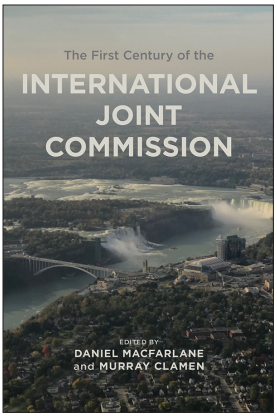
UNIVERSITY OF CALGARY
Press



THE FIRST CENTURY OF THE INTERNATIONAL JOINT COMMISSION

Edited by Daniel Macfarlane and Murray Clemen

ISBN 978-1-77385-108-2

THIS BOOK IS AN OPEN ACCESS E-BOOK. It is an electronic version of a book that can be purchased in physical form through any bookseller or on-line retailer, or from our distributors. Please support this open access publication by requesting that your university purchase a print copy of this book, or by purchasing a copy yourself. If you have any questions, please contact us at ucpress@ucalgary.ca

Cover Art: The artwork on the cover of this book is not open access and falls under traditional copyright provisions; it cannot be reproduced in any way without written permission of the artists and their agents. The cover can be displayed as a complete cover image for the purposes of publicizing this work, but the artwork cannot be extracted from the context of the cover of this specific work without breaching the artist's copyright.

UNIVERSITY OF CALGARY
Press
press.ucalgary.ca

Acknowledgement: *We acknowledge the wording around open access used by Australian publisher,* **re.press**, *and thank them for giving us permission to adapt their wording to our policy* http://www.re-press.org

13

The International Joint Commission and the Evolution of the Great Lakes Water Quality Agreement: Accountability, Progress Reporting, and Measuring Performance

Debora VanNijnatten and Carolyn Johns

The International Joint Commission (IJC) is one of the world's most unique international environmental institutions. Though it was established under the 1909 Boundary Waters Treaty (BWT) primarily to resolve disputes between water users, especially in the Great Lakes–St. Lawrence basin, its role has greatly expanded into environmental and ecosystem governance. In the earliest decades after its establishment, the commission provided the Canadian and American governments with the means to investigate and understand the growing pollution problems in the Great Lakes. However, the IJC soon began to take on an environmental policy advisory role, gently pushing the parties to the treaty—the Canadian and US federal governments—toward a higher level of environmental co-operation in addressing worsening pollution in the Great Lakes basin, and also toward firmer infrastructure to support such co-operation. With the signing of the 1972 Great Lakes Water Quality Agreement (GLWQA), the IJC was given a more supportive role (and additional help in the form of advisory boards), but it also became enmeshed in monitoring and reporting

on the commitments made. Over the course of successive revisions to the GLWQA in 1978, 1987, and 2012 this role in monitoring, reporting on, and assessing the performance of the parties in meeting these commitments has grown.

When discussions began in earnest over 2005 and 2006 on the third (and most recent) "renewal" of the GLWQA, it was clear that Canada and the United States had fallen behind in supporting implementation efforts under the agreement and were ill-prepared to meet new environmental challenges in the basin. The *Twelfth Biennial Report*, compiled by the IJC under the GLWQA and released in 2004, laid out a dizzying array of problems that had not been adequately addressed, and referred to the need for "a greater level of binational communication and cooperation" in order to "better face future threats and address current needs."[1] Debate immediately centred on a familiar concern: How do we better assess and spur performance by the parties in terms of meeting the General and Specific Objectives of the GLWQA?

Indeed, one of the main sections of the *2007 Review of the Great Lakes Water Quality Agreement*, which was intended to provide the parties with a starting point as they contemplated another round of revisions to the agreement, was "accountability and implementation"; this section laid out the need for "establishing specific results, designating responsible entities and improving mechanisms to hold them accountable."[2] According to the review authors, this should include "setting timelines and reporting on progress to achieve the goals of the agreement." Meanwhile, the IJC, given its responsibility for coordinating actions under the GLWQA, was citing the need for "an uncommonly strong Accountability Framework for Great Lakes' restoration and protection."[3] In another report, *Promises to Keep: Challenges to Meet*, a coalition of Great Lakes environmental non-governmental organizations recommended that a renewed agreement provide for greater "accountability for implementation."[4]

Performance was to be a key focus for the 2012 GLWQA, then, and certainly not for the first time since the original 1972 GLWQA came into effect. In fact, it has been a continuing concern. This chapter traces the evolution of water governance in the Great Lakes basin under the IJC with an emphasis on the post-1960 period, during which—as various contributors to this volume note—the commission has done its most important

environment-related work. We focus in particular on efforts under successive versions of the GLWQA to set objectives, assess performance in meeting those objectives, and tighten accountability for this performance. Beginning with a brief look at the binational regime first established under the BWT and its mechanisms for joint accountability, the chapter carefully tracks the increase in the number and breadth of objectives under the GLWQA of 1972, 1978, 1987, and 2012, and the continued difficulties in terms of implementation. It also follows the attempts to hold governments accountable for meeting those objectives through ever more transparent and inclusive approaches, as well as reporting mechanisms. In the 2012 revision to the GLWQA, we see the most varied requirements yet, in terms of measuring and reporting on outcomes as well as asking governments to account for these outcomes.

In examining the various approaches and tools used by the IJC to push for new environmental objectives under the GLWQA and assess efforts by the parties to meet these objectives, the chapter also provides insights into the evolving role of the IJC itself over time. As an international organization, the IJC has worked through governmental, stakeholder, and scientific networks, both vertically across levels of government and horizontally across borders, to foster support for the IJC's oversight role and for the management objectives that have been built into the GLWQA regime. The IJC faces challenges, however, as it navigates the difficult diplomatic and policy terrain associated with "implementation oversight" (as the editors of this collection call it) of the signatory parties. Yet the IJC remains a model in terms of its ability to foster the creation of diverse policy communities that can work collaboratively at multiple governance levels to support achievement of GLWQA objectives. The side benefit is that when one avenue of action is closed, there remain other opportunities for encouraging binational action. In this way, this chapter provides support for the contention made by Murray Clamen and Daniel Macfarlane in their introduction to this volume, namely that the IJC is most certainly "an adaptable governance form."

The 1909 Boundary Waters Treaty and an Environmental Mandate for the International Joint Commission

The BWT was clearly an attempt to settle a long list of pre-existing disputes about the use (and abuse) of the waters of the Great Lakes–St. Lawrence, and other boundary waters, by explicitly shifting the basis of the legal and diplomatic framework to that of a shared perspective, where actions taken by one "High Contracting Party" were not to interfere with the use of the resource by the other party.[5] Further, the BWT subjected "treaty boundary waters," expansively defined, to a new evidence-based dispute-resolution procedure. This procedure, to be applied on a case-by-case basis and in a public manner with the involvement of stakeholders, was to be under the purview of the IJC and its commissioners and staff. The IJC was the guardian of this shared perspective on management of the lakes, the primary arbiter of disputes, and the key channel of communication between governments and between governments and the public on issues relating to the lakes. The text of the treaty was, however, unambiguous as to the hierarchy of relationships: the commission's role was to recommend solutions and, during the course of its advisory operations and dispute-resolution tasks, report to the governments. Final decisions and implementation were left to the parties themselves.

While prioritizing commercial and navigable uses in article i, the BWT also introduced a key pillar of the binational regime that would serve as the foundation for the parties to undertake joint environmental management later in the century. Article iv states that "the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other." The IJC thus became responsible, under the BWT, for administering a joint regime that upheld (indeed, protected) the economic uses of the basin waters yet also introduced pollution concerns; that subjected uses of basin waters to a high level of public scrutiny; and that did so in a manner that was to be consultative and evidentiary, with emphasis placed on the importance of science in managing basin waters. This reflected concerns at the state, provincial, and local levels around this time (as Benidickson details in chapter 3 of this volume); public officials were increasingly

lamenting the impacts of local sewage and other wastes on waterways at the same time that scientists were determined to bring down rates of typhoid and other waterborne illnesses.

