact.[46] For example, as noted in the Report,[47] Withdrawals "undertaken for hydroelectric generation" are exempt.[48] This is in contrast to the two allowed exemptions in the Compact.[49] Michigan must repeal these additional exemptions.

III. Management and Regulation of Diversions (§ 4.9)

The three categories of exceptions to the prohibition on Diversions[50] are not mentioned in Michigan's Report or any of the Measures that the Report references.

Like the Compact, Michigan's Measures start with a general ban on all diversions.[51] However, the exceptions expressed under Michigan Law are not consistent with those contemplated by the Compact. Michigan allows for exception from the general prohibition of Diversions those "authorized by law"[52] and those "out of the drainage basin of the Great Lakes existing on September 30, 1985."[53] Additionally, Michigan's definition of "Diversion" excludes:

(i) A consumptive use;
(ii) The supply of vehicles, including vessels and aircraft, whether for the needs of the persons or animals being transported or for ballast or other needs related to the operation of vehicles;
(iii) Use in a noncommercial project on a short-term basis for firefighting, humanitarian, or emergency response purposes, and;
(iv) A transfer of water from a Great Lake watershed to the watershed of its connecting waterways.[54]

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[43] Compact § 4.11(3).
[44] MICH. COMP. LAWS § 324.32723(6)(e) (emphasis added).
[45] Compact § 4.11.3.
[46] *See* MICH. COMP. LAWS § 324.32727.
[47] *See* REPORT at 2.
[48] MICH. COMP. LAWS § 324.32727(1)(c).
[49] *See* Compact § 4.13 (exempting from Article 4 requirements Withdrawals to supply vehicles and in certain short-term, non-commercial projects).
[50] See *id.* § 4.8 (the general prohibition); *id.* § 4.9 (the three exceptions and exception standard).
[51] MICH. COMP. LAWS § 324.32703 (2008) ("Subject to section 32704,1 a diversion of the waters of the state out of the Great Lakes basin is prohibited.").
[52] *See id.* § 324.32703a.
[53] *See id.* § 324.32704.
[54] *Id.* § 324.32701(1)(p) (2008).

Somewhat confusingly, the middle two exceptions from Michigan's definition of "Diversion" are taken from the Compact's list of *Withdrawals* that are exempt from the Compact's requirements.[55] Creating additional confusion, the Measures that the Report point to as applicable to §§ 4.8-4.9 of the Compact include one that deals exclusively with Michigan's exclusions to Withdrawals.[56]

If Michigan is applying a more stringent standard towards Diversions than the one contemplated by the Compact, as evidenced by the same general ban less the allowed exceptions,[57] that would be a positive development. However, allowing exceptions other than those allowed for by the Compact means that Michigan is not complying with the Compact. The exceptions from the general ban on diversions must be limited to those contemplated by the Compact if Michigan is to be in compliance. Further, the Report's description of how Michigan handles Diversions is incomplete and confusing.[58]

IV. Proposal Monitoring (§ 4.3.4)

In response to the Compact's proposal monitoring obligation,[59] Michigan passed legislation allowing the Department of Environmental Quality to request the "attorney general to commence a civil action for appropriate relief, including a permanent or temporary injunction, for a violation of" Michigan's Measures.[60] In addition to granting injunctions, courts are empowered to impose various civil fines.[61]

While this Measure allows for various enforcement actions, there is nothing in the Report or the Measures referenced by the Report that addresses the obligation to monitor. In fact, it seems that the state places the obligation to monitor on the registrants rather than assuming that obligation itself.[62] The Compact plainly places the obligation to monitor on the state;[63] Michigan must adopt some sort of monitoring program, such as a requirement that the state conduct periodic inspections of approved withdrawals. And if such a program already exists, it should have been described in the Report.

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[55] Compact § 4.13.

[56] MICH. COMP. LAWS § 324.32727 (2008) (noting that the exceptions referred to therein apply to withdrawals unless they result in a diversion). *See also* MICH. COMP. LAWS § 324.32723(7) (2008) ("The department shall issue a water withdrawal permit under subsection (1)(d) if the transfer complies with section 4.9 of the compact").

[57] *But see* Bridget Donegan, Comment, *The Great Lakes Compact and the Public Trust Doctrine: Beyond Michigan and Wisconsin Common Law*, 24 J. ENVTL. L. & LITIG. 455, 466 (2009) (noting that, because Michigan is entirely within the Great Lakes Basin, the intrabasin transfers is the only diversion exception of the compact relevant to the state).

[58] *See* REPORT at 3.

[59] *See* Compact § 4.3.4.

[60] MICH. COMP. LAWS § 324.32713(2008).

[61] *Id.*

[62] *See id.* § 324.32706b(5) (2008) ("After a property owner registers a withdrawal, if, in developing the capacity to make the withdrawal, the conditions of the withdrawal deviate from the specific data that were entered into the assessment tool, the property owner shall rerun the assessment tool and shall enter the corrected data into the assessment tool. The property owner shall notify the department of the corrected data . . . .").

[63] *See* Compact § 4.3.4. Note that the Compact defines "Party" as "a State party to this Compact." *Id.* § 1.2.

IV. Regional Review (§§4.5.1(e), 4.5.2, 4.5.4)

Under the Compact, certain Proposals are to be subject to Regional Review.[64] When such a Proposal is made, both the state within which that Proposal was made[65] and the other states[66] have varied obligations. However, neither Michigan's Report nor the Measures it references make any mention of these obligations. Michigan must enact Measures to ensure its compliance with these obligations, and, to the extent such Measures already exist, the Report should be amended to reflect that they exist. These Measures should include, at a minimum, specific rules that dictate when a proposal must undergo Regional Review.

V. Public Participation (§6.2)

Under the Compact, each state is obligated to "ensure procedures for the review of Proposals subject to the Standard of Review and Decision consistent with" four requirements.[67] Michigan's compliance with this obligation does not appear in the Report. As discussed below, although Michigan purports to give the public an opportunity to participate in the decision-making process, compliance is satisfied on an ad hoc and informal basis. To fully ensure compliance with the Compact's public participation requirements, Michigan must adopt measures to formalize the process.

A. Public Notification and Comment

After a review of the many Measures mentioned in the Report, Michigan is not in compliance with the requirement to provide public notification and opportunity to comment.[68] Under Michigan law, the comment period shall be "not less than 45 days . . . ."[69] However, this comment period only applies to those withdrawals requiring a water withdrawal permit.[70] For those withdrawals not requiring a water withdrawal permit, the only mention of a public comment period appears in MICH. COMP. LAWS § 324.32704a. By that Measure, "[t]he governor

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[64] *See id.* § 4.5.

[65] *See, e.g., id.* § 4.5.2(a) ("The Originating Party shall determine if a Proposal is subject to Regional Review . . . .").

[66] *See, e.g., id.* § 4.5.4(e) ("All Parties shall exercise their best efforts to ensure that a Technical Review . . . does not unnecessarily delay the decision by the Originating Party . . . .").

[67] *Id.* § 6.2.

[68] *Compare* Compact § 6.2.1 *with* MICH. COMP. LAWS § 324.32723(4) (2008).

[69] MICH. COMP. LAWS § 324.32723(4) (2008).

[70] *Id.* § 324.32723(1) ("Except as provided in subsection (13), the following persons shall obtain a water withdrawal permit prior to making the withdrawal:

> (a) A person who proposes to develop withdrawal capacity to make a new withdrawal of more than 2,000,000 gallons of water per day from the waters of the state to supply a common distribution system.
>
> (b) A person who proposes to develop increased withdrawal capacity beyond baseline capacity of more than 2,000,000 gallons of water per day from the waters of the state to supply a common distribution system.
>
> (c) A person who proposes to develop withdrawal capacity to make a new or increased large quantity withdrawal of more than 1,000,000 gallons of water per day from the waters of the state to supply a common distribution system that a site-specific review has determined is a zone C withdrawal.
>
> (d) A person who proposes to develop a new or increased withdrawal capacity that will result in an intrabasin transfer of more than 100,000 gallons per day average over any 90-day period.").

shall establish a public comment period with regard to a proposal . . . to divert waters . . . ."[71] This is problematic for two reasons. First, the governor has not established this comment period.[72] Second, this comment period only applies to proposals to divert water, but the Compact obligates each state to provide public notification and comment period with regard to all Withdrawals, Diversions, and Consumptive Uses.[73] Michigan must provide opportunity for public comment on all Proposals. Until the state does so, it is not in compliance with this obligation.[74]

B. Public Access to Documents

Nothing in the Measures referenced by the Report indicates that Michigan is in compliance with this obligation under the Compact.

C. Public Hearings

Nothing in the Measures referenced by the Report indicates that Michigan is in compliance with this obligation under the Compact.

D. Record of Decision

Nothing in the Measures referenced by the Report indicates that Michigan is in compliance with this obligation under the Compact.

VI. Promotion of Science and Research (§ 1.4, 4.1.6)

While Michigan's Report describes a few efforts the state has made to support scientific understanding[75] in compliance of the Compact's obligation,[76] the Report could do more. Michigan's approach of combining its assessment tool, driven by science-based models, with its online registration process has been praised as a "novel means of predicting resource impacts ... ."[77] The Report could give some description of how this model is being improved and how the state is coordinating with other Parties to the Compact in pursuit of the scientific objectives put forth by the Compact.

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[71] MICH. COMP. LAWS § 324.32704a (2006).
[72] E-mail from Roger Eberhardt, Senior Envtl. Specialist, Office of the Great Lakes, to Chris Hruska, JD Candidate, University of Michigan Law School (Mar. 13, 2015, 15:59 EST) (on file with author).
[73] *Compare* MICH. COMP. LAWS § 324.32704a *with* Compact § 6.2.1 (stating that this obligation applies to "all Applications") *and* § 1.2 (defining Applications to encompass Proposals and defining Proposals to encompass Withdrawals, Diversions, or Consumptive Uses).
[74] Michigan claims to be in compliance, but only on an ad hoc and informal basis. Telephone Interview with Andrew LeBaron, Envtl. Quality Analyst, Water Use Program div. of MDEQ (Mar. 27, 2015).
[75] *See* REPORT at 4.
[76] Compact §§ 1.4.1, 1.4.2, 4.1.6.
[77] Gosman, *supra* note 26, at 11.

Conservation and Efficiency Program

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

In response to the Compact's obligation to develop goals and objectives,[78] Michigan's Report asserts that "Michigan adopted goals and objectives consistent with the basin-wide conservation and efficiency goals and objectives set forth in section 4.2(1) of the Compact on December 8, 2010 (Appendix 1)."[79] No Appendix is attached to the Report, and it is unclear exactly where it is. It is likely that the preparer of the Report simply forgot to include the document called Michigan Water Conservation and Efficiency Program: Appendix A – Water Conservation and Efficiency Goals and Objectives,[80] which can be found attached to multiple Council documents.[81] Because the goals listed in that Appendix are identical to those listed in the Compact,[82] Michigan is not in compliance with the Compact's obligation that each state shall "develop its *own* . . . goals . . . ."[83] Michigan must develop its own conservation goals to comply with its Compact obligations, and, to the extent such Measures already exist, the Report should be amended to reflect that existence.

II. Implementation (§ 4.2.5)

In response to the Compact's obligation to implement a Water conservation program obligation,[84] Michigan's Report section titled "Water Conservation and Efficiency Program Overview" notes that "[t]he foundation of Michigan's water conservation and efficiency program is the water withdrawal assessment required" of certain Withdrawals.[85] However, the Report does not explain how the program has been implemented. For Michigan to meet its obligations under the Compact, the Report must substantively describe the implementation of Michigan's Conservation and Efficiency Program.

In addition to the Report's thin description of the assessment process, the Report's description of Michigan's conservation and efficiency program has a number of deficiencies:

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[78] *See* Compact § 4.2.2.

[79] REPORT at 4.

[80] GREAT LAKES COMPACT COUNCIL, GREAT LAKES-ST. LAWRENCE RIVER BASIN WATER RES. COMPACT WATER CONSERVATION & EFFICIENCY ANNUAL PROGRAM REV.: STATE OF MICHIGAN 12 (2012) [hereinafter Appendix], *available at* http://www.glslregionalbody.org/Docs/ProgramReports/2012/MI%20Water%20Conservation%20and%20Efficiency%20Program%20Assessment-2012.pdf.

[81] *See id.*; STATE OF MICH. DEP'T OF ENVTL. QUALITY, WATER CONSERVATION &EFFICIENCY PROGRAM REV. (2011), *available at* http://www.glslregionalbody.org/Docs/ProgramReports/2011/MI%20Water%20Conservation%20and%20Efficiency%20Program%20Assessment-2011.pdf.

[82] *Compare* Appendix *with* Compact § 4.2.1.

[83] Compact § 4.2.2 (emphasis added).

[84] *See* Compact § 4.2.5 (noting that, while the program may be voluntary or mandatory, it must "adjust to new demands and the potential impacts of cumulative effects and climate.").

[85] REPORT at 5.

1. The Report's description does not provide any substantive information, but instead relies on vague buzzwords.[86] For example, the Report states that "Michigan's water conservation and efficiency program goes beyond the assessment process to comprise a comprehensive program of water management."[87] It further references "an integrated framework"[88] but fails to describe what that framework is, how it was established, or how the "private and public water users and governmental agencies"[89] work together to manage Michigan's water resources, specifically when it comes to water conservation and efficiency.

2. Michigan's voluntary[90] program is allowed by the Compact. But its voluntary nature would benefit from imposing some level of mandatory obligation that is not satisfied by mere self-certification.[91] While self-certification would at least impose the burden of considering Michigan's goals and objectives concerning conservation and efficiency, a monitoring system would help to ensure that those goals and objectives are in fact pursued by all. The more glaring omission is that even voluntary programs must "adjust to new demands and the potential impacts of cumulative effects and climate."[92]

3. Sec. 4.2.2 of the Compact requires that each state "annually assess its programs in meeting the Party's goals and objectives, report to the Council and the Regional Body. . ."[93] In its Report, the State fails to explain how its program is consistent with Regional goals and objectives and how it promotes environmentally sound and economically feasible conservation measures. Instead, it makes a series of statements with no explanation.

4. Sec. 32701(1) of the Natural Resources and Environmental Protection Act[94] defines environmentally sound and economically feasible measures, requiring that any measure must "Reflect best practices applicable to the water use sector."[95] Regional Objective One also encourages the use of "adaptive programs that are goal-based, accountable and measurable." It is not clear how the sector-specific conservation measures identified on the State's website[96] are any of these. The list of best

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[86] *See id.* ("This program is [sic] establishes an integrative framework of roles and responsibilities . . . creates opportunities for involvement . . . resulting in a latticework of shared investment . . . .").
[87] REPORT at 5.
[88] REPORT at 5.
[89] REPORT at 5.
[90] *Id.*; *see also* MICH. COMP. LAWS § 324.32708a.
[91] *See* MICH. COMP. LAWS § 324.32707(1)(j) (including among the responsibilities of making an annual report "an acknowledgment that the registrant has reviewed applicable environmentally sound and economically feasible water conservation measures . . . .").
[92] Compact § 4.2.5.
[93] Compact § 4.2.2.
[94] MICH. COMP. LAWS § 324.32701(1).
[95] *Id.*
[96] *Water Conservation Measures*, MICH. DEP'T OF ENVTL. QUALITY, http://www.michigan.gov/deq/0,4561,7-135-3304-190105--,00.html (last visited Apr. 25, 2015).

management practices for the Michigan Chamber of Commerce's materials[97] are dated February, 2008; the Best Management Practices For Non-Agricultural Irrigation[98] is undated; the American Water Works Association Michigan Section links to a document[99] that is also undated. Only the Michigan Department of Agriculture and Rural Development's "Generally Accepted Agricultural and Management Practices for Irrigation Water Use"[100] is dated January, 2015. Just as importantly, while the organizations solicited for input certainly have sector-specific expertise, they do not represent the full range of water conservation and efficiency expertise available to the State and its water users.

[97] Barr Eng'g Co., *Water Withdrawal and Conservation Practices* (Feb. 2008), *available at* http://www.michigan.gov/documents/deq/deq-wb-dwehs-wu-conservmeas-overview_231918_7.pdf.
[98] *Best Management Practices for Non-Agricultural Irrigation, available at* http://www.michigan.gov/documents/deq/deq-wb-dwehs-wu-conservmeas-nonagirrigation_231922_7.pdf.
[99] Mich. Section Am. Water Works Assoc., *Guidelines for Generally Accepted Water Management Practices for the Public Water Supply Sector* (2008), *available at* http://www.michigan.gov/documents/deq/deq-wb-dwehs-wu-conservmeas-pwss_463224_7.pdf.
[100] Mich. Dep't of Agric. & Rural Dev., *Generally Accepted Agricultural and Management Practices for Irrigation Water Use, available at* http://www.michigan.gov/documents/mdard/2015_IRRIGATION_WATER_USE_GAAMPs_479960_7.pdf.

MINNESOTA COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

Minnesota must take the following steps to come into compliance with the Compact:

A. Develop and maintain a Water resources inventory for the collection, interpretation, storage, retrieval exchange, and dissemination of information concerning the Water resources of the Party, 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.
B. Conform its registration requirement to require persons withdrawing or diverting water to provide an estimate of the volume of the withdrawal or diversion in terms of gallons per day average in any 30-day period.
C. Either revise its statutes and rules to achieve consistency with the Compact's decision-making standard for proposed withdrawals and consumptive uses, or expressly provide that it will apply the Compact's decision-making standard, notwithstanding any missing or conflicting provisions in its existing statutes and rules.
D. Revise its statutes and rules to require monitoring to ensure consistency with all conditions of approval of withdrawals, consumptive uses, and diversions.
E. Revise its laws to bring its public participation procedures into compliance with the Compact.

II. Water Conservation and Efficiency Program

A. Minnesota must develop its own water conservation and efficiency objectives.
B. Minnesota has water conservation programs for certain users, but no program that applies to all users. Minnesota should release its conservation program that it has been developing for all water users.
C. Minnesota must identify how its conservation programs "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact.

Water Management Program

I. Water Resources Inventory, Registration, and Reporting (§ 4.1)

A. Inventory

As described in a later section, Minnesota requires persons to report on their use of water obtained through withdrawals, diversions, and consumptive uses.[1] But nothing in Minnesota's statutes or rules requires the state to maintain an inventory of "information on the location, type,

[1] MINN. STAT. § 103G.005, subdivision 4 (2014) (defining "appropriating" to mean "withdrawal, removal, or transfer of water from its source"); MINN. STAT. § 103G.281 (2014) (requiring those appropriating water to make annual reports to the state of the total amount of water appropriated).

quantity, and use of … [the state's Water] resources and the location, type, and quantity of Withdrawals, Diversions and Consumptive Uses," as the Compact requires.[2] To comply with the Compact, Minnesota must develop and maintain a Water Resources Inventory that meets all of the Compact criteria.

B. Registration

Minnesota complies with all but one of the registration requirements specified by the Compact. In particular, Minnesota does not comply with the requirement that persons withdrawing or diverting water provide "an estimate of the volume of the Withdrawal or Diversion in terms of gallons per day *average* in any 30-day period."[3] Minnesota instead requires information on the amount of water "appropriated on a *maximum* daily basis."[4]

C. Reporting

Minnesota requires registrants to annually report the monthly volume of water appropriated.[5] In fact, Minnesota requires all users to measure all water uses – even if they do not require permits – and file a water use data statement with the commissioner.[6] Registrants report the data using the Minnesota Department of Natural Resources (MDNR) Permitting and Reporting System (MPARS).[7] Minnesota then submits that information to the Great Lakes Commission's water use database.[8] Minnesota's comprehensive reporting requirements comply with the Compact.

