

## Great Lakes Water Levels Integrated Assessment

### Introduction

Great Lakes water levels are much in the news following over a decade of downward trends on Lakes Michigan and Huron, including historic low levels set in January 2013, and upward trends following the subsequent cold winter, wet spring, and cool summer of 2014. Variation across the Great Lakes in terms of existing water level regulation, degree of observed fluctuation, and shoreline uses makes the question of how best to deal with changing water levels particularly challenging. On April 26, 2013, in an unprecedented non-unanimous report, the International Joint Commission (2013) recommended to the U.S. and Canadian governments that they consider further studies to investigate options for building structures to raise the level of Lake Michigan-Huron by five to ten inches. This measure could provide relief to many shoreline residents and businesses. It also could cause a mix of environmental benefits and harm, and require an extremely extensive planning, design and environmental review process, after which the permits to build the project could still be denied.

Therefore, there is a need to explore additional strategies for mitigating the harm and maximizing the benefits of water level variation in the Great Lakes. International Joint Commission reference studies over the last three decades have identified various options that could help the region adapt to water level changes. Some of these options, such as shoreline management, stand in contrast to lakewide water level control structures in that they are inherently site-specific, and thus allow different localities to address impacts and issues specific to their geography, development, and shoreline uses. In practice, however, location-specific shoreline management and policy options have not been widely adopted. A major challenge in implementation, in addition to variability and uncertainty in water levels, is determining the appropriate integrated mix of options that take into consideration local conditions, multiple objectives, and jurisdictional constraints.

Overcoming these obstacles requires a new approach that emphasizes creative solutions and engagement with decision-makers, and that couples place-based work with a broader regional perspective. It should build upon existing efforts, bring in best-available science, and recognize the dynamic nature of the Great Lakes system made more evident by the recent reversal in water level trends.

Given this challenging context, the University of Michigan (U-M) Graham Sustainability Institute's [Integrated Assessment Center](#) and [Water Center](#) are proposing an Integrated Assessment to consider the environmentally, socially, politically, and economically feasible policy options and management actions to adapt to Great Lakes water level variability.

### Purpose

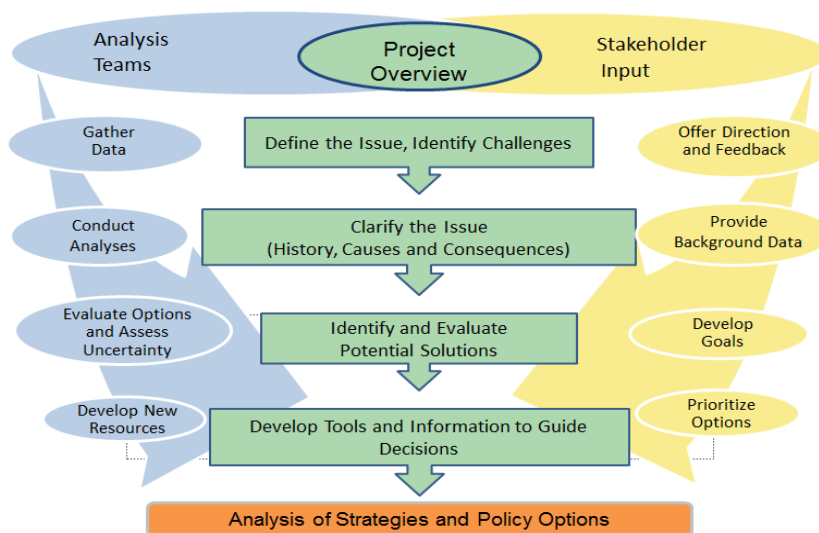
The purpose of the assessment is to develop information, tools, and partnerships to help decision makers address the challenges and opportunities posed by variability in Great Lakes water levels. With a focus on Lakes Michigan-Huron and Erie, including the Lake Huron to Lake Erie corridor, the assessment will identify and evaluate environmentally, politically, socially, and economically feasible adaptive actions and policy options. The analysis of options developed through this assessment will equip the region with a robust set of adaptive strategies that protect the ecological integrity, economic stability, and cultural values of the region. These strategies are also intended to support the notion of living with variability and address the uncertainties of an evolving future associated with climate change and the potential for extreme water levels and associated impacts.

### Approach

This project will adopt an Integrated Assessment (IA) approach as the organizing framework. IA is a deliberative process where experts summarize and synthesize existing scientific data and information to guide

decision making. By engaging representatives from a wide range of impacted sectors and perspectives on a given issue, IAs collaboratively define problems, address diverse perspectives, use and share best-available information, and establish partnerships with the goal of analyzing options for making positive change.