The provision in the BWT for the IJC to consider pollution impacts, and to do so in an evidence-based manner, was quickly set in motion. In 1912, the two national governments asked the IJC to investigate the pollution of boundary waters and undertake "the most expansive bacteriological examination of waters the world has ever known."[6] In his chapter, Benidickson highlights the truly joint nature of the study, which involved public health experts from both countries. The resulting report from the commission in 1918 drew attention to widespread problems stemming from sewage and ship discharges,[7] and showed that the pollution was indeed transboundary,[8] in direct violation of the BWT. It recommended that the IJC be given "the necessary jurisdiction and authority . . . to make such rules, regulations, directions and orders as in its judgment may be deemed necessary" to regulate and prohibit pollution of boundary waters.[9]

However, jurisdictions around the basin—and the parties themselves—were preoccupied from the 1920s to the 1940s with shipping, industrialization, fishing, and other economic activities—not with pollution.[10] It was not until after the Second World War that governments turned their attention more formally to pollution problems along the shared border.[11] Industrial waste, human sewage, and human-made chemicals began to have sustained ecosystem effects. Lake Erie, the shallowest of the lakes, showed serious signs of stress in the form of massive, lake-wide algal blooms (mats of algae) that severely depleted oxygen levels and resulted in the decline of several fish species and massive fish kills. Combined with major episodes of drought and water shortages, public and societal groups, including fishing, hunting, and women's groups, demanded government action.[12] Acting on references from the two federal governments in the late 1940s and '50s to investigate pollution problems at several "connecting channels" in the shared basin, the IJC conducted comprehensive physical, bacteriological, and chemical analysis of domestic and industrial wastes in these channels, and recommended that remedial measures and water quality objectives be put into place in these areas.[13] However, with the persistent inability of governments in the channels to meet the water quality objectives, and the knowledge that pollution

problems were accelerating with industrial and population growth around the basin, Canada and the United States asked the IJC in 1964 to broaden its investigative scope and report on whether "the waters of Lake Erie, Lake Ontario, and the International Section of the St. Lawrence River are being polluted on either side of the boundary to an extent which is causing or is likely to cause injury to health or property on the other side of the boundary," as well as the causes of this pollution and remedial measures that could be taken.[14]

Meanwhile, public concern mounted with regard to the deterioration of water quality. Shocking events, including large-scale fish kills in Lake Erie, the Cuyahoga River in Cleveland, Ohio, catching fire in 1969 due to extremely high levels of pollutants in the water, and the contamination of the walleye fishery by mercury, all brought environmental issues to the forefront of government attention. These events stimulated citizens to push for basin-wide action by the Canadian and US governments, as well as more public accountability on the part of the parties.[15]

The final reference report submitted to the governments in 1970 by the IJC ended up serving as the basis for negotiations on a new binational agreement to address pollution in the Great Lakes (Jennifer Read addresses this in chapter 11 of this volume). The report, which built on technical and scientific work conducted by agencies in the two countries, as well as by the advisory boards and the IJC's own Interim Reports to the governments in the 1960s, found that "the increased quantity and the different composition of municipal and industrial wastes in the last two decades, as well as the residual characteristics of materials discharged into the Lakes, have led to dramatic changes in the biological condition of the Lower Great Lakes System."[16] After outlining a long list of pollution threats to the lakes—including nutrient loadings to the lakes (in particular phosphorus), eutrophication, oil and watercraft pollution, bacterial contamination and toxics such as mercury—the report concluded that "there is no doubt that contaminants entering Lake Erie and Lake Ontario from one country move across the boundary and affect the water quality in the other country."[17] Given this unambiguous conclusion, discussions turned to creating a firmer framework for environmental management in the basin, one that set clear objectives and provided the means for tracking and supporting implementation.

Performance Measurement Comes to the Great Lakes

There are increasing political pressures on governments everywhere to demonstrate that their interventions bring benefits to the environment, and these pressures have intensified as countries continue to struggle with deficits and accumulated debt. Performance measurement, rooted in the new public management models of the 1990s,[18] can be understood as the process of developing and using tools to assess progress in achieving predetermined goals. With growing global concern about water governance, especially in relation to climate change, international organizations such as the United Nations (UN), through its Sustainable Development Goals (SDGs), and the Organisation for Economic Co-operation and Development (OECD), through its water governance program, have been keenly interested in assessing and promoting better water governance and policy regimes using performance assessment. Those who practise performance measurement in environmental and water policy focus on analyzing both the objectives of the policy (i.e., are they appropriate? properly defined? achievable? ambitious enough?) as well as with how to measure results or outcomes against these objectives.[19]

Early attempts to measure ecosystem/water outcomes, beginning in the 1970s, when government mandates to protect the environment were expanding,[20] pioneered the use of "proxy" values, or "indicators," as a way of judging performance. Indicators are metrics, generally quantitative, designed to provide information on the state or condition of something and, when tracked over time, to highlight progress or change in relation to specific program objectives. *Outcome* indicators related to water are numerous; they have been developed as part of broader environmental indicators of water quality/quantity;[21] for water security;[22] for water stress;[23] for water poverty;[24] and for international assessments and comparisons.[25]

Beginning in the late 1990s, however, analysts began to differentiate between outcome indicators (e.g., for ecosystems or water systems) and *societal or program response* indicators.[26] The OECD, other international organizations, and many countries, influenced by the enhanced focus on performance management, began to develop suites of indicators and benchmarks related to measuring government *efforts* in implementation.

This new focus concentrated discussions on understanding the program, policy, and process tools being used to respond to specific ecosystem challenges, and determine whether these were sufficient to support the achievement of objectives.[27] Performance measurement using response indicators thus also involves investigation into *why* objectives may not have been met (i.e., have government entities provided sufficient program and resource support for meeting objectives?).

Debates about environmental policy performance have most recently focused on the need for indicators that provide us with more "horizontal" knowledge about the capacity to support the general aims of environmental management. These so-called *governance* indicators can help us to understand the factors that might contribute to broader performance failures—namely implementation deficiencies across programs, across sectors, and across systems. For example, do governance efforts effectively include and link those decision-makers and communities that are critical for addressing the challenges at hand? Do we have consistent and predictive information on which to base our efforts, with a view to forward-planning? What is the state of collective investment and efforts to implement agreements and policies?

These discussions about societal response and governance indicators highlight the fact that performance assessment is not just about measuring outcomes; it also has democratic roots (i.e., to what extent are governments doing what they say they are going to do and to what extent are they responsive to public concerns?). Much of the literature on the role of the IJC related to environmental quality and the GLWQA has focused on how the institution gets answers to these questions.[28] In a very general sense, accountability can operate "upward," which implies answerability to elected leaders, or "downward" to the public. Certainly, lines of accountability within the framework of binational Great Lakes institutions are more complex and cannot work as they do domestically, but the IJC is subject to both "up" and "down" accountability. It is clear that the IJC is accountable to the parties in carrying out its functions under the treaty (water apportionment and references), as well as in its reporting duties. However, the idea that the parties and the IJC should respond to public concern is firmly rooted in the 1909 BWT (as discussed above) and in successive versions of the GLWQA (as discussed in the next section). As a result of

this, as Krantzberg points out (in chapter 12 of this volume), a "strong and organized public" has emerged that has helped "push for implementation and sustained momentum" in following through on ecological recovery goals, reinforcing "downward" accountability relationships.