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

A. Regulation Level (§ 4.10)

Minnesota set a threshold level for the regulation of new or increased withdrawals that exceed 10,000 gallons per day *or* one million gallons per year.[9] Minnesota thus complies with the Compact because its threshold is less than the default threshold of 100,000 gallons per day or greater average in any 90-day period.[10]

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[2] Great Lakes—St. Lawrence River Basin Water Resources Compact, Pub. L. No. 110-342, § 4.1.1, 122 Stat. 3739, 3739 (2008) [hereinafter Compact].
[3] Compact § 4.1.3. (emphasis added).
[4] MINN. RULES, part 6115.0660, subpart E(3).
[5] MINN. STAT. 103G.281, subdivision 3 and .282, subdivision 3; MINN. RULES, part 6115.0750, subpart 4 (2014).
[6] MINN. STAT. 103G.275, subdivision 2 and .281, subdivision 3 (2014).
[7] MPARS: MDNR Permitting and Reporting System, Minnesota Dept. Natural Res., http://www.dnr.state.mn.us/mpars/index.html (last visited Apr. 26, 2015).
[8] *Great Lakes Regional Water Use Database*, GREAT LAKES COMM'N, http://projects.glc.org/waterusedata/ (last visited Feb. 15, 2015).
[9] Minn. Stat. § 103G.271, subdivision 4 (2014); Minn. Rules, part 6115.0620(C) (2014); MINN. DEP'T OF NATURAL RES., STATE OF MINNESOTA WATER MANAGEMENT PROGRAM FIVE-YEAR REPORTING 2 (2014) [hereinafter WATER MANAGEMENT REPORT].
[10] Compact § 4.10.2.

B. Decision-Making Standard (§§ 4.11, 4.12)

Minnesota enacted the Compact decision-making standard,[11] and any decision the state makes must comply with that standard, but the Report explains that the state uses the standards in its statutes and rules in deciding whether to grant proposals for withdrawals and consumptive uses from surface and groundwater.[12] Although Minnesota's statutes and rules may require the state to *consider* information and factors that bear on the Compact's criteria for approval, [13] they do not require *compliance* with those criteria in important respects.

Nothing in Minnesota's statutes or rules predicate approval on meeting the following criteria:

- Section 4.11.1., requiring the return of water to the source watershed, less an allowance for consumptive use.[14]

- Section 4.11.2, requiring implementation to ensure *no* significant individual or cumulative adverse impacts to the *quality* of the waters and water-dependent natural resources and the applicable source watershed.[15] Minnesota only (arguably) requires protection of the *quantity* of the waters and water-dependent natural resources.[16] In addition, Minnesota authorizes appropriation of groundwater on a conditional basis where the state lacks data to adequately determine the effects of the appropriation.[17] Even where the state has sufficient data, it need only limit appropriations to the safe yield of the aquifer "to the maximum extent feasible and practical."[18]

- Section 4.11.3, requiring implementation to incorporate environmentally sound and economically feasible water conservation measures.[19]

- Section 4.11.4, requiring implementation to ensure compliance with all applicable municipal, state, and federal *laws*, as well as regional interstate and international *agreements*.[20] Minnesota only requires consistency with approved state, regional, and local water and related land resources management *plans*.[21]

Minnesota does require a proposed withdrawal or consumptive use to be reasonable,[22] but does not require consideration of all the factors bearing on reasonableness specified by the

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[11] MINN. STAT. § 103G.801 (2014).
[12] WATER MANAGEMENT REPORT at 3, par. 3a.
[13] MINN. RULE, part 6115.0670, subparagraph 2 (2014).
[14] Compact § 4.11.1.
[15] *Id.* § 4.11.2
[16] *See* Minn. R. 6115.0670, subparagraph 3.B.(6) (2014) (requiring protected flows and protection elevations) *and* Minn. R. 6115.0630, subparagraphs 12 & 13 (2014) (defining protected flows and protection elevations in terms of quantity).
[17] *See* Minn. R. 6115.0670, subparagraph 3.C.(3) (2014).
[18] *Id.* at subparagraph 3.C.(1).
[19] Compact § 4.11.3.
[20] *Id.* § 4.11.4.
[21] MINN. R. 6115.0670, subparagraph 3.A.(4) (2014).
[22] *Id.* at subparagraph 3.A.(3).

Compact. For instance, Minnesota does not require consideration whether efficient use is made of existing water supplies where an increased withdrawal or consumptive use is proposed.[23]

Minnesota either must revise its statutes and rules to achieve consistency with the Compact's decision-making standard, or it must expressly provide that it will apply the Compact's decision-making standard, notwithstanding any missing or conflicting provisions in its existing statutes and rules.

III. Management and Regulation of Diversions (§ 4.9)

As Minnesota acknowledges, diversions are subject to the Compact exception standard as incorporated in Minnesota statute.[24] Minnesota thus complies with the Compact.

IV. Proposal Monitoring (§ 4.3.4)

Minnesota law requires monitoring of the quantity of water used or appropriated,[25] and authorizes – but does not require – additional monitoring to evaluate water resource impacts.[26] These provisions do not fully comply with the Compact, which requires monitoring to ensure consistency not just with the amount of water withdrawn, consumed, or diverted, but with *all* conditions of approval.[27] For example, withdrawals must be monitored to ensure that it causes "no significant individual or cumulative adverse impacts to the quantity or quality of the Waters and Water Dependent Natural Resources and the applicable Source Watershed."[28]

Accordingly, Minnesota must revise its statutes and rules to require monitoring to ensure consistency with all conditions of approval of withdrawals, consumptive uses, and diversions.

V. Regional review (§§ 4.5.1(e), 4.5.2, 4.5.4)

Minnesota complies with the regional review requirements found in Section 4.5 of the Compact.

VI. Public Participation (§ 6.2)

Minnesota does not ensure procedures for the review of proposals subject to the Standard of Review and Decision consistent with the Compact's requirements. Minnesota generally requires hearings on proposals and has established procedures for conducting such hearings,[29] but the state may waive a hearing, apparently without any reason, and may then issue a permit without a hearing.[30] In that event, the applicant and government entities may demand a hearing,

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[23] Compact § 4.11.5.b.
[24] MINN. STAT. § 103G.801, § 4.9 (2014).
[25] MINN. R. 6115.0750, subpart 3.A. (2014).
[26] MINN. STAT. § 103G.282, subdivision 1 (2014).
[27] Compact § 4.3.4.
[28] *Id.* § 4.11.2.
[29] MINN. STAT. § 103G.311 (2014).
[30] *Id.* at subdivision 4.

but not members of the public.[31] These provisions are contrary to the Compact's requirement that Minnesota provide notice and an opportunity to comment before the state makes a decision on an application, as well as the requirement that the state provide guidance on standards for determining whether to conduct a public hearing.[32]

Accordingly, Minnesota must revise its laws to bring its public participation procedures into compliance with the Compact. These revisions must include the establishment of formal criteria for when a hearing is to take place, and an opportunity for public comment on all proposals.

VII. Science (§§ 1.4, 4.1.6)

Minnesota has undertaken initiatives to improve scientific understanding. These focus on gathering information in three program areas: mapping, monitoring, and managing.[33] In addition, "ambient and permit required monitoring networks provide data on groundwater levels, surface water levels and flows, precipitation, and water use that are used to evaluate individual and cumulative impacts."[34] Although these are all positive steps, Minnesota's Report should include a description of how the state works with regional partners to achieve goals contained in Section 1.4.

Conservation and Efficiency Program

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

Minnesota's objectives are the same as those adopted by the Compact Council.[35] Minnesota is therefore not in compliance with the Compact's obligation that each state shall "develop its *own* ... goals ... ."[36] To comply with the Compact, Minnesota must develop its own water conservation and efficiency objectives.

II. Implementation (§ 4.2.5)

Currently, Minnesota's conservation program does not meet the Compact's requirements because it does not cover all water users. The MDNR requires conservation for all water users subject to the permitting program. 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.[37] Currently, Minnesota is

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[31] *Id.* at subdivision 5.(a).
[32] Compact §§ 6.2.1, 6.2.3.
[33] REPORT at 4.
[34] *Id.*
[35] *Compare* MINN. DEP'T OF NATURAL RES., STATE OF MINNESOTA GREAT LAKES-ST. LAWRENCE RIVER BASIN WATER RESOURCES COMPACT WATER CONSERVATION AND EFFICIENCY ANNUAL PROGRAM REVIEW 4-7 (2014) *with* Great Lakes – St. Lawrence River Basin Water Resources Council, Resolution #5, Attachment A at 2-3 (2008).
[36] Compact § 4.2.2.
[37] MINN. DEP'T OF NATURAL RES., STATE OF MINNESOTA GREAT LAKES-ST. LAWRENCE RIVER BASIN WATER RESOURCES COMPACT WATER CONSERVATION AND EFFICIENCY ANNUAL PROGRAM REVIEW 2 (2014).

developing a water conservation program for all water users within Minnesota. Until this new program is released, Minnesota is not in compliance with the Compact because Minnesota's current conservation program only applies to public water users and other users subject to the permitting program.

It is also not clear how the State's water conservation efforts "adjust to new demands and the potential impacts of cumulative effects and climate,"[38] as required by the Compact. Minnesota must include an explanation of how the cited programs and legislative measures will achieve this goal and adjust to changing environmental circumstances unfolding in an age of rapid and volatile shifts in climate.

[38] Compact § 4.2.5.

NEW YORK COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

A. New York has not established a Water Resources Inventory as required by Compact Section 4.1.1. To meet this obligation, New York must establish an Inventory that contains information on the location, type, and quantity of Water Resources and Water Withdrawals in the Great Lakes basin.

B. New York does not require DEC to consider Compact factors in Sections 4.11.1, 4.11.5.2, and 4.11.5 when evaluating all Withdrawal applications. To address this problem, New York must amend its standard for evaluating Withdrawal permit applications to include and apply all of the factors in Compact Section 4.11.

C. New York's standards for approving Withdrawal applications are not in compliance with the Compact's standard. To address this issue, New York must amend the standard for evaluating Withdrawal applications for the Great Lakes basin to fully comply with all the provisions of Compact Section 4.11.

D. Due to the permissive language in the "Prohibitions" section of DEC's permit regulations, DEC is not required to deny withdrawal permits that would violate the Compact. To fix this problem, DEC must amend the "Prohibitions" section of its regulations to make the denial of permit applications that violate the Compact mandatory.

E. The "Exemptions" section of DEC's regulations impermissibly reduces DEC's ability to monitor for Withdrawals that would violate the Compact. To fix this problem, DEC must amend its exemptions regulation to eliminate Withdrawals from the Great Lakes basin.

F. As the Compact requires, DEC must treat Lake Erie and Lake Ontario as having distinct watersheds and subject transfers of water between the watersheds to the Compact's restrictions on "intra-basin transfers" in Section 4.9.2.

G. New York does not conduct any sort of active monitoring of permit holders to ensure that they are carrying out their original proposals. To address this deficiency, New York must amend its laws or regulations to require DEC to conduct periodic inspections of water Withdrawal facilities after they are approved.

H. DEC's regulations require that Diversions to or from the Great Lakes basin be submitted for Regional Review, but make no mention of Withdrawals. DEC should amend its regulations to make clear when DEC requires regional review for Withdrawals.

I. DEC's Uniform Procedures allow modifications to Withdrawal permits to proceed without a chance for public notice. To comply with the Compact, DEC must amend its Uniform Procedures to require notice and a public comment period for all Withdrawal modifications within the Great Lakes basin.

J. DEC's Uniform Procedures do not require public accessibility to all documents relevant to a Withdrawal application. To comply with the Compact, DEC must amend the Uniform Procedures to require public release of all documents relevant all Withdrawals in the Great Lakes basin.

K. DEC's Uniform Procedures do not require the release of a public record of decision for public inspection. To comply with the Compact, DEC must amend the Uniform

Procedures to require the release of a release a public record of decision for all Withdrawal applications in the Great Lakes basin.

L. New York must fulfill its obligation to develop a Water Conservation Program.

II. Water Conservation and Efficiency Program

A. New York has not developed state-specific goals and objectives, nor a water conservation and efficiency program based on those goals and objectives. New York must create such a program, which must identify how it will "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact.[1]

B. DEC grandfathered in existing water withdrawers when it passed its current regulations, so they are exempt from the few conservation requirements DEC does impose on new applicants. To come into compliance with the Compact, New York must develop a formal water conservation program which applies to both new and existing permit holders.

Water Management Program

I. Water Resources Inventory, Registration and Reporting (§ 4.1)

A. Water Resources Inventory

Currently, the only Water Resources Inventory that the state of New York maintains is DEC's Waterbody Inventory/Priority Waterbodies List ("WI/PWL").[2] New York originally established the WI/WPL to comply with section 305 of the Clean Water Act ("CWA"), which requires that states submit biennial reports on pollution levels in all navigable waters.[3] The WI/PWL contains information on all drainage basins in the state. Seven of these basins—Black River, Niagara River/Lake, Genesee River, Oswego River/Finger Lakes, Lake Ontario, Lake Champlain, and St. Lawrence River—are part of the Great Lakes basin.[4]

The WI/PWL program does not fulfill New York's obligations under Section 4.1.1 of the Compact. Since the WI/PWL reports are designed to comply with the CWA, they contain different information than the Compact requires. In general, the WI/PWL reports focus on pollution levels and water quality.[5] They do not contain information on the location, type, consumptive use, or quantity of Withdrawals and Diversions.[6] Moreover, the reports do not

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[1] Great Lakes—St. Lawrence River Basin Water Resources Compact Pub. L. No. 110-342, § 4.2.5, 122 Stat. 3739, 3739 (2008) [hereinafter Compact].

[2] *See Waterbody Inventory/Priority Waterbodies List*, N.Y. DEP'T OF CONSERVATION, http://www.dec.ny.gov/chemical/36730.html (last visited Feb. 16, 2015).

[3] Clean Water Act § 305(b), codified at 33 U.S.C. 1315 (2012).

[4] *Compare* N.Y. STATE DEP'T OF ENVTL. CONSERVATION, THE WATERBODY INVENTORY AND PRIORITY WATERBODIES LIST 3, *available at* http://www.dec.ny.gov/docs/water_pdf/wipwlintro.pdf *with* GREAT LAKES-ST. LAWRENCE RIVER BASIN WATER RESOURCES COUNCIL, MAP OF THE GREAT LAKES BASIN, *available at* http://www.glslcompactcouncil.org/Docs/Misc/GLBasinMap.pdf.

[5] *See, e.g., Saint Lawrence River WI/PWL*, N.Y. DEP'T OF CONSERVATION, *available at* http://www.dec.ny.gov/chemical/36735.html (last visited Feb. 16, 2015).

[6] *See* Compact § 4.1.1.

contain raw data in a form that would allow "interpretation, storage, retrieval, exchange, and dissemination of information concerning the Water resources."[7] To fix this deficiency, the DEC must establish a separate inventory for the Great Lakes basin. The DEC already has much of the infrastructure in place for the collection of information for the inventory through its Withdrawal permit program,[8] so all that remains for New York to do in order to meet its Compact obligations is the creation of a repository in which to enter the Withdrawal data.

B. Registration

New York law requires that all Withdrawals and Diversions above the threshold volume first register with DEC.[9] To implement this statutory requirement, DEC has created a comprehensive procedure for evaluating permit applications[10] as well as established procedures for the modification of permits.[11] Thus, New York complies with its Compact obligations to require registration of Withdrawals and Diversions.[12]

C. Reporting

Under New York law and DEC regulations, any person who is subject to DEC's permit requirements must also submit an annual report to DEC.[13] This report must be submitted on a DEC form,[14] and it must contain all the information required by the Compact.[15]

In enacting the Compact, New York has adopted the Compact's requirement that the state annually forward the information in these reports to a Great Lakes—St. Lawrence River Water use data base repository.[16] DEC has met this obligation.[17]

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

A. Threshold Regulation Level (§ 4.10)

Under New York Law and DEC regulation, all Withdrawals or Diversions that are equal to or greater than the Threshold Volume are subject to DEC regulations and permit

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[7] *Id.*
[8] *See infra,* Section I.B (Registration).
[9] N.Y. ENVTL. CONSERV. LAW § 15-1501.1 (McKinney 2012).
[10] *See* N.Y. COMP. CODES R. & REGS. tit. 6 § 601.11.
[11] *See* N.Y. COMP. CODES R. & REGS. tit. 6 §§ 621.11, 621.13.
[12] Compact § 4.1.3.
[13] N.Y. ENVTL. CONSERV. LAW § 15-1501.4(b) (McKinney 2012) ("The department shall promulgate regulations to implement a permitting program . . . which shall establish . . . monitoring, reporting and recordkeeping requirements"); N.Y. COMP. CODES R. & REGS. tit. 6 § 601.5 (establishing reporting requirements for persons who hold Withdrawal permits).
[14] N.Y. COMP. CODES R. & REGS. tit. 6 § 601.5(a). The form itself can be found through a link on DEC's Annual Water Withdrawal Reporting website, located at http://www.dec.ny.gov/lands/86940.html.
[15] *Compare* N.Y. COMP. CODES R. & REGS. tit. 6 § 601.5(a) *with* Compact § 4.1.1.
[16] N.Y. ENVTL. CONSERV. LAW § 21-1001, § 4.1.5. (McKinney 2012).
[17] *See* N.Y. STATE DEP'T OF ENVTL. CONSERVATION, NEW YORK STATE'S WATER MANAGEMENT PROGRAM REPORT AND ANNUAL WATER CONSERVATION AND EFFICIENCY REPORT FOR 2014 ¶ 4 (2014).

requirements.[18] The Threshold Volume for regulation in New York is 100,000 gallons or more per day for all agricultural and non-agricultural Withdrawals in the state.[19] For agricultural purposes, the Threshold Volume means a withdrawal of "a volume in excess of an average of one hundred thousand gallons per day in any consecutive thirty-day period,"[20] whereas a non-agricultural Withdrawal surpasses the Threshold Volume if the "limiting maximum capacity of the water Withdrawal, treatment, or conveyance system" is equal to or greater than 100,000 gallons per day.[21] Since the volume of an agricultural Withdrawal is measured using a 30-day average method, and the volume of a non-agricultural Withdrawal is measured by its total capacity – methods which are more restrictive than the Compact – New York's Threshold Volume laws and regulations meet the requirements of the Compact.[22]

B. Decision-Making Standard (§ 4.11)

The state of New York has delegated to DEC the authority to regulate all Withdrawals that are greater than or equal to the Threshold Volume.[23] Pursuant to this authority, DEC has implemented procedures to review and approve permit applications for Withdrawals.[24]

New York's implementation of the Compact decision-making standard for Withdrawals is deficient in several areas. DEC fails to define or provide effective technical guidance regarding what conservation and efficiency measures are necessary and sufficient to obtain a permit under Section 4.11.3. In addition, DEC is not obligated to determine compliance with all the factors in Section 4.11 of the Compact. Specifically, DEC's regulations omit the factors set forth in Sections 4.11.5.2 (requiring implementation to ensure no significant impacts to "the applicable Source Watershed") and Sections 4.11.5.a., c., d., and e.[25] To fix this problem, DEC must amend its regulations to include provisions that cover all of the factors in Compact Section 4.11.[26]

New York also fails to meet its obligation under the Compact to withhold approval of a Withdrawal unless it fully complies with the Compact's requirements. The Compact states that Withdrawals may be approved *only* of they meet the criteria contained in Section 4.11.[27] But

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[18] NY ENVTL. CONSERV. LAW § 15-1502.14 (McKinney 2012); N.Y. COMP. CODES R. & REGS. tit. 6 § 601.6(c), (i) (establishing requirement that all new and increased Withdrawals above the Threshold volume obtain a permit from DEC).