The IA process is flexible but typically includes the following iterative steps to promote relevance and credibility: 1) define the policy-relevant issue/challenge, 2) document status and trends, and describe the causes and consequences of the issue, 3) identify and evaluate potential solutions, 4) evaluate the likely environmental, social, and economic outcomes and uncertainty of each option, 5) develop tools and information to guide decisions, and 6) produce an analysis of strategies and policy options informed by stakeholder input (Hisschemoller et al. 2001, NRC 2007, Scavia and Nassauer 2007). Figure 1 illustrates how both technical experts and engaged stakeholders contribute to the process.<sup>1</sup>



**Figure 1:** An IA combines sound science and collaboration with diverse stakeholders to reframe a key issue and develop feasible solutions that promote environmental and economic sustainability.

The IA process will be transparent and inclusive, involving stakeholders representing a wide range of perspectives on water level issues. Following the “honest broker” approach (Pielke 2007), the assessment will consider options without predetermined conclusions and will compare and evaluate a suite of options, rather than a single recommended approach. The process will generate a final comprehensive IA report evaluating options that provides an accessible source of accurate, agreed upon information on the issue.

### Scope

**Geographic & Spatial** – The IA will focus on Lakes Michigan-Huron and Erie, including the Lake Huron to Lake Erie corridor, and include both place-based and regional components. The primary work will focus on a number of specific localities. This will allow teams to engage local stakeholders and move beyond enumeration of general strategies to evaluation of specific, integrated, and feasible options that meet local objectives. The IA will also integrate and expand upon the place-based findings to provide insights for the basin more broadly.

**Topical & Analytical** – The IA will address key areas impacted by water level variability, including, but not limited to, the following: nearshore and shoreland habitat, infrastructure, recreation and tourism, water quality, and shoreline economies. The IA will analyze current conditions and potential response options from an interdisciplinary perspective, taking into consideration relevant environmental, social, political, and economic issues and approaches. Note that the IA will not consider lakewide regulation or water level control structure options.

**Audience** – The IA will involve a range of participants from Canada and the United States. This includes federal, state, provincial, and local regulators, decision makers, property owners/ managers (e.g., individuals, municipalities, and businesses), researchers, and environmental organizations. The Graham Institute held a series of initial conversations with interested stakeholders to understand concerns and existing efforts in order to frame the IA.

<sup>1</sup> More on IA at: <http://graham.umich.edu/knowledge/ia>

## Evaluation

The Graham Institute will measure project success through both process and outcome evaluations. During the IA, project personnel will survey participants and stakeholders at least twice to ascertain the effectiveness of the initiative at addressing key concerns and promoting meaningful engagement. An external peer review process will assess the quality of the selected strategies and options for the final IA report. Following the IA, project personnel will also conduct a scan of stakeholder perspectives regarding water level changes to determine how project outcomes have addressed concerns and if options generated through the assessment have gained broader acceptance.

## Timeline

<b>Timeline</b>	<b>Integrated Assessment Activity</b>
<b>June 2014 - January 2015 (Pre IA)</b>	<ul style="list-style-type: none"> <li>Graham Institute recruits representative stakeholder group/advisory committee.</li> <li>Graham Institute acts as facilitator to help advisory committee develop a guiding question for the IA that is agreeable to stakeholders. A draft guiding question asks: <b><i>What environmentally, socially, politically, and economically feasible policy options and management actions can people, businesses, and governments implement in order to adapt to current and future variability in Great Lakes water levels?</i></b></li> <li>Graham Institute puts out a call for planning grant proposals</li> </ul>
<b>March 2015 - August 2015 (Planning Grants)</b>	<ul style="list-style-type: none"> <li>Each funded planning grant team explores the feasibility of conducting work relevant to the guiding question in a particular locality. Teams identify key impact areas/issues, an approach to identifying feasible response options, and local partners willing to collaborate. Teams prepare a summary reports that provide a base of information for the IA.</li> </ul>
<b>November 2015 - April 2016 (IA Phase 1)</b>	<ul style="list-style-type: none"> <li>Using existing data/ information, each funded analysis team provides an interdisciplinary overview synthesis and report of status, trends, causes, and consequences of changing water levels as they relate to the key issues in a particular locality. Reports will be interdisciplinary and integrate social and natural science.</li> <li>Stakeholders provide feedback on the above reports and input to help identify and develop prospective management /policy options.</li> </ul>
<b>May 2016 - October 2016 (IA Phase 2)</b>	<ul style="list-style-type: none"> <li>Based on stakeholder input to the Phase 1 reports, each analysis team develops a report identifying and analyzing viable policies and adaptive actions that meet local objectives identified in collaboration with community partners. Stakeholder groups provide input.</li> <li>Mid project evaluation.</li> </ul>
<b>November 2016 - April 2017 (IA Phase 3)</b>	<ul style="list-style-type: none"> <li>Analysis teams work together with project personnel to develop a final comprehensive Integrated Assessment report of select options. The report will integrate the findings of the various analysis teams and stakeholder input to identify opportunities across impact areas and for application more broadly throughout the region. It will address jurisdictional considerations, uncertainty, implementation strategies, and performance measures.</li> <li>IA undergoes peer review, and project personnel and teams integrate peer review feedback into report.</li> <li>Graham Institute facilitates public review of final product(s) and compiles public responses to the final options as a separate document.</li> </ul>
<b>(Post IA)</b>	<ul style="list-style-type: none"> <li>Final project evaluation</li> </ul>