Our discussion below of the evolution of a Great Lakes water management regime highlights several characteristics with respect to experience in the basin with performance assessment over time. First, we note that the objectives of the management regime have continued to expand under successive versions of the GLWQA, becoming both increasingly broad yet also more numerous, with the result that the measurement of outcomes has become an ever more difficult and complex task. At the same time (and somewhat perversely), the pressure to provide accountability and track governance performance has increased over the course of successive renewals of the GLWQA. In this respect, outcomes have been emphasized but so, too, has the way that decisions are made, prioritizing input from stakeholders and the scientific community, and layering additional reporting requirements and mechanisms into updated agreements. In line with this expansion of accountability requirements, the IJC's role and capacity has also grown, particularly in terms of performance assessment, but so has that of the parties. This has led, perhaps unsurprisingly, to increased tensions between the commission, which performs the accountability functions, and the parties, who are responsible for implementation. However, the IJC's ability to network with governments and communities at various levels, with a wide variety of stakeholders, and with the academic community, has supported its position in the accountability and performance regime. Valiante and colleagues refer to this as the IJC's ability to create "a binational community external to the formal regime."[29] This external accountability role has broadened in scope over the past four decades.

The 1972 Great Lakes Water Quality Agreement

In 1972, Canada and the United States committed to addressing pollution within the Great Lakes ecosystem under the umbrella of a new binational approach under the GLWQA. In light of "the grave deterioration of water quality on each side of the boundary," the agreement aimed—quite

ambitiously—to "restore and enhance water quality," as well as to prevent future pollution.[30] In a manner similar to the 1909 treaty, it established the lakes as a shared "commons" and the two nations as jointly responsible stewards of this freshwater resource.

The agreement, which is an "executive agreement" between the two countries and does not bind them in the same way that the BWT does, has been described as "unprecedented in scope." Indeed, it was unique in several respects. First, it laid out basin-wide General Objectives enjoining the signatory parties to keep the waters free of putrescent, floating, or foul-smelling materials, toxic discharges, and also excessive nutrients.[31] Specific Objectives were aimed at reducing levels of nutrients, fecal coliform, dissolved solids, iron, and other pollutants in the lakes.[32] Interim objectives were also set for mercury and other heavy metals, organics, oils, and petrochemicals, as well as suspended solids.[33] Further, the parties agreed to meet within one year to set objectives for a range of other contaminants.[34] Annex 2 of the agreement contained a detailed list of objectives for phosphorus loadings from various sources.

Secondly, the parties committed to various implementation measures to meet these objectives—specifically, to put in place municipal and industrial pollution control programs and also to engage in binational co-operative programming.[35] The IJC was to support achievement of the objectives through the monitoring, collection, analysis, and dissemination of water quality data, and provision of advice based on these data.[36] Moreover, the commission would be aided by a new Great Lakes Water Quality Board (composed of senior representatives of the federal, state, and provincial governments), a Research Advisory Board (composed of research managers), and a Regional Great Lakes Office, which the IJC would administer.

Finally—and importantly for our purposes here—the 1972 agreement also provided several accountability mechanisms for tracking performance. The agreement demands consultation between the federal governments as well as periodic reviews of "the operation and effectiveness of the Agreement as a whole."[37] The IJC was mandated to report annually on progress in achieving the water quality objectives set out in the agreement,[38] as well as to report on any other matter, either as requested by the parties or any matter during "the discharge of its functions under the

Agreement."[39] In most instances, IJC reporting was to be done to the parties but also state and provincial governments.[40]

These provisions in articles 3 and 4 of the 1972 GLWQA constituted the first formal reporting requirements for the IJC. This seemed to imply that, given these reporting authorities, the IJC would also be implicated in performance assessment in terms of the follow-through on commitments made in the agreement. However, this immediately set up a tension between the authority to report on performance, which was lodged with the IJC under the 1972 agreement, and the authority to actually implement the commitments, which resided with the Canadian and American governments as the signatory parties to the GLWQA. This tension would become more apparent over time as commitments under the GLWQA increased.

In addition to these accountability requirements, article vi requested that the IJC inquire into and report on "pollution of the boundary waters of the Great Lakes System from agricultural, forestry and other land use activities."[41] The IJC established the International Reference Group on Great Lakes Pollution from Land Use Activities (PLUARG) to plan and implement the requested study, focusing its research agenda on land use and land-use practices, as well as trends and projections on land-use patterns and practices, and also provide detailed surveys of selected watersheds to determine the sources of pollutants. The final PLUARG report, released in 1978, outlined serious pollution sources and issues such as phosphorus that still plague the Great Lakes to this day; indeed, the group highlighted the need for increased action on many fronts, helping to set the stage for a renewal of the GLWQA.

The 1978 Revisions

As concerns deepened over the lack of progress in dealing with existing and new forms of pollution in the basin waters, the 1972 GLWQA was replaced by a new agreement in 1978. The US administration had not provided support for implementing commitments in the 1972 agreement and, on the northern side of the border, Canada's record of forcing industries to comply with the Specific Objectives had been disappointing.[42]

The 1978 GLWQA built upon the pillars established in the 1972 agreement, though it also introduced the more complex "ecosystem approach"

into the water quality management regime, thus recognizing that "a much more systemic perspective was required to understand the problems and what might be done about them."[43] As Krantzberg notes in her chapter in this volume, an ecosystem approach also serves to institutionalize multi-stakeholder decision-making in order to consider a much broader range of human impacts on the water and ecosystem quality. Indeed, the 1978 revisions adopted a more holistic view of the "Great Lakes basin ecosystem," which included the interacting components of air, land, water, and living organisms—including humans—within the drainage basin of the Great Lakes and the international section of the St. Lawrence River. Further, the 1978 agreement called—ambitiously—for the "virtual elimination of persistent toxic substances" in the Great Lakes ecosystem by adopting a philosophy of "zero discharge" of inputs.

A list of toxic chemicals was established for priority action. More specially, new provisions were added in the 1978 agreement to address pollution from assorted land-use activities and the effect of air pollution on Great Lakes water quality. New, stricter water quality objectives were announced, in order not only to maintain but also to restore water quality in the lakes. These changes represented a broadening of the goals underlying the GLWQA regime, both in terms of the management approaches to be taken and the pollutants to be addressed, and a requisite expansion of the expectations on governments with respect to environmental and water quality in the basin. And, to meet these expectations, the parties agreed to provide financial assistance to construct waste treatment facilities[44] and to coordinate planning programs that monitor the discharge of pollutants in the Great Lakes[45]—both of which had been missing from the 1972 agreement.

New accountability provisions were also added to the 1978 agreement. First, the agreement required review of the Specific Objectives by both parties[46] and by the IJC, which was also to make "appropriate recommendations" on progress achieved.[47] In this respect, the United States and Canada were enjoined to consult on the establishment of new or stricter Specific Objectives "to protect the beneficial uses from the combined effects of pollutants," and they were also to "consult on pollutant loading rates for each lake basin so as to preserve the total Great Lakes system."[48] Also significant was the new requirement that Canada and the

United States maintain an inventory of pollution abatement requirements, complete with compliance schedules and status reports, and make it available to both the IJC and the public;[49] this was included "in order to gauge progress toward the earliest practicable completion and operation" of both municipal and industrial pollution control programs.[50] Finally, the IJC was required to report biennially to the parties—rather than on the annual basis set out in the 1972 GLWQA—on the progress made toward fulfilling the water quality objectives. This change recognized the difficulties associated with collecting appropriate data on an annual basis. In general, as the IJC itself notes, "since the 1978 revision, the International Joint Commission has served as an independent assessor of the progress made by the two governments in achieving the Agreement's objectives."[51]

The 1983 Supplement

When the revised 1978 GLWQA was signed, Rasmussen, in his analysis of the changes, expressed considerable doubt that the two governments would improve implementation under the new agreement, given the lack of commitment they had to that point exhibited in adopting enabling national legislation to support implementation of the water quality objectives set out in the agreement and providing the requisite funds for the implementation of such legislation.[52] In the United States, the Nixon administration had refused to fund needed infrastructure around the basin and, even after the 1978 revisions drew attention to continuing implementation problems, the Carter administration's record in funding Great Lakes water quality commitments was little better. Rasmussen had also noted a distinct lack of political enthusiasm for the revised agreement, which, he surmised, would translate into low levels of political will in moving forward on GLWQA commitments.