[19] NY ENVTL. CONSERV. LAW § 15-1502.14 (McKinney 2012) (defining the threshold volume as "volume of one hundred thousand gallons or more per day"); N.Y. COMP. CODES R. & REGS. tit. 6, § 601.2(p).

[20] NY ENVTL. CONSERV. LAW § 15-1502.14 (McKinney 2012).

[21] *Id.*

[22] *See* Compact § 4.10.2.

[23] N.Y. ENVTL. CONSERV. LAW § 15-1501(1)(a) (McKinney 2012).

[24] *See* N.Y. COMP. CODES R. & REGS. tit. 6 § 601 et seq.

[25] *Compare* Compact §§ 4.11.5.2, 4.11.5.a., c., d., and e. *with* N.Y. COMP. CODES R. & REGS. tit. 6 § 601.11.

[26] DEC has taken the position that Compact §§ 4.11.1 and 4.11.5 apply only to "inter-basin diversions," but the plain language of the Compact makes these criteria applicable to all new and increased withdrawals in the Basin subject to management and regulation. Compact § 4.11; *see, e.g.*, DEC, Assessment of Comments, # G-17.14, G-20.4, G-22.16, G-22.17.

[27] Compact § 4.11 ("Proposals … may be approved as appropriate only when the following criteria *are met.*") (emphasis added).

under New York law, DEC need only determine "whether"[28] a proposal does or does not meet certain criteria; meeting the criteria is not a prerequisite to approval.

In fact, DEC may approve a Withdrawal permit if the approval is conditioned to provide mere "satisfactory compliance" with factors DEC must consider.[29] This is a problem because the term "satisfactory compliance" is facially more lenient than the Compact's unequivocal requirement that an application "meet" the decision criteria. Under the "satisfactory compliance" standard, a permit may be approved even if the approval is conditioned "to bring into cooperation all persons that may be affected by the project."[30] In other words, DEC may approve a permit before the permit is proven to meet all of the Compact's criteria. This standard does not conform to the Compact's decision-making standard at all. To address this issue, DEC must amend its regulations so that applications cannot be approved unless they fully comply with all the provisions of Compact Section 4.11.

Another problem with New York's implementation of the Compact decision-making standard is that DEC is not required to deny permits that would violate the Compact. The regulations state that DEC "may" deny a Withdrawal permit if the agency determines that "the water withdrawal will exceed or cause to be exceeded the safe yield or sustainable supply of the water source,[31] meaning denial is not mandatory. Thus, DEC may grant a permit to an applicant whose proposed withdrawal would violate more than one Compact decision factor.[32] To fix this problem, DEC must amend its regulations to make the denial of permit applications that violate the Compact mandatory. This could be done without changing any DEC operational procedures, and without affecting other provisions of the permit application regulations.

Finally, the exemption for withdrawals of hydropower facilities created by DEC's regulations impermissibly reduces the agency's ability to monitor for such Withdrawals, which violates the Compact.[33] Since the exempted Withdrawal is not subject to DEC's permit requirements, DEC is unlikely to be able to effectively police whether the exempted Withdrawals comply with the Compact. To fix this problem, DEC must amend its exemptions regulation to carve-out Withdrawals from the Great Lakes basin.

III. Management and Regulation of Diversions (§ 4.9)

New York law and DEC's regulations prohibit all Diversions from the Great Lakes basin except for those that are allowed under the Compact.[34] Furthermore, all proposals for Diversions

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[28] N.Y. COMP. CODES R. & REGS. tit. 6 § 601.11(c).
[29] N.Y. ENVTL. CONSERV. LAW § 15-1503 (4) (McKinney 2012).
[30] *Id.*
[31] N.Y. COMP. CODES R. & REGS. tit. 6, §601.16(a)(2).
[32] *See* Compact §§ 4.11.2, 4.11.5.d, e.
[33] *Compare* Compact § 4.13 (listing permissible Exemptions under the Compact) *with* N.Y. COMP. CODES R. & REGS. tit. 6 § 601.9(c).
[34] N.Y. ENVTL. CONSERV. LAW § 15-1505.6 (McKinney 2012) ("Diversions from the Great Lakes-St. Lawrence river basin are prohibited by the Great Lakes-St. Lawrence River Basin Water Resources Compact, as enacted in title ten of article twenty-one of this chapter. Limited exceptions for public water supply systems will only be considered when in compliance with that Compact"); N.Y. COMP. CODES R. & REGS. tit. 6 § 601.10(n) ("Diversions of any quantity out of the Great Lakes-St. Lawrence River Basin are prohibited by the Great Lakes-St. Lawrence River Basin Water Resources Compact").

under the Exception Standard, regardless of volume, must undergo review by the Great Lakes Council and or Regional Body.[35]

However, DEC has taken the position that the Compact's limitations on the transfer of water between individual Great Lakes watersheds[36] do not apply in New York because such intra-basin transfers are not possible in New York. DEC interprets the Compact to treat all portions of the Great Lakes-St. Lawrence River Basin within the state as a single watershed.[37] But the Compact treats Lake Erie and Lake Ontario as having distinct watersheds, and provides that transfers of water between the watersheds of any two Great Lakes are subject to the Compact's restrictions on "intra-basin transfers."[38] Therefore, DEC's classification of the Erie and Ontario basins violates the Compact. To comply with the Compact, DEC must treat Lake Erie and Lake Ontario as having distinct watersheds and subject transfers of water between the watersheds to the Compact's restrictions on "intra-basin transfers" in Section 4.9.2.

IV. Proposal Monitoring (§ 4.3.4)

New York is not in compliance with its obligation to monitor under the Compact. Section 4.3.4 of the Compact requires that the state "monitor the implementation of any approved Proposal to ensure consistency with the approval."[39] However, DEC does not conduct any sort of active monitoring of permit holders to ensure that they are carrying out their original proposals. To address this deficiency, New York must adopt a statute or regulations that require DEC to conduct periodic inspections of water Withdrawal facilities once they are approved.

V. Regional Review (§§4.5.1(e), 4.5.2, 4.5.4)

New York law prohibits all diversions from the Great Lakes basin save for the limited exceptions allowed under the Compact.[40] DEC's regulations thus require all proposals for diversions out of the Great Lakes basin to undergo review by the Great Lakes Council and Regional Body.[41] Where Regional Review is needed, DEC requires that the applicant whose proposal is being reviewed must bear the costs of compliance with the Compact.[42]

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[35] N.Y. COMP. CODES R. & REGS. tit. 6 § 601.10(n).

[36] *See* Compact § 4.9.2.

[37] DEC interprets Lake Ontario and Lake Erie to constitute a single watershed because they share a connecting channel, but that interpretation would render the Compact's intra-basin transfer restrictions a nullity, since all of the Great Lakes are hydrologically connected via connecting channels. *See, e.g.*, DEC, Assessment of Comments, # G-12.12, G-17.15, G-20.5, G-22.18, G-22.24.

[38] *See* Compact § 1.2 (defining an intra-basin transfer as "the transfer of Water from the watershed of one of the Great Lakes into the watershed of another Great Lake.").

[39] Compact § 4.3.4.

[40] N.Y. ENVTL. CONSERV. LAW §15-1505(6) (McKinney 2012).

[41] N.Y. COMP. CODES R. & REGS. tit. 6 § 601.10(n) ("Limited exceptions for public water supply systems will only be considered by the Great Lakes-St. Lawrence River Basin Water Resources Council and Regional Body when in compliance with that Compact.").

[42] *Id.* ("[T]he applicant proposing such an exception is responsible for providing the Department information in a timely manner to respond to requests by the Great Lakes-St. Lawrence River Basin Water Resources Council and Regional Body [and is] responsible for costs associated with . . . the Regional Notification and Application Review/Approval processes of the Great Lakes-St. Lawrence River Basin Water Resources Council and Regional Body.").

Although the Compact gives states substantial discretion in determining what proposals are subject to Regional Review,[43] it is not clear whether New York is in compliance. DEC's regulations require that Diversions to or from the Great Lakes basin be submitted for Regional Review, but the regulations make no mention of Withdrawals. Since the Compact leaves the decision to require Regional Review up to the states, New York may not be in technical violation of the Compact's provisions.[44] Nevertheless, DEC should implement further regulation to explain when it would require regional review for Withdrawals.

VI. Public Participation (§6.2)

All permit applications that DEC issues are governed by Article 70 of New York's Environmental Conservation Laws, as implemented in DEC's "Uniform Procedure" regulations.[45] DEC's Uniform Procedures establish deadlines and other procedural requirements to which DEC must adhere when evaluating a permit application. Importantly, DEC's Uniform Procedures differentiate between "major" and "minor" projects.[46]

A. Public Notification and Comment

DEC's Uniform Procedures lay out an extensive framework for conducting public notice and comment for all major projects.[47] But minor projects are not subject to any notice and comment requirements.[48] This is problematic because minor projects may include modifications to *any* size of Withdrawal, including a Withdrawal that was considered a major project at the time it was approved.[49] Consequently, the Uniform Procedures allow Withdrawal permits that exceed the Threshold Volume to be modified without a chance for public notice or comment. This violates the Compact requirement that the public have a chance to comment on "all Applications."[50] To come into compliance with the Compact, DEC must amend the Uniform Procedures to require public comment for all modifications to Withdrawals within the Great Lakes basin which are above the Threshold Volume.

B. Public Access to Documents

Neither Article 70 nor DEC's Uniform Procedures require that DEC assure public access to documents that are relevant to an application.[51] According to Part 621.7 of the Uniform Procedures, DEC can choose to "provide or require the applicant to provide other reasonable public notice." This additional notice "may include … the distribution or posting of information about the proposed project in the area in which the proposed project is to be located, conduct of

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[43] Compact § 4.5.2 ("Originating Party shall determine if a Proposal is subject to Regional Review").
[44] *Id.*
[45] N.Y. ENVTL. CONSERV. LAW § 70-0109.2(a) (McKinney 2012); N.Y. COMP. CODES R. & REGS. tit. 6 § 621 et seq.
[46] *See* N.Y. COMP. CODES R. & REGS. tit. 6 § 621.4. ("Procedures to be followed when reviewing an application for a permit depend upon whether a project is considered major or minor.")
[47] N.Y. COMP. CODES R. & REGS. tit. 6 § 621.7
[48] *See id.*
[49] *See* N.Y. COMP. CODES R. & REGS. tit. 6 § 621.4(b)(2).
[50] *See* Compact § 6.2.1.
[51] *See* N.Y. COMP. CODES R. & REGS. tit. 6 § 621.7(e).

public information meetings, translation of notices for non-English speaking communities and the establishment of document repositories in the area in which the proposed project is to be located."[52]

While the Uniform Procedures do not require the release of all documents relevant to an application, some relevant documents may be released if they are subject to New York's State Environmental Quality Review Act ("SEQR").[53] The SEQR requires all projects which will have a significant environmental impact to complete an Environmental Impact Statement ("EIS")the project can proceed.[54] The regulations implementing the SEQR require that "[a]ll SEQR documents and notices . . . must be maintained in files that are readily accessible to the public and made available on request."[55] However, the SEQR may not apply to all Withdrawals from the Great Lakes basin, and the documents subject to SEQR may not completely overlap with the documents that are required under Section 6.2.2 of the Compact.

New York is not in compliance with the Compact requirement to "[a]ssure public accessibility to all documents relevant to an Application."[56] To start, under the Uniform Procedures, DEC has complete discretion to decide whether to require an applicant to publicly release additional information about a proposed Withdrawal. Even if DEC does decide that additional public disclosures are required, there is no guarantee that DEC will require the release of "all documents relevant to" the application.[57] Moreover, the documents that are released under the SEQR are not sufficient to comply with the Compact because they likely do not represent *all* of the documents that DEC considers when evaluating Withdrawal permit applications. To come into compliance with the Compact, DEC must amend its Uniform Procedures to require public release of all documents relevant all applications for Withdrawals in the Great Lakes basin.

C. Record of Decision

Neither Article 70 nor the Uniform Procedures require that DEC publicly release a record of its decision to approve or deny a Withdrawal permit. Unlike the SEQR, which requires DEC to include "responses to all substantive comments" in the final version of the EIS,[58] the Uniform Procedures do not require DEC to release any sort of record of decision for Withdrawal permits. The only circumstance under which the Uniform Procedures require DEC to produce any record its decision is when DEC denies a permit, in which case DEC must explain to the applicant (not the public) why the permit was denied.[59]

New York is not in compliance with the Compact requirement to provide a "record of decision" for the public.[60] To comply with the Compact, DEC must amend its Uniform

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[52] *Id.*
[53] *See* N.Y. COMP. CODES R. & REGS. tit. 6 § 617 et seq.
[54] *See* N.Y. COMP. CODES R. & REGS. tit. 6 §§ 617.2-617.12.
[55] N.Y. COMP. CODES R. & REGS. tit. 6 § 617.12(b)(3).
[56] Compact § 6.2.2.
[57] *Id.*
[58] N.Y. COMP. CODES R. & REGS. tit. 6 § 617.9(b)(8).
[59] N.Y. COMP. CODES R. & REGS. tit. 6, § 621.10(a).
[60] Compact § 6.2.4.

Procedures to require the release of a release a public record of decision for all Withdrawal applications in the Great Lakes basin. In order to meet the requirements of the Compact, this record would need to contain comments, objections, and responses to comments.[61]

VII. Promotion of Science and Research (§ 1.4, 4.1.6)

New York has not fulfilled its obligation to develop a Water Conservation Program.[62] DEC has developed a draft *Survey of Methods for Implementing and Documenting Water Conservation in New York* ("Draft Survey").[63] The Draft Survey fails, however, to serve as a tool for implementing DEC's regulatory program. It merely provides a menu of possible water conservation strategies, in the form of a literature review. It provides no genuine guidance to applicants or permit-writers that would enable them to identify the circumstances under which any of the catalogued measures should be considered "environmentally sound and economically feasible."

In addition, New York should update its water conservation manual for public water suppliers (i.e., drinking water utilities). The state first developed the manual in 1989 and slightly revised and reissued it in 1999. Consequently, the manual is outdated.

Conservation and Efficiency Program

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

Under New York statute, DEC must establish a water conservation and efficiency program that is aimed at achieving the five goals in Compact section 4.2.1.[64] To meet this obligation, DEC requires that Withdrawal permit applications include a water conservation program which "demonstrates the applicant's water conservation and efficiency measures that are environmentally sound and economically feasible and that minimize inefficiencies and water losses."[65] To help applicants comply, DEC's regulations suggest several measures that applicants can include in their program.[66] However, New York law lacks either a regulatory definition of "environmentally sound and economically feasible conservation measures" or guidance that makes clear what this term means for purposes of water withdrawal permitting.

DEC's actions are not sufficient to comply with the Compact. DEC has not developed state-specific goals and objectives as required by Section 4.2.1. Furthermore, Section 4.2.2 of

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[61] *Id.*

[62] *See id.* § 4.2.

[63] *See* KRISTIN S. LINSEY & RICHARD J. REYNOLDS, A SURVEY OF METHODS FOR IMPLEMENTING & DOCUMENTING WATER CONSERVATION IN N.Y. 2 (October 2013), *available at* http://www.dec.ny.gov/docs/water_pdf/waterconnon.pdf [hereinafter DRAFT SURVEY].

[64] N.Y. ENVTL. CONSERV. LAW § 15-1501.8 (McKinney 2012); Compact § 4.2.1.

[65] N.Y. COMP. CODES R. & REGS. tit. 6, § 601.10(f).

[66] *Id.* (suggesting that water programs include measures such as "source and customer metering; frequent system water auditing; system leak detection and repair; recycling and reuse; and ability to enforce water restrictions during drought."). *See also Water Conservation Requirements*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/lands/86945.html (last visited Apr. 25, 2015); N.Y. STATE DEP'T OF ENVTL. CONSERVATION, WATER CONSERVATION PROGRAM FORM, *available at* http://www.dec.ny.gov/docs/water_pdf/wcpf.pdf.

the Compact requires that each state "shall develop and implement a Water conservation and efficiency program, either voluntary or mandatory, within its jurisdiction based on the Party's goals and objectives establish goals and objectives." DEC has not done this. Neither the permit application requirement nor the Draft Survey constitute an official Water conservation and efficiency program for the state of New York.[67] Such a program need not be mandatory under the Compact, but it still must be established before New York can comply with the Compact. Moreover, to comply with the Compact, New York's program must explain how it will "adjust to new demands and the potential impacts of cumulative effects and climate."

II. Implementation (§ 4.2.5)

New York has not met its obligations under the Compact for section 4.2.5. The Compact requires each state to "implement . . . a voluntary or mandatory Water conservation program for all, including existing, Basin Water users."[68] Because New York has not yet developed a Water Conservation Program, it has nothing to implement. Moreover, persons who held Withdrawal permits at the time of DEC's adoption of its current regulations are exempt from the conservation requirements those regulations impose. To come into compliance with the Compact, New York must develop a formal water conservation program that contains specific requirements and guidelines. If this program is voluntary, it must apply to both new and existing permit holders; the State must also identify how its conservation programs will "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact.[69]

[67] *See generally* WATER CONSERVATION MANUAL. The Water Conservation Manual is authored by two employees of the U.S. Geological Survey and does not have a New York State seal anywhere in the document.
[68] Compact § 4.2.5.
[69] *Id.*

OHIO COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

A. Ohio's water resources inventory does not mandate the collection of information for withdrawals, a vital portion of the Compact's inventory requirements. To remedy this issue, Ohio either must explicitly include withdrawals in its current statute or add a provision to comply with § 4.1 of the Compact.

B. Ohio must revise its code to require registrations of Withdrawals to include an estimate of the appropriate measure of volume and to require registration of Diversions.

C. Ohio must revise its code to require annual reports of the monthly volumes of Withdrawals, Consumptive Uses, and Diversions.

D. Ohio should adopt provisions that mandate the report of information on Withdrawals, Consumptive Uses, and Diversions to a publicly available data base repository.

E. Ohio must demonstrate that it set threshold levels for the regulation of withdrawals through a considered process to assure an effective and efficient water management program that will ensure that uses overall are reasonable, that withdrawals overall will not result in significant impacts to the waters and water dependent natural resources of the basin, determined on the basis of significant impacts to the physical, chemical, and biological integrity of the source watersheds, and that all other objectives of the Compact are achieved.

F. While Ohio purports to apply the Compact's decision-making standard under § 4.11, including the requirement that a proposed use be "reasonable," the state establishes a set of factors for determining reasonableness that differs from the Compact. Ohio should clarify that the Compact's factors control by explicitly listing them in the section of the code requiring compliance with § 4.11.

G. Ohio must adopt a provision requiring the state to monitor the implementation of any approved Proposal to ensure its consistency with the approval.

H. Ohio must establish criteria for determining whether a Proposal is subject to Regional Review.

I. Ohio's report should demonstrate compliance with the Compact's Public Participation requirements.

J. Ohio should show how it will work with its regional partners to enhance the scientific basis for sound Water management decision making under the Compact.

K. Ohio must conform its definition of the term "aggrieved" to federal law by extending its reach beyond persons with economic or property interests to any person whose use, benefit, and enjoyment of the Waters of the Basin depends upon the protection, conservation, restoration, improvement, or management of those Waters.

II. Water Conservation and Efficiency Program

A. Ohio must complete development of its water conservation and efficiency program.
B. Ohio should include a provision stating how its program will be adjusted according to the shifting climate.

Water Management Program

I. Water Resources Inventory, Registration and Reporting (§ 4.1)

A. Water Resources Inventory

The purpose of Compact § 4.1 is to develop and maintain a water resources inventory for the collection, interpretation, storage, and dissemination of information concerning the Water Resources of each Great Lakes State.[1] This purpose is codified in § 4.1.1 of the Compact and is largely satisfied by Ohio's Revised Code §§ 1522.01, 1522.02, 1521.03(B), and 1521.15-16.