## Advisory Committee

The committee's role is to provide input and advice reflecting the views of key stakeholder groups and to ensure the IA scope is relevant to decision makers. Committee members may also provide data and input throughout the process, including feedback on the policy topics, analytic approach, format of the IA, and

review of draft reports. All decisions regarding content of project analyses and reports will be determined by project personnel and researchers.

- Jon Allan, Director, Office of the Great Lakes, Michigan Department of Environmental Quality
- John Allis, Chief, Great Lakes Hydraulics and Hydrology Office, US Army Corps of Engineers - Detroit District
- Mark Breederland, Extension Educator, Northwest District, Michigan Sea Grant
- Kathryn Buckner, President, Council of Great Lakes Industries
- Matthew Child, Physical Scientist, International Joint Commission, Great Lakes Regional Office
- Gene Clark, Coastal Engineering Specialist, University of Wisconsin Sea Grant Institute
- John Coluccy, Director of Conservation Planning, Ducks Unlimited
- Patrick Doran, Director of Conservation for Michigan, The Nature Conservancy
- Bonnie Fox, Manager of Policy and Planning, Conservation Ontario
- Gail Hesse, Great Lakes Water Program Director, National Wildlife Federation
- Erin Kuhn, Executive Director, West Michigan Shoreline Regional Development Commission
- Wendy Leger, Physical Science Senior Officer, Environment and Climate Change Canada
- Scudder D. Mackey, Chief, Office of Coastal Management, Ohio Department of Natural Resources
- David Powers, Attorney, Smith, Martin, Powers & Knier; Save our Shoreline
- Larry J. Robson, Board Chair, Great Lakes Coalition
- David Sweetnam, Executive Director, Georgian Bay Forever
- Kathy Tank, President, Wisconsin Harbor Towns Association

**Project Personnel**

- Don Scavia, Graham Sustainability Institute Director
- Jen Read, Water Center Director
- John Callewaert, Graham Institute Integrated Assessment Center Director
- Maggie Allan, Graham Institute Integrated Assessment Program Specialist
- Funded Analysis Teams

**Preliminary Budget and Funding Plan**

**Total Project Funding:** \$320,000. All funds have been secured.

Category	Source			TOTALS
	U-M Graham Institute	U-M Water Center	Michigan Office of the Great Lakes	
Personnel/subcontracts for planning grant and analysis team members	\$120,000	\$50,000	\$100,000	\$270,000
2-3 Stakeholder Workshops (logistics, food, and travel for advisory committee members)	\$20,000			\$20,000
Travel for analysis teams and project staff	\$5,000			\$5,000
Communications and materials (e.g. reports for distribution and comment, web materials, project evaluation, student research assistants, etc.)	\$25,000			\$25,000
<b>TOTALS</b>	<b>\$170,000</b>	<b>\$50,000</b>	<b>\$100,000</b>	<b>\$320,000</b>

## **References**

- Hisschemoller, M., R. Tol, and P. Vellinga. 2001. The Relevance of Participatory Approaches in Integrated Environmental Assessment. *Integrated Assessment* 2:57-72.
- International Joint Commission. 2013. International Joint Commission's Advice to Governments on Recommendations from the International Upper Great Lakes Study: A Report to the Governments of Canada and the United States. Available from [http://ijc.org/iuglsreport/?page\\_id=1024](http://ijc.org/iuglsreport/?page_id=1024) (accessed July 8, 2014).
- NRC. 2007. Analysis of Global Change Assessments: Lessons Learned. Committee on the Analysis of Global Change Assessments. National Academy Press, Washington, D.C.
- Pielke, R. 2007. *The Honest Broker: Making Sense of Science in Policy and Politics*. Cambridge University Press, Cambridge.
- Scavia S. and J. Nassauer. 2007. Policy Insights from Integrated Assessments and Alternative Futures. Pages 1-27 in J. Nassauer, M. Santlemann, and D. Scavia, editors. *From the Corn Belt to the Gulf. Resources for the Future*, Washington DC.

**Project website:** <http://graham.umich.edu/knowledge/ia/water-levels>

### **Please direct questions to:**

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