In response to the continuing inability of the parties to address the problem of the eutrophication of Lake Erie, the agreement underwent further revision in 1983 when a Phosphorus Load Reduction Supplement was added to Annex 3 of the 1978 GLWQA. As a result, detailed plans to reduce phosphorus loading to receiving waters were developed and adopted by each jurisdiction in the basin. The 1983 Supplement contained no changes in terms of accountability and performance mechanisms or indicators, yet

this addition represented a growing recognition that there would need to be more accountability and reporting related to the annexes dealing with specific issues, such as this one dealing with phosphorus loadings. There was also growing pressure for more public involvement and proposals that the IJC "should make a fundamental shift in its primary role to that of an environmental watchdog, an advocate for an ecological perspective on both sides of the border."[53] Interestingly, it was noted at the time that "the occasional ambivalence of governments is certainly less significant than the general conviction among them and the public that the IJC has become an indispensable instrument for both countries."[54]

The 1987 GLWQA: New Scales of Action and Accountability

There had certainly been some signs of progress in addressing environmental problems in the Great Lakes between 1973 and 1985, as governments attempted to deal with municipal and industrial discharges. It was clear by the mid-1980s, however, that serious pollution problems remained. An estimated 57 million tons of liquid waste were being poured into the Great Lakes annually by its inhabitants, their industries, and their municipalities,[55] and the degraded state of ecosystems was well documented by scientists working at institutions like the National Water Resources Institute, Canada Centre for Inland Waters, Environment Canada, and the US Environmental Protection Agency (EPA).

In 1987 the two national governments again renewed the GLWQA with a concerted focus on the most polluted watersheds in the region. Studies conducted by the IJC prior to the renegotiation had identified forty-three "Areas of Concern," or AOCs, that were particularly problematic watersheds with serious pollution and governance challenges (see Figure 13.1). Remedial Action Plans (RAPs) were to be created for each AOC in order to address "Beneficial Use Impairments" (BUIs) (see Figure 13.2).

The agreement listed a total of fourteen BUIs that could result from various types of water pollution—heavy metals, pathogens, contaminated sediments, and toxic chemicals. In each AOC, multi-level and multi-stakeholder governance institutions were engaged to develop and implement

Figure 13.1. Areas of Concern in the 1987 GLWQA (2018). Used with the permission of Environment and Climate Change Canada.

the RAPs. BUIs were the agreed-upon indicators that must be addressed in order for an AOC to be "delisted"—the *key* metric of progress in cleaning up polluted watersheds.

The revised agreement also ushered in the development of Lakewide Management Plans (LaMPs) to address whole lake contamination by persistent toxic substances. To support these initiatives, the 1987 GLWQA was further broadened through the addition of new annexes addressing nonpoint contaminant sources (associated with land-use activities identified a decade earlier through PLUARG); contaminated sediment; airborne toxic substances; contaminated groundwater; and associated research and development. In addition, the expanded list of Specific Objectives, contained in the revised Annex 1, is striking when compared with the much shorter list in the original 1972 agreement.

Figure 13.2. Beneficial Use Impairments in Great Lakes Areas of Concern. Source: *Progress Report of the Parties* (2016), 12–13.

1. Restrictions on Fish and Wildlife Consumption
2. Tainting of Fish and Wildlife Flavor
3. Degraded Fish and Wildlife Populations
4. Fish Tumors or Other Deformities
5. Bird or Animal Deformities or Reproductive Problems
6. Degradation of Benthos
7. Restrictions on Dredging Activities
8. Eutrophication or Undesirable Algae
9. Restrictions on Drinking Water Consumption or Taste and Odor Problems
10. Beach Closings
11. Degradation of Aesthetics
12. Added Costs to Agriculture or Industry
13. Degradation of Phytoplankton and Zooplankton Populations
14. Loss of Fish and Wildlife Habitat

Accountability provisions were also tightened and decentralized. The IJC had played a critical role in the decade leading up to the 1987 agreement, and the new agreement reinforced the IJC's investigative role with specific reporting responsibilities related to the GLWQA. In effect, the IJC was given a "standing reference" and "permanent watchdog role" in the Great Lakes.[56] Biennial reporting would continue, but on the broadened range of objectives that now included AOCs and LaMPs. In fact, the language regarding the biennial report was quite strong: "This report shall include an assessment of the effectiveness of the programs and other measures undertaken pursuant to this Agreement, and advice and recommendations."[57] Performance was thus clearly in focus, particularly vis-à-vis the RAP process, which focused on tracking the delisting of BUIs in every AOC. Further, the new provision in the 1987 protocol

FIGURE 13.3. Objectives set for the 1972, 1978, 1987, and 2012 versions of the Great Lakes Water Quality Agreements. Source: *Progress Report of the Parties* (2016), 6.

1972	April 15, 1972	Prime Minister Pierre Trudeau and President Richard Nixon sign the first Canada-United States Great Lakes Water Quality Agreement (GLWQA). The 1972 GLWQA committed Canada and the United States to restore and enhance water quality in the Great Lakes ecosystem and established basin-wide water quality objectives and binational commitment on the design, implementation and monitoring of water quality programs. The focus of the 1972 GLWQA was on phosphorous loadings and visible pollution.
1978	November 22, 1978	While reaffirming and building upon the 1972 GLWQA, the 1978 GLWQA introduced the ecosystem approach to the management of Great Lakes water quality. It also called for the virtual elimination of persistent toxic substances in the Great Lakes ecosystem by adopting a philosophy of "zero discharge" of inputs and established a list of toxic chemicals for priority action.
1983	October 16, 1983	A Phosphorous Load Reduction Supplement was added to Annex 3 of the 1978 GLWQA, outlining measures to reduce phosphorous loading throughout the basin. As a result, detailed plans to reduce phosphorous loading to receiving waters were developed and adopted by each jurisdiction in the basin.
1987	November 18, 1987	The 1987 GLWQA called for: 1) the adoption of ecosystem objectives for the lakes; 2) the development and implementation of Remedial Action Plans to restore significantly degraded areas around the Great Lakes identified as Areas of Concerns; and 3) Lakewide Management Plans to address whole lake contamination by persistent toxic substances. The 1987 GLWQA was further broadened through new annexes addressing: non-point contaminant sources: contaminated sediment; airborne toxic substances; contaminated groundwater; and associated research and development.
2012	September 7, 2012	Canadian Minister of the Environment Peter Kent and United States Environmental Protection Agency Administrator Lisa Jackson sign the 2012 GLWQA. The 2012 GLWQA comprehensively addresses today's Great Lakes water quality issues by: 1) modernizing provisions related to excessive algae growth, chemicals, pollution from ships and scientific research; 2) incorporating new commitments to address significant challenges such as the degradation of the nearshore, the threat from aquatic invasive species and climate change, and the loss of habitat and species; and 3) strengthening provisions for governance, accountability, and engagement of government and non-government entities and the public.

Figure 13.4. Performance Assessment, Accountability and Reporting Mechanisms in the 1972, 1978 and 1987 versions of the Great Lakes Water Quality Agreements. Figure created by authors.