The Revised Code provides that the Chief shall have "authority to conduct basic inventories of the water and related natural resources in each basin in the state."[2] Furthermore, § 1521.15 mostly tracks the language of the Compact in § 4.1.1[3] However, it does not require an inventory for the location, type, and quantity of Withdrawals. To comply with the Compact, the state must revise § 1521.15 to establish an inventory that meets these requirements.

B. Registration

Section 1522.16 addresses the registration of permits for Withdrawals, but does not require registrations to include an estimate of the volume of Withdrawals in terms of a gallons-per-day average in any 30-day period, as mandated by the Compact.[4] The state must add this requirement to § 1521.16. In addition, the state must revise § 1522.16 to comply with the Compact requirements that persons who divert water register the Diversion.[5]

C. Reporting

Ohio only partially meets the Compact's reporting requirements in § 1521.16(C).[6] The provision does not comply with the Compact requirement that persons annually

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[1] Great Lakes—St. Lawrence River Basin Water Resources Compact Pub. L. No. 110-342, § 4.1.1, 122 Stat. 3739, 3739 (2008) [hereinafter Compact].
[2] Ohio Rev. Code § 1521.03(B).
[3] Ohio Rev. Code § 1521.15(A).
[4] Compact § 4.1.3.
[5] *Id.*
[6] Ohio Rev. Code § 1521.16.

report the monthly volumes of their Withdrawals, Consumptive Uses, and Diversions in gallons to the state.[7] The state must revise the Revised Code accordingly.

The state also falls short of the Compact requirement that the state report information (on Withdrawals, Consumptive Uses, and Diversions) to a publicly available data base repository.[8] The purpose of providing this information is to "improve the sources and applications of scientific information regarding the Waters of the Basin" under Section 4.1.6.[9] The state should adopt provisions that mandate compliance with these Compact requirements.

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

A. Threshold Regulation Level (§ 4.10)

Ohio established thresholds for the regulation of withdrawals that far exceed the 100,000 gallons per day or greater average in any 90-day period allowed by the Compact.[10] For instance, Ohio does not require an owner or operator of a facility within the Lake Erie watershed to obtain a permit for a withdrawal or consumptive use unless the new or increased capacity for withdrawals or consumptive uses from Lake Erie is at least 2,500,000 gallons of water per day.[11] Nor does Ohio require an owner or operator of a facility within the Lake Erie watershed to obtain a permit for a withdrawal or consumptive use unless the new or increased capacity for withdrawals or consumptive uses from any river or stream or from ground water in the Lake Erie watershed is at least 1,000,000 gallons per day.

The Compact does not require a state to follow a "considered process" [12] when setting threshold levels for the regulation of new and increased withdrawals, so long as the state applies a threshold level for management and regulation of "*all* New or Increased Withdrawals of 100,000 gallons per day or greater average in any 90 day period."[13] Since Ohio did not set the threshold at that level for all types of new or increased withdrawals, it was obligated to set its higher thresholds for other types of withdrawals "through a considered process."[14] The Compact requires the use of a considered process "to assure an effective and efficient Water management program that will ensure that uses overall are reasonable, that Withdrawals overall will not result in significant impacts to the Waters and Water Dependent Natural Resources of the Basin, determined on the basis of significant impacts to the physical, chemical, and biological integrity of the Source Watersheds, and that all other objectives of the Compact are achieved."[15]

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[7] *Id.* at §§ 4.1.3 & .4.
[8] Compact § 4.1.5.
[9] Compact § 4.1.6.
[10] Ohio Rev. Code § 1522.12(A)(1), (2); Compact § 4.10.2.
[11] Ohio Rev. Code § 1522.12(A)(1).
[12] Compact § 4.10.1.
[13] *Id.* at § 4.10.2 (emphasis added).
[14] Compact § 4.10.1.
[15] *Id.*

Ohio's Report fails to demonstrate that the threshold levels for all withdrawal types exceeding 100,000 gallons per day or greater average in any 90 day period were set through a considered process. It also fails to demonstrate that the higher threshold levels assure the effective and efficient water management program required by the Compact. In the absence of these demonstrations, the Council cannot find whether Ohio meets the Compact's water management program provisions, as the Compact requires.[16]

B. Compliance with Decision-Making Standard (§§ 4.11, 4.12)

The Decision-making Standard set forth in § 4.11 of the Compact is addressed in §§ 1522.13 and 1522.17 of the Revised Code. Section 1522.13 begins by stating that the Chief shall issue permits only if he "determines that the facility meets all of the criteria established in Section 4.11 of the Compact."[17] However, R.C. § 1521.17 establishes criteria for determining whether a use of water is reasonable that differ from the criteria for reasonableness established by Compact § 4.11.5.[18]

The state should clarify that the Compact's criteria control when determining whether approval of a proposal for a new or increased withdrawal or a consumptive use is appropriate. As the Ohio Water Management Program Report implies, the best way of accomplishing this would be to list the Compact's factors for determining whether a proposed use is reasonable. [19]

III. Management and Regulation of Diversions (§ 4.9)

Section 1522.11(B) of the Revised Code states that the Chief shall only approve a permit application for a new or increased Diversions if the Chief determines that the application meets the criteria "required to qualify as an exception to the prohibition against diversions established in Section 4.9 of the compact."[20] Though this provision strictly complies with the Compact, re-stating the criteria in § 4.9 would be best because doing so would provide clarity.

IV. Proposal Monitoring (§ 4.3.4)

Ohio does not comply with Compact § 4.3.4 because it does not require the state to monitor the implementation of any approved Proposal to ensure its consistency with the approval.[21] Section 1522.18 of the Revised Code does not comply with the Compact because it only authorizes the Chief to investigate; it does not establish an affirmative duty to monitor the implementation of a Proposal. The absence of a monitoring requirement makes necessary enforcement actions unlikely, which is contrary to the

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[16] *Id.* § 3.4.2.
[17] Ohio Rev. Code § 1522.13(A).
[18] *Compare* Compact § 4.11.5 *with* Ohio Rev. Code § 1521.17 (A) & (B).
[19] STATE OF OHIO, WATER MANAGEMENT PROGRAM REPORT § 4, ¶ 2 (2014) [hereinafter REPORT] ("[L]egislation to provide additional instruction for applying the decision making standard is anticipated.").
[20] Ohio Rev. Code § 1522.11(B).
[21] *See* Compact § 4.3.4.

Compact.[22] To comply with the Compact, Ohio should conduct some sort of active monitoring, such as periodic inspections of approved withdrawals.

V. Regional Review (§§ 4.5.1(e), 4.5.2, 4.5.4)

Ohio fails to establish any criteria for determining whether a Proposal is subject to Regional Review, as the Compact seems to necessitate.[23] The state may be relying on Section 1522.01 of its Revised Code, which ratifies and enacts the Compact, but § 4.5.2.a is not self-executing. The state must adopt language to guide its implementation and further clarify what proposals undergo Regional Review.

VI. Public Participation (§ 6.2)

Section 6.2 of the Compact is not mentioned in the Water Management Program Report. Thus, the report falls short of demonstrating compliance with the Compact's Public Participation requirements. Specifically, the report does not demonstrate that the state provides for public notification of applications and a reasonable opportunity for public comment; public accessibility to all relevant documents; provides guidance on standards for determining whether and how public hearings will be conducted; or provides the record of decisions for public inspection. The state's failure to address these requirements does not comply with the § 3.4.1 of the Compact. To fix this problem, Ohio must create a formal process for public participation that complies with the Compact gives an opportunity for public input for all proposals.

VII. Promotion of Science and Research (§§ 1.4, 4.1.6)

Ohio's Water Management Report discusses the initiatives the state has undertaken to "support an improved scientific understanding of the waters of the Basin."[24] These initiatives include "water quantity assessments for all the river basins within the Ohio portion of the Great Lakes Basin, which quantify the impacts of water withdrawals, consumptive uses, and diversions, and provide useful information in estimating impacts of Basin withdrawals consumptive uses, and diversions."[25]

However, that state has not shown how, pursuant to Compact § 1.4.1, Ohio has "committed to provide leadership for the development of a collaborative strategy with other regional partners."[26] To demonstrate that Ohio will work with its regional partners to enhance the scientific basis for sound Water management decision making under the Compact, the Water Management Program Report should describe how the state seeks to work with other states to achieve the aims of Section 1.4. Such information would also apply to the requirements under § 4.1.6, and would demonstrate how Ohio seeks to

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[22] *Id.*
[23] *See* Compact § 4.5.2.a.
[24] Compact §1.4; REPORT § 7.
[25] REPORT § 7.
[26] Compact § 1.4.1.

"coordinate the collection and application of scientific information" with the other Compact states.[27]

VIII. Enforcement

The Parties to the Compact acknowledged a duty "to protect, conserve, restore, improve, and manage the ... Waters of the Basin for the use, benefit and enjoyment of *all* their citizens."[28] They therefore identified fulfilling that duty as the primary purpose of the Compact.[29]

The Parties to the Compact also realized that enforcement of its terms is essential to its proper implementation. Accordingly, the Compact explicitly provides for enforcement, giving "Any Person aggrieved by a Party action ... [the right] to a hearing pursuant to the relevant Party's administrative procedures and laws."[30] Further, "[a]fter exhaustion of such administrative remedies, ... (ii) any aggrieved Person shall have the right to judicial review of a Party's action in the relevant Party's court of competent jurisdiction, provided that an action or proceeding for such review is commenced within the time frames provided for by the Party's law."[31]

Ohio limits enforcement of the Compact's provisions governing approvals of Withdrawals, Consumptive Uses, and Diversions by defining an "aggrieved" person as a person "with a direct economic or property interest that is or will be adversely affected by" an order on an application.[32] But the uses of the Waters of the Basin include non-economic uses and interests – such as recreation and ecosystem protection, as well as economic and property interests.[33] Thus, Ohio's definition of "aggrieved" leaves persons who use the Waters of the Basin for recreational activities and depend upon the integrity of its ecosystem without recourse to correct an improper implementation of the Compact.

Ohio's definition of "aggrieved" is contrary to the Compact, not only because its aim is to benefit *all* citizens, but because the state's definition is contrary to the federal definition of "aggrieved." The federal definition controls because the Compact is a federal law[34] subject to federal construction.[35]

"Aggrieved" has a "common usage" in federal law that means the plaintiff has an interest "within the 'zone of interests' sought to be protected by the statutory provision whose violation forms the legal basis for his complaint."[36] In a statute, "[h]istory

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[27] Compact § 4.1.6.
[28] Compact § 1.3.1.f (emphasis added).
[29] Compact § 1.3.2.a (emphasis added).
[30] Compact § 7.3.1.
[31] *Id.*
[32] Ohio Rev. Code § 1522.21(A) (defining "aggrieved").
[33] Compact §§ 1.3.1.c.
[34] *Cuyler v. Adams*, 449 U.S. 433, 440 (1981). *See Alabama v. N. Carolina*, 130 S. Ct. 2295, 2312 (2010).
[35] *See* New York v. Hill, 528 U.S. 110, 111 (2000) (internal citation omitted).
[36] *Thompson v. N. Am. Stainless, LP*, 131 S. Ct. 863, 870 (2011) (quoting *Lujan v. National Wildlife Federation*, 497 U.S. 871, 883 (1990)); *Bennett v. Spear*, 520 U.S. 154, 175 (1997) ("the classic

associates the word "aggrieved" with a congressional intent to cast the standing net broadly – beyond the common-law interests and substantive statutory rights upon which 'prudential' standing traditionally rested."[37] The "proper inquiry is 'whether the interest sought to be protected by the complainant is *arguably* within the zone of interests to be protected ... by the statute.'"[38] The zone of interest test does not require that Congress specifically intended to benefit the plaintiff.[39]

The Supreme Court has focused on the purpose of the entire statute to determine the zone of interest. In *Thompson v. N. Am. Stainless, LP*, the Court found the plaintiff within the zone of interest of Title VII – and therefore an "aggrieved" person authorized to sue under 42 U.S.C. § 2000e-5(f)(1) – because "the *purpose* of Title VII is to protect employees from their employers' unlawful actions."[40]

Courts have applied the zone of interest test to other environmental laws and found a broad zone of interest that can include "aesthetic, conservational, and recreational" interests.[41] The Supreme Court has "no doubt" that at least two other environmental laws have zones of interest that include "recreational use and aesthetic enjoyment"[42] and "mention[s] these noneconomic values to emphasize that standing may stem from them as well as from the economic injury."[43] In another example, the Supreme Court has held that injury to whale watching and whale studying is within the zones of interest of two congressional amendments designed to sanction nations that violate the International Convention for the Regulation of Whaling.[44]

To follow *Thompson*, the Compact's zone of interest must be defined in reference to the Compact's purposes. The result is that an "aggrieved person" includes any person

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formulation of the zone-of-interests test is "whether the interest sought to be protected by the complainant is arguably within the zone of interests to be protected or regulated by the statute or constitutional guarantee in question"); *Association of Data Processing Service Organizations, Inc. v. Camp*, 397 U.S. 150, 154 (1970) (forming the modern genesis of zone of interest doctrine).

[37] *Fed. Election Comm'n v. Akins*, 524 U.S. 11, 19 (1998). An "aggrieved" person seeking remedies under the Compact in state court must also meet state standing requirements. Compact § 7.3 ("Any Person aggrieved by a Party action shall be entitled to a hearing *pursuant to the relevant Party's administrative procedures and laws*.") (emphasis added).

[38] *Nat'l Credit Union Admin. v. First Nat. Bank & Trust Co.*, 522 U.S. 479, 492 (1998) (citing to *Data Processing* to emphasize the term "arguably").

[39] *Id.*

[40] *Thompson*, 131 S. Ct. at 870 (emphasis added). *See also Am. Fed'n of Gov't Employees, Local 2119 v. Cohen*, 171 F.3d 460, 469 (7th Cir. 1999) (It is enough that there be an "unmistakable link" between a statute's purpose and the interests advanced by the plaintiff).

[41] *Data Processing*, 397 U.S. at 154.

[42] *Lujan*, 497 U.S. at 886 (stating that both the Federal Land Policy and Management Act (FLPMA) and the National Environmental Policy Act (NEPA) "no doubt" have zones of interest that include "recreational use and aesthetic enjoyment").

[43] *Id.*

[44] *Japan Whaling Ass'n v. Am. Cetacean Soc.*, 478 U.S. 221, 225 (1986).

whose use,[45] benefit, and enjoyment of the Waters of the Basin depends upon the protection, conservation, restoration, improvement, or management of those Waters.[46]

Because Ohio's definition of the term "aggrieved" excludes such persons, that definition is contrary to the Compact. Ohio must conform its definition of the term to federal law by extending its reach beyond persons with economic or property interests to any person whose use, benefit, and enjoyment of the Waters of the Basin depends upon the protection, conservation, restoration, improvement, or management of those Waters.

Conservation and Efficiency Program

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

The program cites Revised Code § 1522.05, which directs the Chief to "adopt voluntary watershed-wide goals, objectives, and standards for water conservation and efficiency consistent with Section 4.2" of the Compact.[47] Despite this statement in its report, "Ohio's water conservation & efficiency goals are those contained in Section 4.2.1 of the Compact,"[48] Ohio used the goals identified by the Regional Body[49] and adapted the regional objectives.

According to Ohio's Report, "Ohio's water conservation & efficiency program consists of education on the value of water conservation & efficiency and promotion of voluntary conservation practices."[50] These educational and promotional programs fall short of the standards called for both in Ohio's legislation and Compact § 4.2.2. However, the report mentions a number of programs that are under development, including programs to encourage and measure water conservation practices and the identification of research and monitoring needs regarding the interaction of groundwater and surface water. Until the State completes this effort, it is impossible to determine whether it is in compliance with § 4.2.2.

II. Implementation (§ 4.2.5)

Pursuant to § 4.2.5, the Compact requires Ohio to implement a voluntary or mandatory Water Conservation program for all, including existing Basin Water users.[51]

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[45] Uses include "municipal, public, industrial, commercial, agricultural, mining, navigation, energy development and production, recreation, the subsistence, economic and cultural activities of native peoples, Water quality maintenance and the maintenance of fish and wildlife habitat and a balanced ecosystem." Compact § 1.3.c.

[46] Compact § 1.3.

[47] Ohio Rev. Code § 1522.05.

[48] OHIO DEP'T OF NATURAL RES., OHIO WATER CONSERVATION & EFFICIENCY PROGRAM REVIEW § 4, ¶ 3 (2014) [hereinafter REVIEW].

[49] Great Lakes-St. Lawrence River Basin Water Resources Council, "Resolution #5—Adoption of Basin-Wide Conservation and Efficiency Objectives," December 8, 2008, available at http://www.glslcompactcouncil.org/Docs/Resolutions/GLSLRBWRC_Resolution5-BasinWideConservationEffficiencyObjectives.pdf

[50] REVIEW, ¶ 5.

[51] Compact § 4.2.5.

"Ohio's water conservation & efficiency program consists of education on the value of water conservation & efficiency and promotion of voluntary conservation practices."[52] Ohio states that its water conservation and efficiency program is currently being implemented in accordance with the guiding objectives and programs.[53] As noted above, the State also indicates it is developing a number of water conservation programs. Again, until the State completes its planning efforts, it is impossible to determine whether it is in compliance with § 4.2.5.

The State does not indicate how it will "adjust to new demands and potential impacts of cumulative effects of climate,"[54] nor is this mentioned as an area under development. Ohio should include an explanation of how the cited programs and legislative measures will achieve this goal and adjust to changing environmental circumstances unfolding in an age of rapid and volatile shifts in climate.

[52] REVIEW, ¶ 5.
[53] REPORT, Appendix 1.
[54] Compact § 4.2.5.

PENNSYLVANIA'S COMPLIANCE WITH THE GREAT LAKES – ST. LAWRENCE RIVER BASIN WATER RESOURCES COMPACT

Executive Summary

I. Water Management Program

A. Pennsylvania must revise its laws to require an inventory of the quantity of all withdrawals and to require an inventory of the location, type, or quantity of diversions and consumptive uses.
B. Pennsylvania must revise its laws to require all persons who withdraw water to register and to register the places of use and places of discharge or an estimate of the volume of the withdrawal in terms of gallons per day average in any 30-day period. In addition, Pennsylvania must revise its laws to require persons who divert water to register.
C. Pennsylvania must revise its law to require annual reports by persons who make consumptive uses and diversions and to require all registrants to include in their annual reports the monthly volumes of water withdrawn.
D. Pennsylvania must revise its laws to monitor the implementation of approved proposals to withdraw, consume, and divert water.
E. Pennsylvania must demonstrate its compliance with the Compact's Regional Review and public participation requirements.
F. Pennsylvania should improve its promotion of science by using the data it collects to better advance the understanding of individual and cumulative impacts of withdrawals on the Great Lakes basin ecosystem.

II. Water Conservation and Efficiency Program

A. Pennsylvania must identify its own water efficiency goals and objectives as required by Section 4.2.2.
B. Pennsylvania must finally establish the water resources technical assistance center since it is central to the development of its water conservation and efficiency program.
C. Pennsylvania must identify how its conservation program adjusts to new demands and the potential impacts of climate change.

