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.

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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

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ACKNOWLEDGEMENTS

This report was made possible by the generous support of The Frey Foundation.

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."