1972	Annual Report on progress in achieving Objectives to Parties and information to states/provinces
	Ability to report on any other matter "during `the discharge of its functions under the Agreement"
1978	Biennial reporting
	Reporting by both IJC and Parties on progress achieved
	Introduction of concept of impact of pollutants on "beneficial uses" (BUIs)
	Parties required to make inventory of pollution abatement requirements with compliance schedules and status reports to IJC and public
1987	Biennial reporting on expanded range of Objectives, AOCs and LaMPs * Importance of BUIs in reporting on/delisting AOCs
	Lakewide Management Plans
	Provision to set "lake ecosystem objectives" for each Lake, along with ecosystem health indicators to assess progress towards reaching these objectives

that "lake ecosystem objectives" for each lake be established, along with "ecosystem health indicators" to assess progress toward these objectives,[58] represented a step further down the road to performance assessment, now using indicators.

If we look across the various revised agreements, Figure 13.3 highlights the changes in terms of objectives, from the original 1972 GLWQA through the 1978 and 1987 revisions. Figure 13.4 then provides our summary of alterations in the accountability and reporting regime.

Figures 13.3 and 13.4, and the discussion above, highlight two trends. First, we can see the expansion of objectives over the course of successive agreements vis-à-vis the ever longer list of pollutants and ever more annexes addressing specific problems; higher expectations embedded in new approaches such as ecosystem management and the virtual elimination

of pollutants; and also the need for concerted follow-through on the BUI system (which constituted outcomes indicators) for RAPs and LaMPs. Second, alongside this broadening of programming and responsibility under the GLWQA came enhanced reporting responsibilities. Third, it is also evident that the enhanced reporting requirements were directed not only at the parties to the GLWQA (the national governments) but also to other audiences, including governments at other levels, as well as a broader range of communities, from local stakeholders, organized environmental interests, scientists, and those involved in RAP citizen advisory committees and working with LaMPs.

Accountability and Reporting by the Early 2000s

Despite the ambitious policy goals set out in the 1987 agreement, such as the commitment to virtually eliminate toxics, as well as the signing of new agreements like the 1997 Great Lakes Binational Toxics Strategy, implementation and policy efforts on the part of governments around the basin waned in the 1990s and into the 2000s. The lack of transboundary policy effort and domestic political will, were particularly evident in the slow progress cleaning up the most polluted sites on the Great Lakes.[59] Some twenty years after the 1987 and newer agreements had been established, over half of the basin's original wetlands had been lost, and miles of rivers and shoreline remained degraded.[60]

Significantly, the BUIs highlighted in the 1987 agreement had become an increasingly visible way of measuring the progress in addressing Great Lakes pollution—or, rather, the lack thereof. For each AOC, the impairments to specific beneficial uses were determined in phase 1 of the RAP, after which phase 2 would focus on restoring the beneficial uses that had been impaired. If all uses could be restored, this indicated that remediation of the AOC had been completed and ecosystem health restored. The AOC could thus be "delisted." However, by 2007, only three AOCs had been delisted (two in Canada and one in the United States),[61] and progress in the remaining AOCs and many other watersheds in the Great Lakes remained slow as pollution continued.

The State of the Great Lakes Ecosystem Conference (SOLEC) reports, released every two years between 1994 and 2008, indicated that

the increasing number and imbalance of water uses continued to have negative impacts on water quality. Environment Canada and the US EPA had been leading the SOLEC assessments for the parties since 1994, when the first State of the Great Lakes report was released. In 1998, a suite of outcome indicators was introduced to allow for consistent and comprehensive assessment, as well as comparability across reporting cycles.[62] In the early 2000s, several new and re-emerging issues surfaced in the Great Lakes, including evidence of pharmaceutical chemicals; the enduring problem of the importation of invasive species;[63] the plateaued progress in addressing the "dead zone" in Lake Erie; and increasing concern about climate change and water levels.[64] Some forty years after the first GLWQA, as well as the implementation of various policy initiatives in the United States and Canada, the basic objectives of swimmable, drinkable, fishable waters had not been met, and forty of the AOCs remain the most polluted sites in the region.

In terms of performance assessment, in the decade prior to the signing of the 2012 GLWQA, binational progress reporting had virtually stopped. The last binational SOLEC jointly hosted by Environment Canada and the EPA was held in 2011, with conference presentations focusing on land-based issues that impact water quality and the health of the Great Lakes. The last SOLEC report in 2011 showed that progress had plateaued and even declined on several indicators.[65] There has not been a SOLEC or report since, and the International Association of Great Lakes Research conference, binational.net, and other forums seemed to informally replace SOLEC and scientific progress reporting.

A 2011 IJC report focusing on a twenty-five-year assessment of scientific and ecosystem indicators highlighted some successes, but also many outstanding challenges.[66] Although US legislation required reporting and the EPA continued reporting, the Canadian Senate and the Commissioner of the Environment and Sustainable Development were becoming vocal about the fact that efforts and reporting under the GLWQA had declined, and that the IJC's role in holding the parties accountable for implementation of the agreement had been undermined.[67] Moreover, the Canada-Ontario implementation agreements—which set out the roles and financing for programming on the Canadian side—were weakened and even suspended.[68]

In 2006, the IJC initiated a public consultation on the GLWQA and submitted a report to the Canadian and US federal governments expressing concerns about the lack of progress, reporting, accountability, and its own ability to fulfill its role:

> Over the years, the Commission's ability to carry out its mandate has been limited because, among other things, the governments have not followed many of the reporting requirements set out in the Agreement and have not provided all the information the Commission and the public require to evaluate progress. Shortcomings in monitoring and reporting need to be addressed in order for the Commission to be able to carry out its responsibilities more effectively.[69]

The IJC called for a new "action-oriented" agreement with "clear accountability provisions," a binational steering committee, more public involvement, and "requisite resources."[70] It also asked for "a reference in the new Agreement, pursuant to Article IX of the Boundary Waters Treaty, that gives a more clear and meaningful role to the Commission in implementing the agreement by: evaluating progress through Commission assessments, reports, and public consultations; identifying emerging issues and suggesting solutions; and facilitating collaboration among all Great Lakes basin interests."[71]

There were also calls from environmental groups and activists for an updated agreement; one report from the Alliance for the Great Lakes flagged concerns about gaps in surveillance and monitoring programs, the slow pace of moving forward with the progress indicators called for in 1987, and the need to improve research coordination and increase research funding.[72] In fact, the communities that had become increasingly involved and invested in GLWQA programming and the work of the IJC—working with the RAPs, LaMPs, water quality initiatives, and the academic community—were pushing for action to address the implementation deficits. Krantzberg (chapter 12 in this volume) also notes the key role of the Water Quality and Science Advisory Boards in fostering a collaborative environment for joint action. The result, as Clamen and Macfarlane note in the

introduction to this volume, is that the IJC "increasingly incorporated transnational policy networks [and] public feedback."

Soon after the election of President Obama in 2008, change seemed to be in the offing with the announcement of a major Great Lakes environment and economy effort. The Great Lakes Restoration Initiative (GLRI), unveiled by the administration in 2009, contained an investment of $500 million (allocated over the 2010–14 period) for the basin, creating a well-funded program for state and societal actors to re-engage in Great Lakes efforts. A series of reviews and reports leading up to the BWT's and the IJC's hundredth anniversaries also fed the momentum to update the 1987 agreement. Meanwhile, scholarly observers were documenting the lack of progress on many fronts and at all levels,[73] and indicating that the parties needed to address the "implementation deficit" that existed despite numerous laws and institutions with policy mandates in the Great Lakes.[74] Finally, in 2009 it was announced by US Secretary of State Hillary Clinton and Canadian Minister of Foreign Affairs Lawrence Cannon that the two countries would renegotiate the GLWQA, last signed in 1987, with considerable input from the US EPA and Environment Canada.