Water Management Program

I. Water Resources Inventory, Registration, and Reporting (§ 4.1)

A. Water Resources Inventory

While Pennsylvania requires an inventory of the state's water resources, including their location, type, quantity, and use,[1] the state does not fully comply with the Compact's requirement that it inventory the location, type, and quantity of withdrawals.[2] Pennsylvania does

[1] 27 Pa. Cons. Stat. § 3112(a)(1) & (2) [redacted]
[2] Great Lakes—St. Lawrence River Basin Water Resources Compact, Pub. L. No. 110-342, § 4.1.1, 122 Stat. 3739, 3739 (2008) [hereinafter Compact].

not require an inventory of the quantity of all withdrawals, but only withdrawals "obtained through interconnection with another person, or instream hydropower uses."[3] Other withdrawals subject to the state's registration requirement do not have to provide information about the quantity of their withdrawals. These include public water supply agencies and persons whose total withdrawal exceeds an average rate of 10,000 gallons per day in any 30-day period.[4]

Pennsylvania also does not require an inventory of the location, type, or quantity of diversions and consumptive uses. This is directly contrary to the Compact's mandate.[5] To comply with the Compact, Pennsylvania must establish a separate inventory for all the Great Lakes Basin withdrawals that includes all the information required under Section 4.1.

B. Registration

Pennsylvania complies with the Compact's registration requirement with respect to withdrawals, requiring registration by persons whose total withdrawal exceeds an average rate of 10,000 gallons per day in any 30-day period.[6] However, as indicated above, only those who obtain withdrawals "through interconnection with another person, or instream hydropower uses," must register the amount withdrawn.[7] Furthermore, Pennsylvania does not require registrants to register the places of use and places of discharge or an estimate of the volume of the withdrawal in terms of gallons per day average in any 30-day period.[8] This is not in compliance with the Compact.[9] Pennsylvania must amend its registration requirements to include this information.

Pennsylvania also does not comply with the Compact's registration requirement with respect to diversions. The state does not require registration of any diversions, while the Compact requires any person who diverts water of any amount to register.[10] Thus, to comply with the Compact, Pennsylvania must revise its laws to require persons who divert water to register.

C. Reporting

Pennsylvania requires registrants to annually report the amount of consumptive and non-consumptive uses by those withdrawing water.[11] However, contrary to the Compact, but no such report is required with respect to consumptive uses and diversions, contrary to the Compact.[12] In addition, registrants withdrawing water are not obligated to include in their annual reports the

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[3] 25 Pa. Code § 110.203(2)(ii) ([redacted]

[4] *See id.* § 110.201(1) & (3).

[5] Compact § 4.1.1.

[6] 25 Pa. Code § 110.201(1) & (3).

[7] 25 Pa. Code § 110.203(2)(ii) ([redacted]

[8] *See* PA. DEPT. OF ENVTL. PROTECTION, WATER SOURCE REGISTRATION, FORM 3940-FM-BSDW0048 (Oct. 2013), *available at* http://www.portal.state.pa.us/portal/server.pt/document/1376425/02_chapter_110_water_withdrawal_and_use_registration_form_pdf_%282%29.

[9] Compact § 4.1.3.

[10] Compact § 4.1.2.

[11] 25 Pa. Code § 110.304(2) (20xx).

[12] Compact § 4.1.4.

monthly volumes of water withdrawn, as the Compact requires.[13] Consequently, Pennsylvania has not met its reporting obligations under the Compact.

To meet this obligation, Pennsylvania must revise its law to require annual reports by persons who make consumptive uses and diversions and to require all registrants to include in their annual reports the monthly volumes of water withdrawn.

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

A. Regulation Level (§ 4.10)

Pennsylvania complies with the Compact because it set a threshold for the regulation of "any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 gallons per day averaged over any 90-day period."[14]

B. Compliance with Decision-Making Standard (§§ 4.11, 4.12)

Pennsylvania adopted the Compact's Decision-Making Standard verbatim and therefore is in compliance.[15]

III. Management and Regulation of Diversions (§ 4.9)

Pennsylvania adopted the Compact's prohibition of new or increased diversions and its exceptions to the prohibition of diversions verbatim.[16]

IV. Proposal Monitoring (§ 4.3.4)

Pennsylvania requires monitoring of the amount of water withdrawn,[17] but this does not constitute sufficient compliance with the Compact. Pennsylvania must monitor not only withdrawals, but consumptive uses and diversions, and it must monitor not only the quantity of water withdrawn, consumed, or diverted, but the implementation of other conditions of approval of withdrawals, consumptive uses, and diversions.[18] For example, Pennsylvania must require monitoring to detect any significant adverse individual or cumulative impacts as a result of a withdrawal, consumptive use, or diversion to ensure consistency with the decision-making and exception standards.[19]

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[13] *Id.*
[14] 32 Pa. Cons. Stat. § 817.26(1)(i).
[15] 32 Pa. Cons. Stat. § 817.22.4.11.
[16] 32 Pa. Cons. Stat. § 817.22.4.8 & .9.
[17] 25 Pa. Code §§ 110.501-502.
[18] Compact § 4.3.4; 32 Pa. Cons. Stat. § 817.22.3.4.
[19] Compact §§ 4.9.4.d., 4.11.2.; 32 Pa. Cons. Stat. §§ 817.22.4.9.4.d., 817.22.4.11.2.

V. Regional Review (§§ 4.5.1(e), 4.5.2, 4.5.4)

Pennsylvania has not demonstrated its compliance with the Compact's Regional Review provisions. To comply with the Compact, Pennsylvania must enact laws or regulations that specify how the state determines whether a proposal must undergo regional review.

VI. Public Participation (§ 6.2)

Pennsylvania had not demonstrated compliance with the Compact's public participation requirements and, contrary to the Compact, does not appear to provide public notice of applications, a reasonable opportunity to comment before decisions are made, accessibility to relevant documents, guidance on whether to conduct a public hearing, or the record of decision for public inspection.

VII. Promotion of Science and Research (§ 1.4; § 4.1.6)

Overall, Pennsylvania is engaged in scientific research that meets the requirements of Compact § 1.4. The Pennsylvania report describes initiatives to support an improved scientific understanding of the waters of the basin, an improved understanding of the groundwater of the basin, and the role of groundwater in basin water resource management.[20] Specifically, the report discusses five regulatory projects that the state is in the process of developing and implementing including: a project evaluating instream flow needs,[21] a GIS application to support the review of water withdrawals,[22] a plan to research new information about sediment quality and habitat,[23] a project mapping watershed impact,[24] and a harmful algal bloom task force to asses conditions of algal bloom breakouts.[25] One area in which Pennsylvania could improve is by using the data it collects to better advance the "understanding of the individual and [c]umulative impacts of [w]ithdrawals…on the [b]asin [e]cosystem" as suggested by Compact § 1.4. In addition, Pennsylvania's Report should describe how the state works with regional partners to achieve goals contained in Section 1.4.

Conservation and Efficiency Program

I. State goals and Objectives (§§ 4.2.1, 4.2.2)

Pennsylvania established goals pertaining to water conservation practices and measures.[26] However, Pennsylvania has not identified state-specific objectives that align with the regional objectives.[27] To comply with its obligations under the Compact, Pennsylvania must "develop its

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[20] COMMONWEALTH OF PA., PENNSYLVANIA GREAT LAKES WATER MANAGEMENT PROGRAM FIVE YEAR REPORT 13 (2014) [hereinafter REPORT].
[21] Id. ¶6(a).
[22] Id. ¶6(b).
[23] Id. ¶6(c)
[24] Id. ¶6(d)
[25] Id. ¶6(e).
[26] 27 Pa. Cons. Stat. §3120(a)(1)-(8). Pennsylvania defines "water conservation practices and measures" in 27 Pa. Cons. Stat. §3102.
[27] Compact § 4.2.2.

own Water conservation and efficiency goals and objectives" that are consistent with, but independent of, the Compact's objectives in this area. [28]

Pennsylvania law requires the development of a state water plan,[29] which is a key component of a water conservation and efficiency program. However, as Pennsylvania makes clear in its report, it is still developing key aspects of its program, including a Technical Resources website that will "help [it] achieve all eight goals...";[30] development of the site will continue into 2016. A planning committee "to explore ideas that promote water conservation in the Erie area"[31] was convened in 2014; the work of that committee is still underway. Until Pennsylvania finalizes its state water plan, there is no way to know whether the plan will meet the state's obligations under Section 4.2.2.

II. Implementation (§ 4.2.5)

Pennsylvania lays out aspects of its water conservation program and explicitly states that it is a voluntary program.[32] However, the state has not established the Technical Resources website that seems to be central to the establishment of its water conservation and efficiency program.

It is also not clear how the state's water conservation efforts "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact.[33] Pennsylvania must include an explanation of how the cited programs and legislative measures will achieve this goal and adjust to changing environmental circumstances unfolding in an age of rapid and volatile shifts in climate.

[28] *Id.*
[29] 27 Pa. Cons. Stat. §3111 (20[illegible])
[30] COMMONWEALTH OF PA., PENNSYLVANIA GREAT LAKES WATER MANAGEMENT PROGRAM FIVE YEAR REPORT 13 (2014) [hereinafter REPORT].
[31] REPORT, at 2.
[32] 27 Pa. Cons. Stat. §3120(a)-(b)
[33] Compact § 4.2.5.

WISCONSIN COMPLIANCE WITH GREAT LAKES COMPACT

Executive Summary

I. Water Management Program

Wisconsin must revise its water management program as follows to come into compliance with the Compact:

A. Develop and maintain a complete water resources inventory.
B. Make the Compact decision-making standard for withdrawals applicable to all withdrawals that average 100,000 gallons per day or more in any 30-day period.
C. Improve withdrawal regulation, requiring the Compact decision-making standard for all withdrawals above 100,000 gallons per day.
D. With regard to the diversion exception for straddling counties, eliminate the current statutory definitions of "reasonable water supply alternative" and "without adequate supplies of potable water" or revise them to eliminate the consideration of cost.
E. Expand monitoring requirements for diversions by adding statutory or regulatory provisions, for all diversions, that ensure monitoring for water return and detect any adverse individual or cumulative impacts as a result of the diversion. In addition, Wisconsin should add specific monitoring requirements for certain types of diversions, such as monitoring to ensure that the amount of water returned to source watershed was truly being maximized (for straddling communities and straddling counties) and that the diversion was not endangering the integrity of the Great Lakes Basin (for straddling counties).

Wisconsin could also take the following measures to improve its compliance with the Compact:

A. With regard to reporting, eliminate the domestic security exception for release of withdrawal and diversion location information
B. With regard to public participation, eliminate the domestic security exception for release of withdrawal and diversion location information, increase objectivity in the hearing standard, and add a regulation explicitly stating that the record of decision – including comments, objections, responses and approvals, approvals with conditions and disapprovals – is part of the public record.
C. More effectively use withdrawal data already collected to improve scientific research programs with regard to cumulative impacts of withdrawals.

II. Water Conservation and Efficiency Program

A. Wisconsin should establish a voluntary or mandatory conservation and efficiency program for *all* users; simply casually encouraging users to conserve water is not enough.
B. Wisconsin must clarify how its conservation programs "adjust to new demands and the potential impacts of cumulative effects and climate," as required by the Compact and Wisconsin law.

Water Management Program

I. Water Resources Inventory, Registration and Reporting (§ 4.1)

A. Water Resources Inventory

The information in the Water Management Program Review (WMPR) does not make clear whether Wisconsin is meeting the Compact's requirements for the Water Resources Inventory. While the Wisconsin Department of Natural Resources (DNR) reports the data regarding withdrawals and diversions gathered under the registration and reporting requirements, as described below,[1] the Compact also requires that states develop "a [w]ater resources inventory… including … the location, type, and quantity of [w]ithdrawals, [d]iversions, and [c]onsumptive uses."[2] Wisconsin does not mention an internal inventory system in its WMPR, apart from the improved data management system related to tracking withdrawals and a statewide Springs Inventory,[3] which is not a *comprehensive* inventory of the water resources in Wisconsin.

Wisconsin's statute mandates the development and maintenance of a water resource inventory as described in the Compact (to be completed by June 1, 2014),[4] but the WMPR does not give any indication that this has been completed, and a search does not yield an inventory. Wisconsin has the framework in place to create this required inventory. It simply needs to complete the task.

B. Registration

Wisconsin satisfies the Compact's requirements for registration and exceeds them in several ways. Wisconsin requires the inclusion of information about the continuity of the water use, as well as information about any water quality permits for the site.[5] Wisconsin also exceeds Compact requirements by requiring all parties with the *capacity* to withdraw a thirty-day average of 100,000 gallons per day to register, while the Compact requires only parties that actually *withdraw* that amount to register.[6]

C. Reporting

Overall, Wisconsin meets the Compact requirements for reporting. The Compact requires those that withdraw a thirty-day average of 100,000 gallons per day to report; Wisconsin exceeds this requirement by requiring certain users to report no matter how much water is withdrawn.[7] Wisconsin also complies with the Compact by reporting the information gathered through its

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[1] *Wisconsin Water Withdrawals*, WISCONSIN DEPT. NATURAL RES., http://dnr.wi.gov/topic/WaterUse/WithdrawalSummary.html (last visited Feb. 15, 2015).
[2] Compact § 4.1.1.
[3] 2014 WISCONSIN WATER MGMT. PROGRAM REVIEW 4, 14 [hereinafter REPORT].
[4] Wis. Stat. § 281.346(11)(a).
[5] Wis. Stat. § 281.346(3)(b).
[6] Wis. Stat. § 281.346(3)(a).
[7] *Id.*; *see also* Wis. Admin. Code NR § 860.15 (stating that all permittees must report water withdrawals).

reporting requirements to a water use data base repository.[8] Wisconsin's WMPR does not state that Wisconsin is complying with this requirement, but there is a statutory requirement that Wisconsin provide this information,[9] and according to the Great Lakes Regional Water Use Database, Wisconsin has submitted this data for 2012 and 2013.[10]

Wisconsin's compliance with reporting requirements is questionable in one regard: the Compact requires that states make the information gathered through its reporting requirements publicly available, consistent with the requirements in Compact Section 8.3.[11] Wisconsin law states that the DNR "may consider domestic security concerns when determining whether information regarding locations of withdrawals and diversions ... may be released to the public."[12] While Compact Section 8.3 does give states leeway in providing confidentiality for disclosures, the Compact focuses on "confidential, proprietary, or commercially sensitive information"[13] as opposed to security concerns. It is unclear whether Wisconsin's "domestic security" statutory exception for disclosure violates the Compact, and it is also unclear whether it is a large loophole in Wisconsin's law or a rarely invoked provision that has no practical implication.

Generally, Wisconsin is in compliance with reporting requirements of the Compact, but its compliance could be improved by eliminating the domestic security exception for release of withdrawal and diversion location information.

II. Management and Regulation of Withdrawals (§§ 3.4, 4.3, 4.10, 4.11, 4.12)

The Wisconsin WMPR explains its water withdrawal management by sector, water source, quantity, and location, as dictated by the Compact Section 3.4. However, Wisconsin's compliance with Compact Sections 4.10 and 4.11 is deficient.

A. Regulation Level (§ 4.10)

Wisconsin generally complies with the Compact because its threshold for the regulation of withdrawals is 100,000 gallons per day or more average in any 30-day period,[14] which is less than the default threshold of 100,000 gallons per day or greater average in any 90-day period.[15] A person must obtain coverage under a general permit when seeking a withdrawal "that average[s] 100,000 gallons per day or more in any 30-day period but that do[es] not equal at least 1,000,000 gallons per day for any 30 consecutive days."[16] A person must obtain an individual

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[8] Compact § 4.1.
[9] Wis. Stat. § 281.346(11)(b).
[10] *Great Lakes Regional Water Use Database*, GREAT LAKES COMM'N, http://projects.glc.org/waterusedata/ (last visited Feb. 15, 2015).
[11] Compact § 4.1.
[12] Wis. Stat. § 281.346(3)(cm).
[13] Compact § 8.3.
[14] Wis. Stat. § 281.346(4m).
[15] Compact § 4.10.2.
[16] Wis. Stat. § 281.346(4s)(a).

permit when seeking a withdrawal "that equals at least 1,000,000 gallons per day for any 30 consecutive days."[17]

B. Decision-Making Standard (§§ 4.11, 4.12)

Wisconsin established distinct decision-making standards for the withdrawal of different quantities of water. For any new or increased withdrawal that averages more than 100,000 gallons per day in any thirty-day period (but less than 1,000,000 gallons per day for any thirty consecutive days), no decision-making standard applies. This might have been acceptable had Wisconsin decided not to make such withdrawals subject to management and regulation. Since Wisconsin did make such withdrawals subject to management and regulation, it fails to Comply with the Compact.[18]

For a new or increased withdrawal that is greater than 1,000,000 gallons per day for any thirty consecutive days, the state decision-making standard applies.[19] But that standard does not require compliance with the criteria in the Compact decision-making standard,[20] as the Compact requires.[21]

For any new or increased Great Lakes basin withdrawals greater than 10,000,000 gallons per day, Wisconsin claims the Compact decision-making standard applies.[22] But Wisconsin does not faithfully follow that standard. The Compact requires a determination of the reasonableness of a proposed use based upon whether efficient use is made of existing water supplies where a proposed withdrawal is for an increased withdrawal or consumptive use.[23] However, Wisconsin does not require such a determination for increased withdrawals. Rather, it only requires the determination for proposals that would result in an increased "water loss."[24] Under Wisconsin law, the term "water loss" does not include withdrawals, only diversions and consumptive uses.[25]

To remedy the various deficiencies in Wisconsin's compliance with the Compact, the state must make the Compact decision-making standard applicable to all withdrawals that average 100,000 gallons per day or more in any 30-day period.

III. Management and Regulation of Diversions (§ 4.9)

Wisconsin's statutory language for regulation of diversions does not comply with the Compact. Wisconsin has defined two key terms[26] that substantially change the regulation of a

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[17] *Id.* at § 281.346(5).
[18] Compact § 4.11 ("Proposals subject to management and regulation in Section 4.10 shall be declared to meet this Decision-Making Standard and may be approved as appropriate only when … criteria are met.").
[19] Wis. Stat. § 281.346(5)(e)(1); *see also* Wis. Stat. § 281.346(5m).
[20] *Compare* Wis. Stat. § 281.346(5m) *with* Compact § 4.11.
[21] Compact § 4.11 (proposals subject to management and regulation in Section 4.10 must meet the Compact decision-making standard).
[22] Wis. Stat. § 281.346(5)(e)(2). *See also* Wis. Stat. § 281.346(6).
[23] Compact § 4.11.5.b.
[24] Wis. Stat. § 281.346(6).
[25] Wis. Stat. § 281.346(wm).
[26] Wis. Stat. § 281.346(1) (defining "reasonable water supply alternative" and "without adequate supplies of potable water").

diversion to a community within a straddling county.[27] Wisconsin departs from the Compact by first defining "reasonable water supply alternative" as a "water supply alternative that is *similar in cost* to, and as environmentally sustainable and protective of public health as, the proposed new or increased diversion and that does not have greater adverse environmental impacts than the proposed new or increased diversion."[28]

Wisconsin also improperly interprets the phrase "adequate supplies of potable water" in a way that allows the state to consider cost when evaluating diversions. According to Wisconsin law, a community's supply of potable water is inadequate if it lacks a water supply that is "[1] economically and environmentally sustainable in the long term to meet reasonable demands for a water supply in the quantity and quality that complies with applicable drinking water standards, [2] is protective of public health, [3] *is available at a reasonable cost*, and [4] does not have adverse environmental impacts greater than those likely to result from the proposed new or increased diversion."[29]

The Compact does not authorize the consideration of cost either in determining whether potable water supplies are adequate or as a basis for evaluating water supply alternatives. The Compact only authorizes the consideration of cost in evaluating alternatives to intra-basin transfers resulting in consumptive use of less than, or equal to or greater than, five million gallons per day over any 90-day period. Specifically, applicants for such transfers must "demonstrate that there is no feasible, *cost-effective*, and environmentally sound water supply alternative."[30] This language shows that when the drafters of the Compact intended to allow cost to be considered in an application for a diversion, they knew how to say so.

The drafters' silence with respect to diversions to communities within a straddling county therefore must be interpreted as an intention that cost not be a valid consideration for such diversions. This interpretation is consistent with the purpose and language of the Compact, which establish that diversions may be approved only in extreme circumstances to promote the conservation of water and foster the ecological health of the region. [31]

Wisconsin therefore must eliminate these two definitions or revise them to eliminate the consideration of cost to comply with the Compact.

IV. Proposal Monitoring (§ 4.3.4)

Wisconsin's compliance with the monitoring requirement for withdrawals and diversions stands in need of improvement. Wisconsin requires annual reporting of the monthly volumes of

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[27] Wis. Stat.. § 281.346(4)(e).
[28] Wis. Stat. § 281.346(1)(ps) (emphasis added).
[29] Wis. Stat. § 281.346(1)(zm) (emphasis added).
[30] Compact § 4.9.2.c.ii (emphasis added).
[31] *See* Amanda K. Beggs, *"Death by a Thousand Straws": Why and How the Great Lakes Council Should Define "Reasonable Water Supply Alternative" Within the Great Lakes Compact*, 100 IOWA L. REV. 361, 378 (2014) (discussing Wisconsin's definition of "reasonable water supply alternative" and possible Council definition).

withdrawal,[32] of the volumes of diversion,[33] of changes to the withdrawal system that may result in changes to the permit,[34] and of implemented water conservation and water use efficiency measures.[35] While such reporting is crucial for compliance, there are many other elements of a withdrawal or diversion that necessitate monitoring. For example, adding provisions, for all diversions, to ensure monitoring for water return and to detect any adverse individual or cumulative impacts as a result of the diversion would improve Wisconsin's ability to ensure consistency with the exception standard.[36] Wisconsin should also add specific monitoring requirements for certain types of diversions, such as monitoring to ensure that the amount of water returned to source watershed was truly being maximized (for straddling communities and straddling counties)[37] and that the diversion was not endangering the integrity of the Great Lakes Basin (for straddling counties).[38]

V. Regional Review (§§ 4.5.1(e), 4.5.2, 4.5.4)

Wisconsin complies with the regional review requirements found in Section 4.5 of the Compact.

VI. Public Participation (§ 6.2)

Wisconsin's WMPR does not detail its public participation procedures; however, Wisconsin does have statutes and regulations that address public participation for the water management program.[39] For the most part, as the following discussion indicates, Wisconsin's public participation procedures are adequate under the Compact, although several improvements could strengthen Wisconsin's compliance with the Compact.

A. Public Notification and Comment

[32] Wis. Stat. § 281.346(3)(e)(1). *See also* Wis. Admin. Code NR § 860.15(4) (stating that all permittees must report water withdrawals).
[33] Wis. Stat. § 281.346(3)(e)1.
[34] Wis. Admin. Code NR § 860.15(6) ("The permittee shall by March 1 notify the department of changes made in the previous calendar year to the information submitted in the application that require amendment…"). *See also* Wis. Admin. Code NR § 860.16 (detailing what changes in an operation constitute an amendment).
[35] Wis. Admin. Code NR § 852.11(6) (requiring annual reporting for all water conservation plans, which are required for all permittees).
[36] Wis. Stat. § 281.346(4)(f).
[37] Wis. Stat. § 281.346(4)(c) and (e).
[38] Wis. Stat. § 281.346(4)(e).
[39] *See* Wis. Stat. § 281.346(9)(b) (giving requirements for public notice and comment rules for applications to which the state decision-making standard or Compact decision-making standard apply, which includes diversions and all withdrawals that need an individual or general permit under Wisconsin law); Wis. Adm. Code NR § 860.40 (providing the regulations governing public participation with regard to applications to which the state decision-making standard or Compact decision-making standard apply, which includes diversions and all withdrawals that require an individual or general permit under Wisconsin law).

In compliance with the Compact[40], Wisconsin provides thirty days for public comment,[41] and DNR cannot issue a permit until the public notice and comment regulations have been fulfilled.[42]

B. Public Access to Documents

Wisconsin law provides that any record regarding a proposal is received as a public record and shall be made available for public inspection.[43] However, the law gives an exception for records that "may be treated as confidential upon a showing to the secretary that the record or information is entitled to protection as a trade secret … or upon a determination by the department that domestic security concerns warrant confidential treatment."[44] While Compact Section 8.3 allows states to provide confidentiality for certain disclosures – specifically, "confidential, proprietary, or commercially sensitive information"[45] – it does not authorize confidentiality based on security concerns. Because the Compact requires public access to *all* documents, the protections in Section 8.3 should be read narrowly. Wisconsin should ensure compliance with the Compact by eliminating the domestic security exception for release of withdrawal and diversion location information.

C. Public Hearings

As required by the Compact,[46] Wisconsin does provide procedures for hearings and guidance on standards on determining whether to conduct a hearing for a proposal;[47] however, the standard for determining whether or not a hearing should be held is based on whether the "department determines that there is a significant public interest in holding a hearing."[48] While this is *a standard*, it is quite subjective, giving room for DNR to deny hearings for a multitude of reasons, potentially disguised as a lack of public interest. One way for Wisconsin to improve compliance with the spirit of the Compact is to increase objectivity in this hearing standard, perhaps by eliminating the "significant public interest" criterion altogether, and simply holding a hearing for any request that meets the current procedural requirements.[49]

D. Record of Decision

Currently Wisconsin has no statutory provisions or regulations regarding public access to the record of decision. Ensuring public access to the specific documents DNR uses to make a decision would improve transparency, increasing Wisconsin's compliance with the spirit of the

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[40] Compact § 6.2.
[41] Wis. Admin. Code NR § 860.41.
[42] Wis. Admin. Code NR § 860.40.
[43] Wis. Stat. § 281.346(9)(e).
[44] *Id.*
[45] Compact § 8.3.
[46] Compact § 6.2.
[47] Wis. Stat. § 281.346(9)(d); Wis. Admin. Code NR § 860.42.
[48] Wis. Stat. § 281.346(9)(d); Wis. Admin. Code NR § 860.42.
[49] Wis. Admin. Code NR § 860.42 (giving procedural requirements that requests for hearing must satisfy, including being in writing and dated, including applicant name or application number, submission within thirty-day comment period, indicating the interests of the requester, and giving legal reasons why hearing is warranted).

Compact. Wisconsin should add a regulation explicitly stating that the record of decision – including comments, objections, responses and approvals, approvals with conditions and disapprovals – is part of the public record, or at least provide procedures to make the official record of decision available for public inspection.

VII. Promotion of Science and Research (§§ 1.4, 4.1.6)

Overall, Wisconsin is engaged in scientific research that meets the requirements of Compact Section 1.4. One area in which Wisconsin could improve is by using the data it collects to better advance the "understanding of the individual and [c]umulative impacts of [w]ithdrawals…on the [b]asin [e]cosystem" as suggested by Compact Section 1.4. Wisconsin stores all of the water use data collected from its registration and reporting programs (required under Section 4 of the Compact[50]) in a dedicated geographic information system database that is updated by DNR staff through a web-based application.[51] While the WMPR states that this data "is used to support DNR decision-making and serves as the basis for…sector specific studies,"[52] it does not give any more specific information about the studies conducted with this information. Wisconsin law does state that "[t]he department shall participate in the periodic assessment of the impacts of withdrawals, diversions, and consumptive uses";[53] however, there is no indication in the report about any such assessment. By better using the withdrawal data it is already required to collect (and is actually collecting), Wisconsin could substantially improve its scientific programs and compliance with the Compact.

Conservation and Efficiency Program

I. State Goals and Objectives (§§ 4.2.1, 4.2.2)

Wisconsin is in compliance with Sections 4.2.1 and 4.2.2. Although Wisconsin's goals are identical to the Council's goals,[54] they still comply with the Compact because they were adopted after a thorough development process that included public input. As Wisconsin reported in its 2011 Program Review, it convened an advisory stakeholder group to develop its goals and objectives in 2008.[55] Wisconsin convened a public comment process to slightly revise its goals in 2011 and also applied those revised goals and objectives statewide, with voluntary conservation and efficiency measures in the Mississippi River Basin. Wisconsin reviews these goals and objectives every five years.

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[50] Compact § 4.1.
[51] REPORT at 13.
[52] *Id.*
[53] Wis. Stat. § 281.346(11)(e).
[54] WISCONSIN DEPT. NATURAL RES., WISCONSIN STATE WATER CONSERVATION AND WATER USE EFFICIENCY GOALS 1 (Revised 2011), *available at* http://dnr.wi.gov/topic/WaterUse/documents/WDNR_Statewide_WCE_Objectives_2011.pdf.
[55] WISCONSIN DEPT. NATURAL RES., WATER CONSERVATION AND EFFICIENCY PROGRAM REVIEW (NOV. 2011), *available at* http://www.glslcompactcouncil.org/Docs/ProgramReports/2011/WI%20Water%20Conservation%20and%20Efficiency%20Program%20Assessment--2011.pdf.

II. Implementation (§ 4.2.5)

Wisconsin has developed a water conservation and efficiency program that is, for the most part, consistent with both the Council's and the state's objectives and goals[56]; however, the program is not clearly in compliance with the Compact.

Wisconsin's program "requires mandatory water conservation and efficiency measures for new or increased withdrawals in the Great Lakes Basin, for any new or increased diversions from the Great Lakes Basin, and for any new or increased withdrawals – statewide – that will result in a water loss averaging more than 2 MGD in any thirty-day period."[57] Compact Section 4.11 requires that all new or increased withdrawals and consumptive uses regulated under Compact Section 4.10 incorporate environmentally sound and economically feasible water conservation measures.[58] Wisconsin's program complies with this requirement, as it implements a tiered system of efficiency requirements, starting with new and increased withdrawals averaging 100,000 gallons per day averaged in a thirty-day period, which are the withdrawals regulated under Compact Section 4.10.[59] The mandatory requirements comply with the goals of the Council and Wisconsin.

The mandatory and voluntary aspects of the current program are well-documented for new and increased withdrawals above 100,000 gallons per day averaged in a thirty-day period. However, it is unclear what the program requires for existing users or new or increased withdrawals below 100,000 gallons per day. The WMPR states that "[v]oluntary water conservation and efficiency measures are encouraged for existing water users throughout the state" and that DNR is "developing a voluntary program through education and outreach opportunities, identifying leaders in water conservation and efficiency in each of the water use sectors, and establishing procedures to improve the water use efficiency and conservation efforts in state government facilities."[60] However, there is no codified plan – mandatory or voluntary for existing users or new withdrawals below 100,000 gallons per day. Simply encouraging water users throughout the state to use conservation measures is not adequate to comply with the Compact, which states that states "shall implement…a voluntary or mandatory [w]ater conservation for *all*, including existing, Basin Water users."[61] Wisconsin does have a statutory mandate to implement a "water conservation and efficiency program…for *all users* of the Great Lakes basin" within 24 months of the Compact becoming effective; however, it does not appear

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[56] Wis. Admin. Code NR § 852.

[57] REPORT at 14. *See also* Wis. Admin. Code NR § 852.02, 04.

[58] Compact § 4.11. *See also* Compact § 1.2 (defining "Environmentally Sound and Economically Feasible Water Conservation Measures" as "measures, methods, technologies or practices for efficient water use and for reduction of water loss and waste for reducing a Withdrawal, Consumptive Use or Diversion that i) are environmentally sound, ii) reflect best practices applicable to the water use sector, iii) are technically feasible and available, iv) are economically feasible and cost effective based on an analysis that considers direct and avoided economic and environmental costs and v) consider the particular facilities and processes involved, taking into account the environmental impact, age of equipment and facilities involved, the processes employed, energy impacts and other appropriate factors.").

[59] REPORT at 14. *See also* Wis. Admin. Code NR § 852.02, 04.

[60] REPORT at 14-15.

[61] Compact § 4.2.

that Wisconsin has done this.[62] To remedy this, Wisconsin should codify—through guidance, regulation, or statute—at a voluntary plan or mandatory plan for *all users*; simply casually encouraging users to conserve water is not enough.

The Compact requires that states annually assess their plans and "adjust to new demands and potential impacts and cumulative effects and climate."[63] Wisconsin's WMPR does not give any indication of efforts to adapt to changing conditions or climate change, but Wisconsin law does require the DNR to include "new demands of water…[and] potential impacts of the cumulative effects of diversions, withdrawals, and consumptive uses and…climate" in its annual assessment of the program.[64]

While the WMPR gives some examples of the way in which Wisconsin is promoting conservation and efficiency measures outside of the mandatory program,[65] these efforts are not mandated by statute or regulation, and more could be done to promote water conservation and efficiency than the current efforts laid out in the report. Wisconsin could mandate conservation and efficiency measures that require retrofits. Perhaps more importantly, Wisconsin should at least establish a voluntary plan for *all users*, incorporating the promotion of water conservation and efficiency measures.

[62] Wis. Stat. Ann. § 281.346(8)(c) (emphasis added).
[63] Compact § 4.2.
[64] Wis. Stat. Ann. § 281.346(11)(b).
[65] REPORT at 16-17.

Name: James Wallace

Date of Submission: June 29, 2015

Location: Waterloo, Ontario

Comments:

As to Recommendation 3- All municipalities relying on Great Lakes water as well as those relying on ground water extraction in the G.L. basin should be required by the State and the Province to report consumption to the ijc. Rec. 6 The Provinces and States should legislate controls over municipalities withdrawing ground water to regulate consumption and to monitor and regulate water quality. Rec.7 The ijc should gather information from States and Provinces to determine minimum investment necessary to maintain existing consumption and to determine investment necessary to improve conservation. As to page 42- "sparse measurement points leads to substantial amounts of uncertainty". Just as in Canada's meteorology service which long has relied on observations across the country from volunteers, the residents along the Great Lakes should be provided with the opportunity to gather information for the ijc. On page 48 - "continued operation of evaporation stations is uncertain". The ijc should not be shy in advising its members that money and facilities are required . As a resident of Waterloo, I am most concerned by the comments on pp. 56,57 and 59 as to the unsustainability of the water drawdown in this area . I trust that the ijc will separately draw these comments to the attention of the Province of Ontario and The Regional Municipality of Waterloo for comments and action.

Name: Stanley “Skip” Pruss

Date of Submission: June 29, 2015

Location: Lansing, Michigan

Comments:

The comments of 5 lakes Energy are focused on the water, energy and climate nexus as a specific area where further analysis would provide useful information for the Commissionâ€ ™s consideration. Effects of Non-Consumptive Water Withdrawals The Commissionâ€ ™s report finds that â€ œpoor water quality impairs the potential uses of the waters of the Great Lakes and constitutes a virtual â€ œremovalâ€ • of usable waters from the system.â€ • The ecological and climatological system impacts to the waters of the Great Lakes from thermoelectric energy generation include: â€ ¢ Thermal loadings from cooling waters transferring heat energy into receiving waters, disrupting aquatic ecosystems and potentially contributing to algae and cyanobacteria growth. â€ ¢ Emissions of metals and acid gases affecting transboundary waters. â€ ¢Fossil fuel thermoelectric generation is the largest contributor to global warming, accounting for 45 percent of Canadian and 37 percent of U.S. GHG emissions, respectively. â€ ¢ Thermoelectric water discharges are increasing the ambient surface water temperatures of the Great Lakes. €

Impingement at cooling water intakes and entrainment of fish and other aquatic organisms of various life stages result in significant mortality. This largely underdeveloped area of research merits further attention as non-consumptive water withdrawals may be considered â€ œvirtual removalsâ€ • based upon their impacts on the ecology of the Great Lakes. Beneficial effects of Emerging Energy Policies Great Lakes provincial and state governments have adopted new energy policies and incentives to accelerate the deployment of zero-carbon and low carbon power generation technologies. These policy innovations directly mitigate the loading of metals, acid gases, heat energy and other pollutants into the Great Lakes Basin, reducing ecological impacts as well as reducing greenhouse gas emissions. Reductions of these pollutants are an important benefit of the energy transition underway and directly support the mission of the IJC in protecting the physical, biological and chemical integrity of Great Lakes water resources. The IJCâ€ ™s decision-making framework should include consideration of energy supplies, water resources and climate impacts to inform long-range planning efforts and risk evaluation of the Great Lakes Basin. New information on the impacts of Climate Change on the Great Lakes Basin Much of the supporting data as well as the findings and determinations flowing from the data in the Commissionâ€ ™s report are quite old. For example, the Commissionâ€ ™s report cites the 1996 IPCC Second Assessment when the IPCC issued its Fifth Assessment in 2014. Similarly, the Commissionâ€ ™s report references the prospective release of the National Climate Assessment (NCA) in 2000 when the most recent NCA issued in final form in 2014. The recent NCA contains numerous specific findings regarding likely temperature increases in the Midwest and the foreseeable climate impacts to the Great Lakes Region, including articulation of the vulnerabilities of Great Lakes water resources. Both the IPCC and the NCA now find that climate impacts can only be mitigated through substantial decarbonization of the economy, entailing a fundamental transition of the energy system over time to zero and low-carbon energy sources.

See attachment.

Comments on the International Joint Commission's report, *Protection of the Waters of the Great Lakes, Final Report to the Governments of Canada and the United States.*

5 Lakes Energy LLC, a consultancy focused on the complex interrelationship of water, energy and climate, welcomes the opportunity to comment on the International Joint Commission's report, *Protection of the Waters of the Great Lakes, Final Report to the Governments of Canada and the United States.*

The Commission's report identifies a number of areas where new research or further literature review would be desirable. The comments of 5 Lakes Energy are focused on the water, energy and climate nexus as a specific area where further data, quantitative and qualitative analysis would provide useful, if not essential, information for the Commission's consideration.

The systemic interdependences and effects of water use, energy generation and global warming are rapidly becoming the focus of increased scientific research, policy development and public discourse. These interrelationships broadly connect economic, social, political and environmental issues, presenting complex, dynamic, even existential problems. While the complex interactions and impacts of water, energy and climate concern everyone, everywhere, the globally unique, geographically specific effects in the Great Lakes Region present immediate and consequential economic, health, and ecological management issues. Our carbon intensive energy system is having profound effects on Great Lakes commerce, agriculture, tourism and recreational opportunities, as well as pronounced cumulative physical effects on soil and water chemistries, lake levels, and fresh water ecological systems.

Effects of Non-Consumptive Water Withdrawals

The Commission's report emphasizes that the waters of the Great Lakes Basin are a holistic ecological system and that preserving the physical, biological and chemical integrity of Great Lakes water resources is paramount. The Commission's report also finds that *"poor water quality impairs the potential uses of the waters of the Great Lakes and constitutes a virtual "removal" of usable waters from the system."* The impacts from thermoelectric generation are critical in this regard and demonstrate the complex interrelationships of water, energy and climate issues as well as the vulnerabilities of the water resources of the Great Lakes Region.

Emissions from the combustion of fossil fuels, discharges of heated cooling water, and large-scale non-consumptive water withdrawals for cooling for thermoelectric plants have significant impacts on the physical, biological and chemical integrity of Great Lakes.

Impacts from Thermoelectric Power Production – There are 583 thermoelectric power generation units on the Great Lakes. The cooling water requirements of thermoelectric generation plants makes the Great Lakes a valuable resource for electric central baseload plants which account for 70 percent of all water withdrawals from the Basin.[1] The Commission's report focuses only on the consumption of water from thermoelectric generation, finding that only 1 percent of water used for thermoelectric power is

[1] Report, p 9. More recent USGS date indicate withdrawals for thermoelectric generation from the Great Lakes constitute 72 percent of total withdrawals (21.9 Bgal/d) in 2005. http://pubs.usgs.gov/sir/2010/5031/

consumed.[2] But there are numerous ecological and climatological system impacts to the waters of the Great Lakes from thermoelectric energy generation.