The 2012 Revision and a Heightened Emphasis on Accountability and Performance Indicators

After three years of renegotiation, the new GLWQA was signed in 2012, renewing interest in policy objectives and implementation efforts. Canada and the United States significantly revised the GLWQA to strengthen and "modernize" it. Essentially, the 2012 GLWQA reflects a binational consensus that existing laws, policies, and institutions are sufficient and that, instead, the focus needs to be on improving the performance of both transboundary and domestic implementation efforts to attain better results than those achieved over the last forty years.[75]

Notable in the revised 2012 agreement, Canada and the United States have established a "comprehensive shared vision and common objectives as well as commitments to science, governance and action"[76] aimed at supporting efforts to restore and protect Great Lakes water quality and ecosystem health. As part of this vision, the 2012 revisions add the

"precautionary principle," "polluter pays," and "adaptive management" as key principles and approaches guiding implementation of the agreement.[77] This expands even further the scope of responsibility the governments have taken on and also the role of the IJC in monitoring actions by all levels of government related to the General and Specific Objectives of the agreement. Something that has galvanized renewed policy efforts since the 2012 agreement was signed is the increased importance both countries have placed on engaging the broadest range of governments, interest organizations, and the public in the restoration and protection of Great Lakes water quality. The principles and approaches set out in article 4(k) now include "incorporating Public opinion and advice, as appropriate, and providing information and opportunities for the Public to participate in activities that contribute to the achievement of the objectives of this Agreement."[78] The IJC notes, on its website explaining the new agreement, that "the involvement and participation of State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, local public agencies, and the Public are essential to achieve the objectives of the Agreement."[79]

Significantly, the agreement lists "accountability" as first among its "Principles and Approaches"; here, accountability is defined as "establishing clear objectives, regular reporting made available to the Public on progress, and transparently evaluating the effectiveness of work undertaken to achieve the objectives of this Agreement."[80] Support for this focus on accountability can be found vis-à-vis the General and Specific Objectives and the annexes, several of which—such as Annex 9 on Climate Change—are new. Annex 10 on Science is a new version of a previous annex on prioritizing research that commits the parties to establishing science-based ecosystem indicators "to anticipate emerging threats and to measure progress in relation to achievement of the General and Specific Objectives of the [GLWQA]."[81] Progress reporting has become even more central to implementation—both in terms of public forums and progress reports. In addition to biannual Great Lakes Executive Committee meetings and public forums every three years, there are now three important progress reports: the Progress Report of the Parties (PRP) covers binational and domestic actions related to the implementation of the agreement; State of the Great Lakes (SOGL) reports also prepared by the parties; and

the IJC's Triennial Assessment of Progress (TAP) report. In contrast to the PRP, which is organized around the annexes in the GLWQA, the SOGL indicators and the IJC TAP reports are organized according to the nine General Objectives set out in the agreement.

The first progress report on the "operationalization" of the new 2012 GLWQA was the PRP released in 2016. In addition to highlighting the actions led by the US EPA and Environment and Climate Change Canada, the report follows the structure of the 2012 agreement, addressing the progress of the parties in relation to the thirteen articles of the agreement setting forth the overall goals and "mechanics" of the agreement. The remaining sections address the progress of the parties in relation to each of the agreement's ten annexes. This report clearly outlines how the newly established implementation structures with designated actors accountable for action made significant progress in the three-year period following the new agreement. In contrast to the previous two decades, in which very limited progress was evident, the parties did make progress on several fronts.[82] One major area in this respect relates to performance indicators and recasting SOLEC into a formal SOGL report.

The SOGL report describes "basin-wide environmental trends and lake-specific conditions using ecosystem indicators." Most of the indicator work falls to the Ecosystem Indicator and Reporting (EI&R) Task Team under Annex 10. The parties have been updating and revising the suite of ecosystem (outcome) indicators previously used in SOLEC reports, using key indicators as the basis of collecting and aggregating relevant scientific information. Content from the first SOGL report was presented at the Great Lakes Public Forum in October 2016 and the technical report was released in June 2017.[83] The report focuses on nine indicators that align with the nine General Objectives in the GLWQA. The nine indicators contain forty-four sub-indicators to assess progress over time and "how the lakes are responding to management actions," including basin-wide data and lake level data to report on: current status (good, fair, poor, undetermined) and trends over time (improving, unchanging, deteriorating, undetermined). As noted in the *State of the Great Lakes 2017 Technical Report*:

Table 13.1 State of the Great Lakes 2017

Indicator	Status	Trend
Climate Change and Watersheds	Fair	Unchanging
Habitat and Species	Fair	Unchanging
Invasive Species	Poor	Deteriorating
Nutrients and Algae	Fair	Unchanging-Deteriorating
Groundwater	Fair	Undetermined
Toxic Chemicals	Fair	Unchanging-Improving
Fish Consumption	Fair	Unchanging-Improving
Drinking Water	Good	Unchanging
Beaches	Fair-Good	Unchanging

Source: *State of the Great Lakes 2017 Highlights Report*, 2017.

> No one agency or organization has the jurisdiction or the capacity to monitor, manage, restore and protect an ecosystem as large as the Great Lakes so assessing the environmental conditions of the Great Lakes using ecosystem indicators involves hundreds of people from many agencies and organizations on both sides of the border. The information in this document, has been assembled with involvement from more than 180 scientists and experts from the Great Lakes community within Canada and the United States. These experts represent over 30 different agencies and organizations.[84]

The parties' first report on the state of the Great Lakes, using the new indicator suite, assessed the overall environmental condition of the lakes as "fair and unchanging." As outlined in Table 13.1, this status is evident across most of the nine General Objectives and associated indicators.

The nearly 100-page technical report is very impressive; it was followed by the 2017–19 "priorities for science and action," which guided next steps related to each of the GLWQA annexes and provided ongoing updates and reporting on binational.net. The *State of the Great Lakes 2019 Highlights Report* was released at the Great Lakes Public Forum in June

2019 and the *State of the Great Lakes 2019 Technical Report* will be released sometime in 2019, after the writing of this book.

These reporting requirements have further strengthened the accountability provisions of the agreement and, perhaps most importantly, have encouraged governments to continue to think about how progress might be measured. Indeed, both the IJC and the parties have spent considerable time and effort over the past few years developing the indicators for reporting purposes and collecting the relevant data. The IJC had also initiated work on performance measures in its 2011 report[85] by including the traditional SOLEC indicators and adding performance measures for AOCs and beaches. Further, they commissioned a report in 2013 exploring the idea of GLEEM—Great Lakes Environmental Effectiveness Metrics[86]—and organized an Indicators Workshop in 2014, where experts and stakeholders were brought together to discuss the existing ecosystem health and human health indicators, as well as potential response and program effectiveness indicators. In 2015, the IJC also tested the GLEEM approach and method related to two General Objectives outlined in the GLWQA (beaches and invasive species) using surveys of experts and stakeholders in the region to independently assess indicators, progress, and achievements.[87] However, as the parties moved ahead with their own indicators work, the IJC then seemed to take a "wait and see" approach, viewing its role as primarily to review and comment on the indicators the parties developed and made public at the Great Lakes Public Forum in October 2016.

The IJC began work on their Triennial Assessment of the Parties (TAP) report without initially having access to the PRP and SOGL reports (they were released in 2016 and 2017, respectively). Pursuant to article 7.1 (k) of the 2012 GLWQA, the IJC was also tasked with collecting and summarizing public input on PRP and SOGL reports throughout 2017. The IJC released its draft TAP report in January 2017, and after a significant public engagement and review released the final 182-page TAP report in November 2017. As noted in the report:

> The IJC commends the two federal governments for *considerable progress* they have made to accelerate the cleanup of contaminated Areas of Concern, set new loading targets for the amount of phosphorus entering Lake Erie to reduce

> harmful algal blooms, and establishing the work groups and processes needed to implement the Agreement. However, the IJC finds that work needs to be increased in several key areas.[88]

While clearly acknowledging the many fronts on which the parties had made progress since implementation of the GLWQA began in 2013, including a proposed near-shore framework, accelerated restoration of contaminated AOCs, preventing any newly introduced aquatic invasive species, and improved reporting on groundwater science, the IJC stressed the need for more accountability on the basic human health goals of fishable, swimmable, drinkable waters. As noted in the report:

> The IJC also finds that the governments need to strengthen *public engagement, accountability and funding* to achieve the Agreement's objectives. Governments need to incorporate more robust public engagement into their activities, including engagement with diverse communities and Tribal, First Nations and Métis governments. Clear, time-bound targets for action are needed as are long-term aspirations for improvements in the status and trends of Great Lakes indicators against which progress can be more definitively assessed.[89]

Compared to the period before the 2012 GLWQA, progress is clearly evident when viewed in the context of the key indicators associated with the removal of BUIs and the delisting of AOCs, particularly under the US GLRI.[90] However, the IJC report also recommended that the parties set a fifteen-year goal for completing remedial actions at all AOCs, and it called on both the Canadian and US governments to properly fund these efforts, given that AOCs have been a priority since 1987. The report also underscored the need for more emphasis on accountability and indicators related to preventative actions and efforts.

Observations and Conclusions

As highlighted above, many of the environmental problems plaguing the region have been known for decades. Over forty years have passed since the public demanded action and accountability from Canadian and US governments and oversight by the IJC. In 1999, just as the parties to the GLWQA seemed to be abandoning a review of the agreement, Michael Donahue wrote that "we cannot move forward unless we are first able to look back, assess progress, evaluate performance and apply lessons learned to the balance of our journey."[91] This chapter has traced the evolution in thinking about how accountability for progress and performance has been assessed under the agreement in the period since 1960. It shows that the objectives of the GLWQA have become both more encompassing, with the integration of ecosystem, precautionary, and preventative approaches, and more specific with a lengthening list of pollutants to be addressed and indicators. Yet this examination also shows that in terms of meeting these objectives, the GLWQA has in many cases been disappointing, despite the accountability mechanisms in the agreement also becoming more numerous and varied.

The more recent efforts to embed an indicators approach into basin environmental management through the reporting function under the 2012 GLWQA represents another step up the ladder of performance assessment. However, it is important to note that, despite some significant progress by the parties in developing nine indicators and forty-four sub-indicators that align with the nine General Objectives of the agreement, the IJC has recommended refinement of some indicators as well as new indicators for future use. SOLEC served as the scientific backbone of indicator work under the GLWQA and has been subsumed within the new SOGL reporting regime that is led by the parties. The parties themselves have taken a much more active and directive role in performance reporting with the PRP and SOGL reports, but it remains to be seen if and how they will use this performance information, and whether the IJC will develop and use other performance indicators in its TAP report to assess progress under the agreement.

Under the 2012 GLWQA provisions, the parties are responsible for implementation and reporting and the IJC is responsible for overall

reporting on progress under the agreement; both have focused on *outcome* indicators. The IJC and the parties have not yet moved to develop societal/program response or governance indicators. While the ecosystem and human health indicators currently in use are very important in terms of highlighting ecosystem and human health outcomes, both scholarship on water governance and international organizations such as the OECD argue that governance indicators are critical as measures of progress and for the ongoing assessment and dialogue processes in shared water basins.

Interestingly, one of the features differentiating the 2012 revision from earlier versions of the agreement, according to the IJC itself, is its focus on "enhanced governance,"[92] and the heavy emphasis it places on public and stakeholder engagement fits with this. Questions have already been raised as to how the commission and parties will know, for example, whether they have been successful in their public engagement efforts under the agreement.[93] This seems to be the next horizon for those who seek to enhance performance in maintaining and restoring environment and ecosystem health in the Great Lakes basin. At present, the sole focus on ecosystem and human health outcome indicators does not reflect the complexity and comprehensiveness now embedded in the General and Specific Objectives of the regime. Nor does it recognize the critical role that the binational community—indeed various binational communities—brought together by the IJC, in conjunction with the now very broad range of programming under the GLWQA, play in supporting implementation of GLWQA programming and in scrutinizing the effectiveness of these efforts. The aggregation of data and reporting related to the GLWQA by the parties and IJC is impressive. However, using the data beyond reporting requirements related to strategic policy, planning, and implementation priorities remains a challenge. For this, strong governance mechanisms need to be in place.

Pushing forward with the promises made in the 2012 agreement will not be easy, however. Given the policy decisions taken by the Trump administration on environmental protection, climate change, and water protection, the United States is simply not going to continue to play the leadership role vis-à-vis the Great Lakes basin that it had assumed under the Obama administration. This makes the political environment for the IJC, already sensitive, even more tricky. In this more challenging context,

the commission must continue to evolve and strengthen its human and knowledge resources in order to be able to perform its traditional role of binational fact-finder. Further, the IJC will need to protect and bolster its ability to measure progress vis-à-vis the parties, rather than cede the field in terms of such key tools as indicator development and application. Yet the IJC is a dynamic organization and it displays significant strengths—in terms of in-depth research; willingness to wrestle with the longer-term focus required of adaptive management; and a real facility for working across governance scales, NGO networks, and the academic community, as well as with citizens. Perhaps more than any other contribution, the IJC's firmly rooted commitment to, and increasing expertise in, reaching outward, both across and outside of governments, in the pursuit of mutual understanding, collaborative action, and accountability, has set a productive tone for Canada-US environmental relations that reaches beyond water quality. Further, in an era in which the sub-national level has become increasingly significant not only for achieving policy outcomes, but also for building the political will to move forward, the IJC is well placed to engage and coordinate. The six new commissioners appointed to the IJC in May 2019—which include among them an Indigenous representative, several environmental activists, and a former state assemblywoman—are likely to deepen the commission's networks and reach across various communities.

The IJC is also exceedingly adept at working within changing and sensitive political contexts. Yet the key task for the commission as we move into the next hundred years will be to survive, adapt, and even thrive in turbulent times, not merely by flying below the radar but by mobilizing and operationalizing the support of diverse communities, networks, and governments to take on the difficult environmental challenges we will face in the coming decades.

Notes

1 International Joint Commission (IJC), *Twelfth Biennial Report on Great Lakes Water Quality*: Executive Summary (2004), available at: https://www.nrc.gov/docs/ML0703/ML070390585.pdf.

2 Agreement Review Committee, *Final Report to the Great Lakes Binational Executive Committee: Review of the Great Lakes Water Quality Agreement* (September 2007), http://publications.gc.ca/collections/collection_2012/ec/En164-21-1-2007-eng.pdf, p. 2.

3 IJC, *Thirteenth Biennial Report on Great Lakes Water Quality* (2006), http://publications.gc.ca/collections/collection_2011/ijc/E95-1-1-13-eng.pdf, p. 2.

4 See Alliance for the Great Lakes, Biodiversity Project, Canadian Law Association, and Great Lakes United, *The Great Lakes Water Quality Agreement. Promises to Keep; Challenges to Meet. Perspectives from Citizens in Consultation with the Great Lakes Basin's Environmental Community* (December 2006), available at: http://www.cela.ca/sites/cela.ca/files/uploads/553GLWQA_promises.pdf.