- Thermal loadings from cooling waters transfer heat energy into receiving waters, disrupting benthic communities and aquatic ecosystems and potentially contributing to algae and cyanobacteria growth.
- Emissions from thermoelectric power plants result in the deposition of mercury and other metals resulting in physiological and neurological impacts to infants and children.
- The emissions give rise for the need of cautionary fish advisories which reduce recreational and commercial fishing opportunity resulting in measurable economic loss to coastal communities.
- The release of acid gases is a causative factor in the acidification of the Great Lakes and other water bodies.
- Fossil fuel based stationary combustion sources are the largest contributors to global warming, accounting for 45 percent of Canada's greenhouse gas emissions and 37 percent of U.S. greenhouse gas emissions.[3]
- Warming attributable to the combustion of fossil fuels is increasing the ambient surface water temperatures of the Great Lakes.
- Impingement at cooling water intakes and entrainment of fish and other aquatic organisms of various life stages result in significant mortality.

This largely underdeveloped area of research merits further attention as non-consumptive water withdrawals may be considered "virtual removals" based upon their impacts on the ecology of the Great Lakes.

Beneficial effects of Emerging Energy Policies

Great Lakes provincial and state governments have adopted new energy policies and incentives to accelerate the deployment of zero-carbon and low carbon power generation technologies. As of 2014, Ontario has eliminated all coal-fired electric generation and has deployed 1,925 MW of wind and solar energy and has achieved cumulative energy savings of 6,000 GWh.[4] The Québec government has initiated a process to develop a new Québec energy policy more reliant on renewable energy and energy efficiency.[5] All eight Great Lake states have renewable portfolio standards that increase the percentage of power generation derived from zero or low carbon sources. These policy innovations directly mitigate the loading of metals, acid gases, heat energy and other pollutants into the Great Lakes Basin, reducing ecological impacts as well as reducing greenhouse gas emissions. Reductions of these pollutants are an important benefit of the energy transition underway and directly support the mission of the IJC in protecting the physical, biological and chemical integrity of Great Lakes water resources. The IJC's analysis framework should include assessing and integrating consideration of energy supplies, water resources and climate impacts to inform long-range planning efforts and risk evaluation of the Great Lakes Basin.

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[2] DOE recently reported that 2.3 Bgal/d or 4 percent of freshwater from thermoelectric generation is consumed. DOE, *The Water Energy Nexus: Challenges and Opportunities*, July 2014 http://energy.gov/downloads/water-energy-nexus-challenges-and-opportunities p.9

[3] http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=5B59470C-1&offset=2&toc=show
http://www.epa.gov/climatechange/ghgemissions/gases/co2.html

[4] Ontario Energy Report, Q4 2014 http://www.ontarioenergyreport.ca/pdfs/OER-Electricity-Data_ElectricitySupply.pdf

[5] http://www.politiqueenergetique.gouv.qc.ca/home/

New information on the impacts of Climate Change on the Great Lakes Basin

Although acknowledging the importance of assessing the impacts from climate change on the Great Lakes Basin, a weakness in the Commission's report is the fact that much of the supporting data as well as the findings and determinations flowing from the data are quite old. For example, the Commission's report cites the finding from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment from 1996 that "the balance of the evidence suggests there is a discernable human influence on the climate system." In 2014, the IPCC issued its Fifth Assessment informed by two additional decades of enhanced data collection, improved modeling tools, and greater predictive analytic capacity. The IPCC has now determined that the "[h]uman influence on the climate system is clear, and ….continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems.[6] Similarly, the Commission's report references the prospective release of the National Climate Assessment (NCA) in 2000 when the most recent NCA issued in final form in 2014. The recent NCA contains numerous specific findings regarding likely temperature increases in the Midwest and the foreseeable climate impacts to the Great Lakes Region, including articulation of the vulnerabilities of Great Lakes water resources.[7]

Both the IPCC and the NCA find that climate impacts can only be mitigated through substantial decarbonization of the economy, entailing a fundamental transition of the energy system over time to zero and low-carbon energy sources. Information and new analytical tools are now available to provide more precise information regarding the effects of pollutants, greenhouse gas emissions and thermal loadings from powerplants as well as enabling quantification of reductions of the same through substitution of clean energy resources. Further inquiry by the IJC on the effects of the deployment of renewable energy resources in mitigating impacts to water resources could provide valuable future guidance on integrating energy, water and climate policy planning.

About 5 Lakes Energy LLC

5 Lakes Energy is a Michigan-based, national policy consulting firm offering services in clean energy and the environment to the public and private sectors in the form of research, analysis, modelling and policy development and support.

[6] IPCC, *Synthesis Report, Summary for Policy Makers*, http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

[7] National Climate Assessment, Midwest Chapter 18, http://nca2014.globalchange.gov/report/regions/midwest

Name: Marc Hudon

Date of Submission: June 26, 2015

Location: Saguenay, Québec

Comments:

Thank you very much on this opportunity to comment on your report. I appreciated the fact that you noted the existence of the Advisory committee to the Compact/Agreement (CA) but as a member of this committee during the 5 years of work to go from Annex 2001 to the signed CA, this advisory body hasn't been put to work to the extent it should have been to accompany, guide and motivate our leaders within the Regional Body involved in the implementation of the CA. Formal face to face meetings were asked from the beginning but to no avail. I say this because without an advisoty committee there would not have been a CA. Likewise, without the leadership and/or involvement of the Federal government and/or IJC influence. There were much more than the ten jurisdictions at work during those 5 years to get to a viable end product that made us all proud to be a part of. Since the signing, many regional political leaders have gone and new comers have arrived but few retain the "institutional memories" of WHY the Compact and agreement were so important to reach and of how hard it was to get all ten jurisdictions to agree to a common tool to work from in managing our Basin waters for future decades, even against commerce concerns. Granted, a few NGOs have also gone, but the majority is still there, contributing in a too limited way mostly thru formal conference calls for a few minutes. Some recommendations : 1. Please remove the reference box which covers up the lac St-Pierre area (p.2); 2. Stronger role by the IJC in all matters regarding transboundary waters, including those of rivers flowing into transboundary rivers. 3. Funds be allowed to support a much more active role by the Advisory committee and for a face to face working session with regional states representatives and federal relevant representatives for at the very least two full consecutive days per year. 4. A much stronger role for the Federal government and for the IJC, to have an oversight capacity to the CA performance. 5. Include a section at the end of the report, looking out to the future of the Great Lakes and St-Lawrence river Basin waters, that projects where we should aim at being at in say 20-30 years in light of your findings in 2014. A vision that includes how to align the waters’s interests in light of challenges like the very real Waukesha diversion proposal that may arise from within the Basin. Finally, with all the water problems California and Nevada are actually facing as we see in the many papers articles these days, the impacts of climate changes looming, we simply cannot afford any kind of failure to take place regarding the Compact and Agreement. This is a model from which the world can learn from and it must be thru it's authenticity, rigorousness and fairness for people, towns and stakeholders in real needs. Marc Hudon, Nature Quebec.

Name: Patricia Bowne

Date of Submission: June 24, 2015

Location: Milwaukee, Wisconsin

Comments:

Beginning to divert water from the Great Lakes will not solve as many problems as it will create. It will encourage developments in areas that do not have enough water to support them, thereby causing an ever-increasing demand until the resource is endangered or destroyed, as we have seen happen with rivers and aquifers in other parts of the country. And it will slow the development of sustainable technologies.

Name: Thomas Gaertner

Date of Submission: June 23, 2015

Location: Wauwatosa, Wisconsin

Comments:

Great Lakes water is a gift from the last great glaciation. It is a one-time endowment. It should not be diverted.

Name: Aisha Chiandet

Date of Submission: June 22, 2015

Location: Collingwood, Ontario

Comments:

Among the many threats facing the Great Lakes, the export of water outside the Great Lakes Basin is one of the more important ones, not because of an immediate risk of harm, but because allowing it would open the door for potentially huge exports over the long term and this would likely be an irreversible decision. Cross watershed boundary water exports should be banned. Communities that do not have enough water to support growth must either stop growing or find ways to improve water efficiency - preferably both.

Name: Krista Bailey

Date of Submission: June 22, 2015

Location: Southbend, Indiana

Comments:

Research, awareness, and education to public and private sectors are all critical pieces that must be supported and funded to ensure the protection of this unique and valuable ecosystem and associated services. I would love to see a stop to the removal of waters, as any export impacts the ecosystem as it is not returned at an equal pace. However, that is likely unrealistic given economic and social pressures on the system. Efficiency is key – the best savings and conservation steps we can take are to use less to begin with, and to use what we do need in the most efficient and effective way possible Maintain an adaptive management approach in decision making at local and state levels Fund more research in water balance components, and a water cycle that includes consumptive use, especially considering climate change impacts Explore and enact conservation measures regarding use and discharges Groundwater education and conservation efforts and funding should be increased Advocate/lobby for frack free areas in groundwater sensitive areas The best policies and plans cannot be supported or implemented without ongoing public education and research into best practices and modeling Yes, provide ongoing increases in funding to support high quality, results oriented research that can help predict impacts and identify opportunities for ecosystem enhancement Public education and engagement for all ages is a critical component that needs funding to build understanding, support, and active participation in conservation and efficiency measure and for understanding of research and its necessity.

Name: Dan Carpenter

Date of Submission: June 17, 2015

Location: Lion's Head, Ontario

Comments:

While I agree that the systems in place are helping, there is insufficient knowledge to the public at large regarding this process. Perhaps that is why there are few comments. Public input is only going to happen if they know what is going on. This was a tough read. I suggest that the time frame be reduced to every 5 years rather than 10. Yes, cities and towns need to get their water mains and infrastructure up to date. The governments of both countries know full well that the funding can be made available but they choose not to. Formerly from the Waterloo-Kitchener region, I know the impacts the surrounding communities had when the new systems went into operation. Farmers wells went dry almost over night in the surrounding areas. This past winter of 2014-15 has hit many Ontario municipalities really hard with frozen and broken mains. Large communities have to deter increasing population growth and create incentives for people to move to other areas to reduce the high level drains in concerned ground water areas.

Name: Eric Hodgins

Date of Submission: June 10, 2015

Location: Kitchener, Ontario

Comments:

Attached letter refutes the comment that Kitchener Waterloo has an unsustainable groundwater supply and requests this statement be removed from the final report.

Region of Waterloo

Transportation and Environmental Services
Water Services
150 Frederick Street, Floor 7, Kitchener ON N2G 4J3 Canada
Telephone: 519-575-4426 TTY: 519-575-4608
Fax: 519-575-4452
www.regionofwaterloo.ca

Date: June 8, 2015
File #: E06-01

International Joint Commission
234 Laurier Avenue W
22nd Floor
Ottawa ON K1P 6K6

To Whom It May Concern:

Re: Draft Report on Progress Made In Defending The Great Lakes From Diversions, Bulk Exports and Large-Scale Withdrawals

The letter provides comments from the Regional Municipality of Waterloo (Region) on the above draft report prepared by consultants Ralph Pentland and Alex Mayer dated May 15, 2015. Specifically, Region staff do not agree with the statement in the report that groundwater supply for the Kitchener-Waterloo area is not sustainable. The Region is responsible for water supply management for the Waterloo and Kitchener area, amongst others. It operates approximately 120 groundwater supply wells that provide 80% of the water to approximately 550,000 people. The specific reference in the report and a summary of the Region's evidence to refute the statement in the draft report is provided below.

In the chapter on groundwater, the following statement is made on page 57:

"These studies and others suggest that groundwater withdrawals in the Chicago-southeastern Wisconsin area and the Waterloo-Kitchener area are unsustainable. These areas and others that depend on groundwater supplies are under continued pressure from increasing populations."

Reference for this statement is identified as reference number 134 which is the following: Frind, E. O., Russell, H. A., Rudolph, D. L., and Sharpe, D. R. 2014. The Waterloo Moraine: Water, Science and Policy. Canadian Water Resources Journal, 39(2): 85-87.

As noted above, Region staff do not agree with this statement and provide the following information to support this objection.

The article that is identified as the source (Frind et. al) is a preface article to an entire volume of the Canadian Water Resources Journal that focusses on groundwater research and sustainability of groundwater sources in the Waterloo Moraine. The Waterloo Moraine is located entirely within the boundaries of Waterloo Region and its aquifers provide water for approximately 45% of the Region's water supply system. As a preface article, this article does not provide any scientific data or research but rather provides a summary of what is contained in the remaining research articles. In this article, the authors speculate on water shortages that could occur. The following statement from the article illustrates the kind of speculation statements that are made:

"Growth not only increases the demand on water but can potentially diminish the resource itself. Sprawling subdivision developments over the aquifer recharge areas can affect the quantity of water available, urban contaminants such as road salt can impact the groundwater quality and aggregate pits can weaken the protection of the aquifers from contaminants. Consequently, conflict can potentially arise when the growing demand tests the limits of the resource."

The next sentence then states:

"Water managers at the Region of Waterloo have so far been successful in striking a balance between growth, water use and the protection of the water source, using a multi-faceted approach including demand management, delineating groundwater sensitivity zones and constraining the urbanized area by means of a "countryside line"."

Together, these two segments first speculate about conditions that can contribute to groundwater unsustainability in the area and then go on to conclude that the Region has been successful in developing a sustainable supply.

Subsequent articles in this volume of the journal provide technical research that supports that groundwater use in the Region is sustainable. Specifically, E.O. Frind and T.A. Middleton (CWRJ Vol. 39 No. 2) conclude "… the Region is successfully meeting the challenges of providing a sustainable water supply to the growing community, and at the same time maintaining the health of the ecosystem dependent on groundwater." Also, P.A. Meyer, et. al (CWRJ Vol. 39 No. 2) conclude "…water budget and risk assessment scenarios suggest the forecasted municipal water demand to the year 2031 can be met with existing groundwater wells and surface water intakes. The estimated future takings are not expected to lead to pumped water levels at any municipal wells that fall below safe operating thresholds. The impact of increased municipal demand on sensitive surface water features, such as rivers and

streams hosting cold-water fisheries, is predicted to be less than 10% of the current estimated base flow."

The conclusions on sustainability in the above articles stem from the water budget and risk assessment process undertaken for the Region as part of the Clean Water Act (2007). The Clean Water Act mandates mitigation of water quantity and quality threats to municipal water supply systems. For quantity, a local water budget and risk assessment, relying on and building on a Grand River watershed water budget, was undertaken for the Region's water supply wells to assess whether the sources of supply were sustainable to meet future demands to 2031.

This assessment, while complete, is not currently publically available and concludes that existing and permitted water supply system can meet forecasted demands. The updated and approved Water Supply Master Plan for the Region (Stantec, 2015) concluded that the existing and planned water supply system was sufficient to meet demand to 2031. Using the same demand projections, these systems are forecasted to be able to also meet 2051 demand. Further, it was recommended as part of the Plan that a proposed pipeline to Lake Erie was not needed within the 2051 water supply planning horizon. A copy of the staff report presented to Regional Council on this matter is attached.

I trust these comments provide sufficient information to support that Waterloo Region has a sustainable groundwater supply system. In light of the information summarized in this letter, Region staff request that the statement regarding unsustainable groundwater supplies in Kitchener-Waterloo be removed from the final report.

If you have any comments or concerns, please do not hesitate to contact the undersigned.

Yours truly,

Eric Hodgins, M.Sc., P.Geo
Manager, Hydrogeology and Source Water

/ewh

Report: E-14-067

Region of Waterloo

Transportation & Environmental Services

Water Services Division

To: Chair Jim Wideman and Members of the Planning and Works Committee

Date: May 27, 2014 **File Code:** C06-60(A); E02-40(A)/4007

Subject: Water Supply Master Plan Notice of Completion

Recommendation:

That the Regional Municipality of Waterloo approve the strategy recommended in the Water Supply Master Plan (WSMP) Update summarized in Report E-14-067 dated May 27, 2014;

And that the Regional Municipality of Waterloo publish the Notice of Completion for the WSMP and provide the WSMP Update Report for public review and comment for a 30 day period in accordance with Municipal Engineers Association's Master Planning Process.

Summary:

The Region periodically updates its long-term water supply strategy and capital program to reflect changes in water demand, regulations, growth patterns, and other transient factors. An update to the existing Water Supply Master Plan (WSMP) was initiated to address a declining trend in water demands experienced in recent years, and to address new constraints on groundwater usage arising from the provincial 2006 Clean Water Act and the outcome of recent studies triggered by this new legislation.

Generally, new water supply projects and upgrades previously planned are still needed, but with an adjustment in timing. Most critically, the WSMP update has found that a new water supply from outside of the Region (the proposed Great Lake displacement pipeline), can be delayed beyond 2051 (instead of by 2035), and the Region can be adequately supplied by local sources of water in the interim, through implementation of improvement, expansion and reconfiguration projects on existing sources and distribution infrastructure.

The Region should continue water conservation efforts to minimize water consumption and delay the need for costly displacement pipeline as long as possible.

The proposed changes to the long-term water supply strategy have resulted in reductions for the Region of approximately $65 million in the 2014 Ten Year Capital Program and any costs related to the Great Lakes pipeline.

The updated Master Plan addresses the needs for water supply arising from future development, and supports extending the life of the existing systems and operating them in the most efficient manner, reducing the operational costs and the potential impacts on the environment.

The Water Supply Master Plan Update report has been prepared, and it is recommended that the Notice of Completion of the WSMP be published, and that the report be posted for public review and comment for a 30-day period, beginning on June 15, 2014, as required by the Municipal Engineers Association Master Planning Process.

Comments received during the above public review period will be filed, addressed and incorporated into the report.

Report:

Background

The Region's Integrated Urban Supply (IUS) is a large and complex drinking water supply network that supplies potable water to the cities of Kitchener, Cambridge and Waterloo, and parts of the Townships of Woolwich (St. Jacob's, Elmira and Breslau), Wilmot (Mannheim, Shingletown and St. Agatha), and North Dumfries (Lloyd Brown). The long-term water supply strategy for these communities is documented in the Region's Water Supply Master Plan (WSMP).

The previous version of the WSMP was completed and approved by Regional council in 2007 (Report E-07-065 dated June 12, 2007). This study was completed to address the impacts of planning, regulatory and technical changes since the Region's long-term water supply strategy was approved by Council in May 2000. Based on the population and employment growth at the time, the 2007 WSMP showed that the planned infrastructure and implementation schedule of the 2000 WSMP was still appropriate.

The Region periodically updates the WSMP and capital works program to reflect changes in water demand, regulations, growth patterns, and other transient factors. The current update to the Water Supply Master Plan (WSMP) is primarily needed to address the following important new information:

1. A declining trend in water demands experienced throughout the Region in recent years;
2. Latest population and employment growth forecasts;
3. New constraints on groundwater usage arising from the provincial Clean Water Act (CWA) and new detailed groundwater studies triggered by the CWA;
4. Recommendations arising from the Water Supply and Distribution Operations Master Plan (WSDOMP) completed in 2013.

The Region awarded the consulting contract for updating the WSMP project to Stantec Consulting Ltd. in 2011 (Report E-11-055 dated May 3, 2011). The project was originally scheduled to be completed in 2013. However, the need to integrate the supply strategy with the outcome of the CWA-related studies (currently nearing completion) necessitated the delay of the WSMP update completion to 2014.

The 2007 WSMP forecasted fairly modest reductions in per capita water usage, and an overall increasing trend in total water demands. This study forecasted an average daily water demand of approximately 220 ML/day and maximum week daily demand of 275 ML/day by the year 2031. This forecast would require the expansion of the Region's water supply system over the next two decades and the construction of a Great Lake displacement pipeline by the year 2035. However, over the past five years, residential per capita water usage has decreased more than expected, and total water demands in the Region have shown a declining trend, as also observed in many other municipalities across North America. The current average day demand forecast is now approximately 160 ML/day with a maximum week daily demand of approximately 195 ML/day.This substantially changes the assumptions upon which previous master planning decisions had been made, such as the quantity of new water supply needed, the schedule for developing those new supplies, and the rate of capital fund expenditures needed to implement the required infrastructure. The graph in Appendix A shows the updated water demand forecast in comparison to the previous 2007 forecast.

The population and employment projections used in the Master Plan update were developed by Planning, Housing, and Community Services, using Ontario's Places To Grow figures for the 2031, and an extrapolation to 2051 using similar growth rates.

The CWA regulatory changes and required studies have brought awareness of previously unknown constraints on some of the Region's existing and proposed water supply systems. The "Tier 3 Water Budget and Water Quantity Risk Assessment" (Tier 3 Study), required as part of the CWA, has indicated that the amount of water that can be sustainably extracted from the Region's wells could be different from values previously included in the Region's water-taking permits. The Region will still be able to use higher volumes of water during months of elevated water demand in the Summer or for supplying emergencies. However, the long term sustainable average supply of existing sources will likely be lower than these permitted values, requiring additional sources located at other locations to maximize the Region's water supply capacity and to minimize the stress on the existing sources. Overall, the total volume of long term water use during periods of elevated water consumption (Summer) and months of lower water consumption (Fall, Winter and Spring) will need to be within the long term sustainable average water capacity. Recent water-taking permits have included restrictions to average day and peak day water-taking that were not part of previous supply system permits. Consequently, the assumptions that formed the basis of the 2007 WSMP strategy are no longer accurate, and a revised strategy was needed. Appendix B shows the average daily water demand until 2051 and the available long term sustainable supply capacity. Appendix C shows the maximum week water demand until 2051 and the maximum available supply capacity. These appendices also show the incremental capacity added by individual projects recommended in the WSMP.

The Region awarded the consulting contract for updating the WSMP project to Stantec Consulting Ltd. in 2011 (Report E-11-055 dated May 3, 2011). The project was originally scheduled to be completed in 2013. However, the need to integrate the supply strategy with the outcome of the CWA-related studies (currently nearing completion) necessitated the delay of the WSMP update completion to 2014.

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The population and employment projections used in the Master Plan update were developed by Planning, Housing, and Community Services, using Ontario's Places To Grow figures for the 2031, and an extrapolation to 2051 using similar growth rates.

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In 2013, the Region completed the Water Supply and Distribution Operations Master Plan (WSDOMP) (Report E-13-044 dated April 30, 2013). The focus of this study was primarily on the optimization and efficiency of the IUS water distribution system, whereas, the focus of the WSMP is primarily on the management and development of the sources of water. Recommendations of 2013 WSDOMP were considered and incorporated in the WSMP update.

WSMP Summary

A preliminary summary of the WSMP update was presented to Regional Council late in 2013 (Report E-13-123 dated December 3, 2013), prior to the public consultation detailed in the next section. The public and area municipalities generally supported the key recommendations of the WSMP update, summarized below:

- Delay the construction of a Great Lake displacement pipeline beyond 2051;
- Extend the life of the existing sources and operate/maintain them more efficiently. The combined capacity of the IUS well fields, the Grand River intake and the work recommended to address the Tier 3 Study constraints will be sufficient to meet water demands beyond 2051;
- Implement water supply operating strategies to meet the Clean Water Act requirements as identified in the WSMP;
- Construct infrastructure identified in the WSDOMP to optimize the IUS water distribution system;
- Continue with the Water Efficiency Program to reduce average and peak water demands;
- Continue with the Groundwater Monitoring Program;
- Continue to monitor and evaluate the trends in the Region's water demands;
- Continue to update the MP approximately every five years, considering the latest information and new regulatory changes.

Declining water demands have shifted the Region's 20 to 30-year needs away from a Great Lake pipeline in favour of investments to improve and extend the life of the existing supply systems. Generally, new water supply projects and upgrades previously planned are still needed, but not as soon as previously planned. The attached table in Appendix D compares the changes in strategy, timeline and budget from the 2014 WSMP Update to the 2007 WSMP.

The proposed changes to the long-term water supply strategy resulted in capital savings of approximately $65 million over the next ten years, a change already reflected in the 2014 Ten Year Water Capital Program and costs associated with the Great Lakes pipeline.

The Water Supply Master Plan Update report has been prepared, and it is recommended that the Notice of Completion of the WSMP be published, and that the report be posted for public review and comment for a 30-day period, beginning approximately June 15, 2014, as required by the Municipal Engineers Association Master Planning Process.

Comments received during the above public review period will be filed, addressed and incorporated into the report.

Public and Other Stakeholder Consultation

The project team consulted with the public, area municipalities, and regulatory agencies in the development of the updated WSMP, to ensure that the WSMP considers the needs and expectations of all impacted stakeholders. A summary of the key consultations is provided below:

The Notice of Commencement for the Water Supply Master Plan was issued by mail, local newspaper advertising, and Region website posting in July, 2011.

- Stakeholder meetings were convened in December 2011 and September 2013, with participation from City of Kitchener, City of Cambridge, City of Waterloo, Township of Woolwich, the Ministry of the Environment, the Grand River Conservation Authority, and Region staff. Additional meetings with City of Waterloo and City of Cambridge were also held in September 2013 to consult with staff that were unable to attend previous consultation meetings.
- Public Consultation Centres (PCC) were advertised in local newspapers in November and December 2013, and held as follows:
    - December 10, 2013 in Waterloo
    - December 11, 2013 in Kitchener
    - December 12, 2013 in Cambridge

  Attendance at the PCC's was low. The comments received were in favour of the Master Plan recommendations, and supported more use of local sources instead of a Great Lake pipeline and continuation of the Region's water efficiency and conservation programs.
- Pending Council approval of the WSMP update, the Notice of Completion will be mailed to the stakeholders and others on the project mailing list, and advertised in local newspapers and on the Region website in June 2014. As required by the Municipal Engineers Association Master Planning Process the project title will be available for public and stakeholder review and comment for a 30 day period.

Based on the consultation completed to date, the project team is satisfied that the WSMP update meets the needs of the stakeholders.

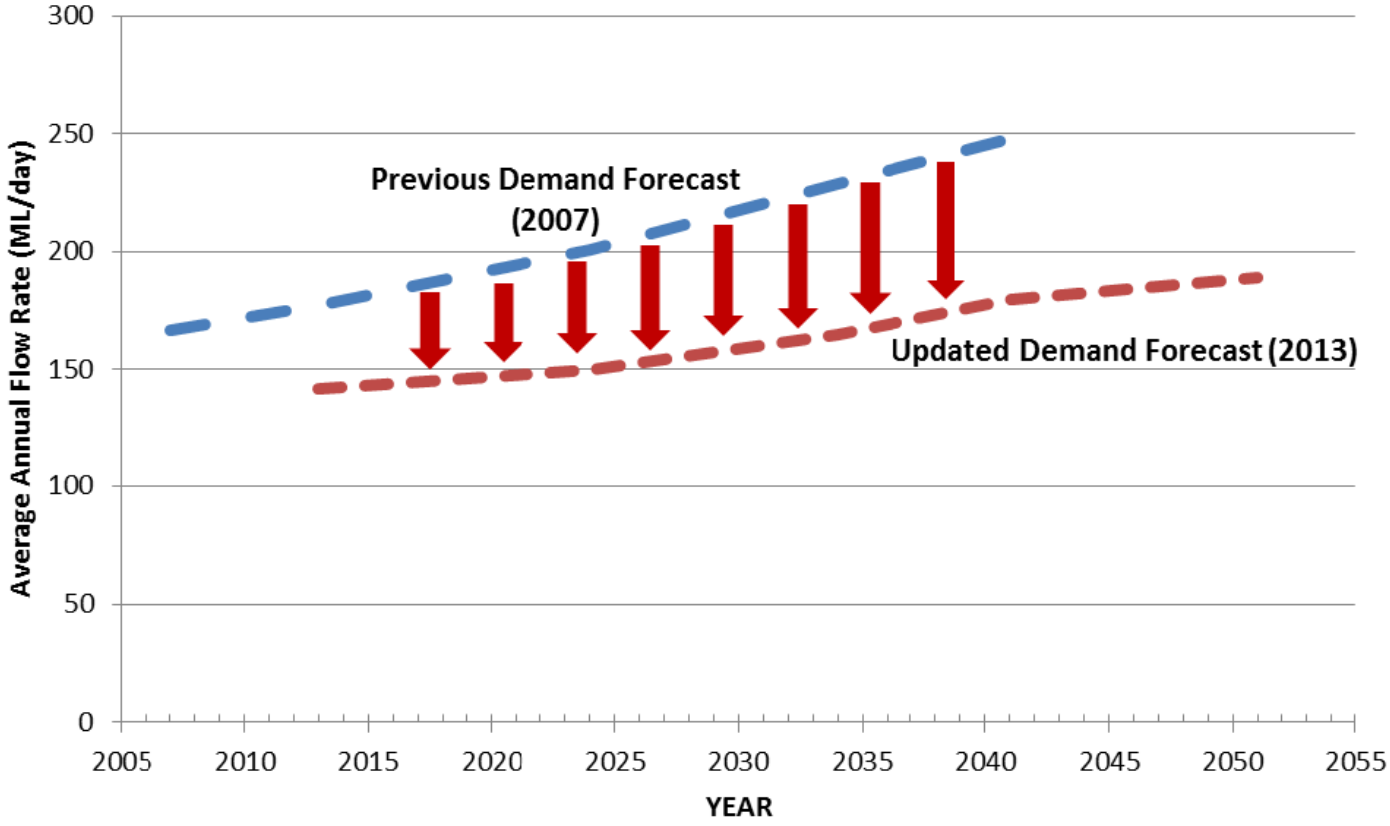
Corporate Strategic Plan:

The strategy recommended in the WSMP update will support the Region's Strategic Plan Focus Area 1: "Protect and Enhance the Environment", Strategic Objective 1.2: "Reduce greenhouse gas emissions and work to improve air quality", and Strategic Plan Focus Area 2: "Growth Management and Prosperity", Strategic Objective 2.2: "Develop, optimize and maintain infrastructure to meet current and projected needs."

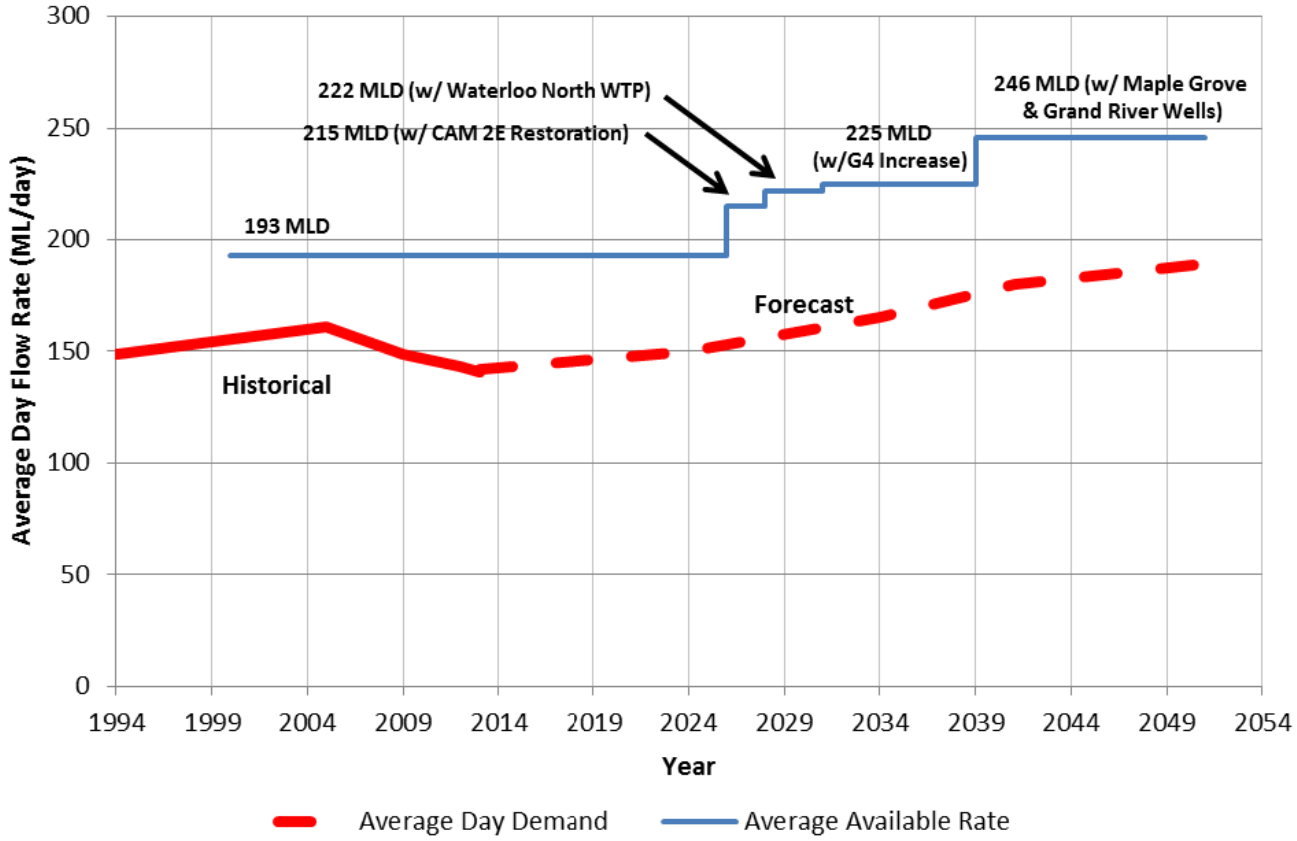
Financial Implications:

As a result of the Region's long-term water supply strategy recommended in the 2014

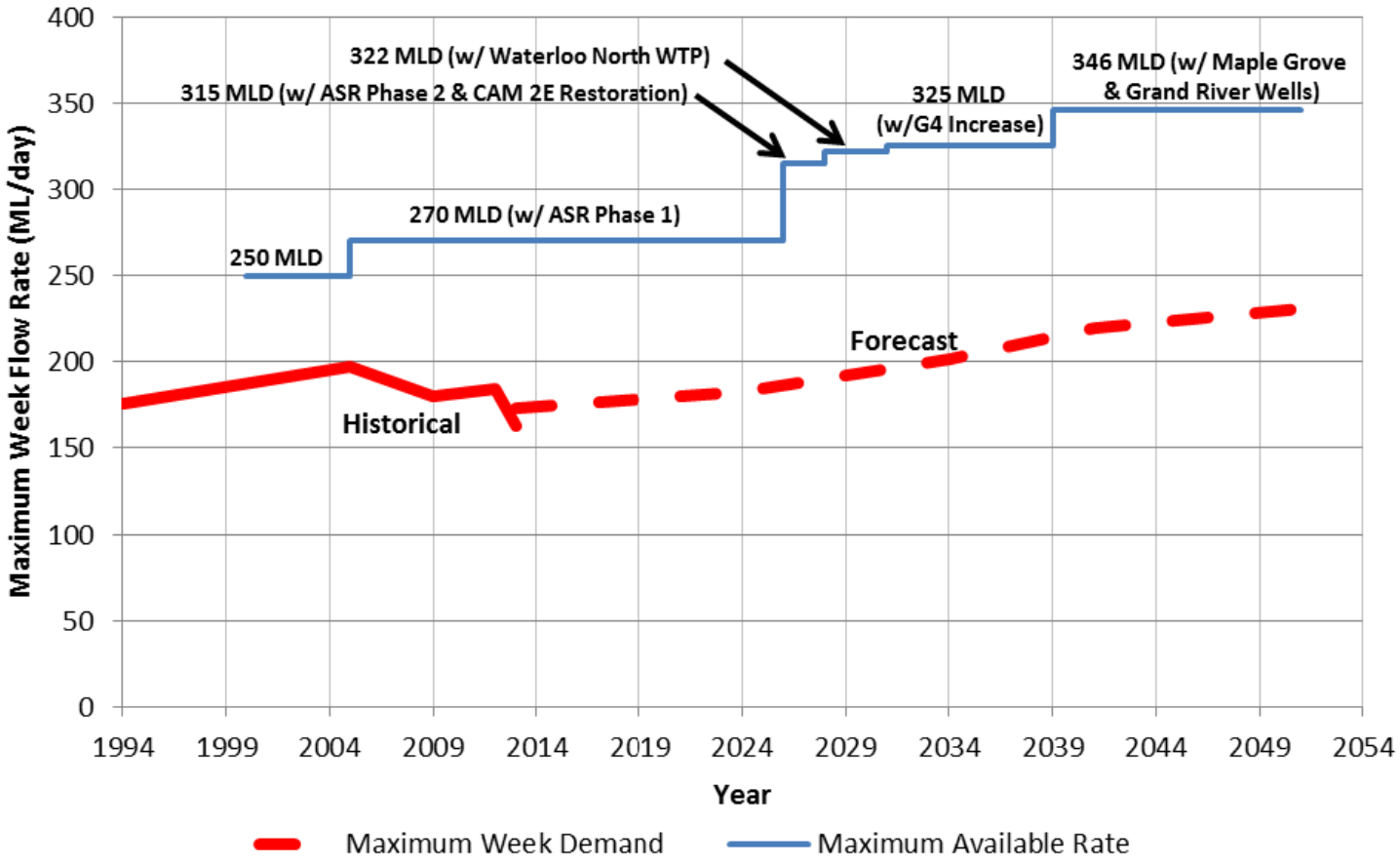
Appendix A – Comparison of Previous and Updated Water Demand Forecasts



Appendix B – Average Daily Water Demand vs. Long Term Sustainable Supply Capacity



Appendix C – Maximum Week Water Demand vs. Maximum Available Supply Capacity



Appendix D – Comparison of Key Recommendations from the 2007 WSMP and the 2014 WSMP Update

2007 WSMP	2014 WSMP Update
Construction of Phase 2 of the ASR facility to meet seasonal peak demands by 2011 ($12M capital)	Construction of Phase 2 of the ASR facility by 2026 ($12M capital)
Construct up to 23ML/d of additional groundwater sources by 2018 ($47M capital)	• Construct new Waterloo North Supply System by 2022 ($10M capital) • Construct new Maple Grove Supply System by 2025 ($5.7M capital) • upgrade existing aging supply sources and facilities until 2040 ($76M capital) For a total of 31 ML/d additional supply by 2040
Construction of a Great Lake displacement pipeline supply by 2035 ($700M capital)	Need for Great Lake Supply deferred beyond planning period (projected need 2051). Re-evaluate need for Great Lake Supply, and alternatives to it, in future MP updates
Continued support of the Water Efficiency Master Plan and other water efficiency measures	Continue with the Water Efficiency Programs
Continued maintenance and improvements to existing water supply facilities	Address constraints in the supply and distribution systems (e.g. strategically develop supplies closer to the communities where more water is needed; plan for continued intensification)
Continued update the MP every five years	Update the MP every five years

Name: Vern Storm

Date of Submission: May 28, 2015

Location: Superior, Wisconsin

Comments:

Please continue to protect the Great Lakes. It would be a real shame to have them ruined.

Name: Lynn Schense

Date of Submission: May 27, 2015

Location: Lansing, Michigan

Comments:

I urge you to err on the side of caution. I am a lifetime resident of Michigan and grew up on the shores of Lake Superior. These waters are a national treasure and need to be protected!

Name: Guy Webb

Date of Submission: May 27, 2015

Location: Ishpeming, Michigan

Comments:

Diversion of Great Lakes water should be strictly limited to communities directly on the shores of the lakes. All other diversions should be permanently forbidden. This rule should be strictly enforced with intensely punitive fines for any and all violations.