5 See, for example, article ii, which notes that "any interference with or diversion from their natural channel of such waters on either side of the boundary, resulting in any injury on the other side of the boundary, shall give rise to the same rights and entitle the injured parties to the same legal remedies as if such injury took place in the country where such diversion or interference occurs." Further, article iii states that "It is agreed that, in addition to the uses, obstructions, and diversions heretofore permitted or hereafter provided for by special agreement between the Parties hereto, no further or other uses or obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line, affecting the natural level or flow of boundary waters on the other side of the line shall be made except by authority of the United States or the Dominion of Canada within their respective jurisdictions and with the approval, as hereinafter provided, of a joint commission, to be known as the International Joint Commission."

6 IJC *Final Report of the International Joint Commission on the Pollution of Boundary Waters Reference* (Washington and Ottawa: IJC, 1918), https://www.ijc.org/sites/default/files/A62.pdf, p. 10.

7 Ibid., 18–22.

8 Ibid., 25–9.

9 Ibid., 50.

10 Murray Clamen and Daniel Macfarlane, "The International Joint Commission, Water Levels, and Transboundary Governance in the Great Lakes," *Review of Policy Research* 32, no. 1 (2015): 40–59.

11 IJC, *Annual Report for 2008: Boundary Waters Treaty Centennial Edition (*Washington and Ottawa: IJC, 2008), https://ijc.org/sites/default/files/ID1629.pdf, p. 24

12 Carolyn Johns and Mark Sproule-Jones, "Great Lakes Water Policy: The Cases of Water Levels and Water Pollution in Lake Erie," in *Canadian Environmental Policy and Politics: Prospects for Leadership and Innovation* (4th ed.), ed. Deborah VanNijnatten (Don Mills, ON: Oxford University Press, 2016), 252–77.

13 Ibid.

14 IJC, *Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River* (Ottawa: Information Canada, 1971), https://scholar.uwindsor.ca/cgi/viewcontent.cgi?article=1012&context=ijcarchive, p. 3.

15 Johns and Sproule-Jones, "Great Lakes Water Policy."

16 IJC, *Pollution of Lake Erie*, 3.

17 Ibid., 37.

18 See, for example, Patrick Dunleavy and Christopher Hood, "From old public administration to new public management" *Public Money & Management* 14, no. 3 (1994): 9–16.

19 Organisation for Economic Co-operation and Development (OECD), *Measuring Results of Environmental Regulation and Compliance Assurance: Guidance for countries of Eastern Europe, Caucasus, and Central Asia* (Paris: OECD, 2009), http://www.oecd.org/env/outreach/42942944.pdf, p. 11.

20 See, for example, D. B. Tunstall, "Developing Indicators of Environmental Quality: The Experience of the Council on Environmental Quality," *Social Indicators Research* 6 (1979): 301–47, and H. Verwayen, "Social Indicators: Actual and Potential Uses," *Social Indicators Research* 14, no. 1 (1984): 1–27.

21 See, for example, Yale University's Environmental Protection Index, available at https://epi.envirocenter.yale.edu/.

22 See, for example, G. Dunn and K. Bakker, "Canadian approaches to assessing water security: An inventory of indicators" (Vancouver: University of British Columbia, 2009); D. Garrick and J. Hall, "Water Security and Society: Risks, Metrics and Pathways," *Annual Review of Environment and Resources* 39 (2014): 611–39; and E. Norman, G. Dunn, K. Bakker, D. M. Allen, and R. Cavalcanti de Albuquerque, "Water Security Assessment: Integrating Governance and Freshwater Indicators," *Water Resources Management* 27, no. 2 (2013): 535–51.

23 See, for example, Transboundary Water Assessment Programme, available http://www.geftwap.org/twap-project; United Nations, "UN Water," available at https://www.un.org/waterforlifedecade/transboundary_waters.shtml.

24 R. G. Garriga and A. Foguet, "The Water Poverty Index: Assessing Water Scarcity at Different Scales" (paper presented at Congres UPC Sostenible, Barcelona, 2015); and Caroline Sullivan, "Calculating a Water Poverty Index," *World Development* 30, no. 7 (2015): 1195–1210.

25 L. De Stefano, "International Initiatives for Water Policy Assessment: A Review," *Water Resources Management* 24 (2010): 2449–66 ; and OECD, *Water Governance in OECD Countries: A multi-level approach* (OECD Studies on Water, 2011), available at https://www.oecd.org/governance/regional-policy/48885867.pdf.

26 C. Azar, J. Holmberg, and C. Lindgren, "Socio-ecological indicators for sustainability," *Ecological Economics* 18 (1996): 89–112; F. Molle and P. Mollinga, "Water poverty indicators: Conceptual problems and policy issues," *Water Policy* 5 (2003): 529–44; and O. Ohlsson and A. R. Turton, "The turning of a screw: Social resource scarcity as a bottle-neck in adaptation to water scarcity," (Occasional Paper Series: School of Oriental and Asian Studies, Water Study Group, University of London, 1999).

27 Dunn and Bakker, "Canadian approaches to assessing water security"; and D. Kaufmann and A. Kraay, "Where are we? Where should we be going?" *World Bank Research Observer* 23, no. 1 (2008): 1–30.

28 Lee Botts and Paul Muldoon, *Evolution of the Great Lakes Water Quality Agreement* (East Lansing: Michigan State University Press, 2005); Carolyn Johns, "Transboundary Environmental Governance and Water Pollution in the Great Lakes Region: Recent Progress and Future Challenges" in *Transboundary Environmental Governance Across the World's Longest Border*, ed. Stephen Brooks and Andrea Olive (East Lansing: Michigan State University Press, 2018), 77–113. Johns and Sproule-Jones, "Great Lakes Water Policy"; Mark Sproule-Jones, *Restoration of the Great Lakes: Promises, Practices, and Performances* (Vancouver: UBC Press, 2002).

29 Marcia Valiante, Paul Muldoon, and Lee Botts, "Ecosystem Governance: Lessons from the Great Lakes" in *Global Governance: Drawing Insight from the Environmental Experience*, ed. O. Young (Cambridge, MA and London: MIT Press, 1997), 197–225.

30 Great Lakes Water Quality Agreement (GLWQA). United States and Canada. Signed at Ottawa 15 April 1972; entered into force 15 April 1972.

31 1972 GLWQA, article ii.

32 1972 GLWQA, article iii.

33 1972 GLWQA, Annex 1, sections 1 and 2.

34 1972 GLWQA, Annex 1, section 7.

35 1972 GLWQA, article v.

36 1972 GLWQA, article vi.

37 1972 GLWQA, article ix.3.

38 1972 GLWQA, article vi.3.

39 1972 GLWQA, article vi.4.

40 1972 GLWQA, article vi.3, 4.

41 1972 GLWQA, article vi.

42 Eric Rasmussen, "The 1978 Great Lakes Water Quality Agreement and Prospects for U.S.–Canada Pollution Control," *Boston College International and Comparative Law Review* 1, no. 1 (1979): 506–7.

43 George Francis, "Binational Cooperation for Great Lakes Water Quality: A Framework for the Groundwater Connection," *Chicago-Kent Law Review* 65, no. 2 (1989): 363.

44 Revised GLWQA of 1978 United States and Canada. Signed at Ottawa 22 November 1978; entered into force 22 November 1978. See article ii.b, available at https://treaties.un.org/doc/publication/unts/volume%201153/volume-1153-i-18177-english.pdf.

45 1978 GLWQA, article ii.c.

46 1978 GLWQA, article iv.2.

47 Ibid.

48 Rasmussen, "The 1978 Great Lakes Water Quality Agreement and Prospects," 511.

49 1978 GLWQA, article vi.c.

50 Ibid.

51 IJC, *First Triennial Assessment of Progress on Great Lakes Quality* (Ottawa and Washington: IJC, 2017), 6.

52 Rasmussen, "The 1978 Great Lakes Water Quality Agreement and Prospects," 520.

53 Kim Richard Nossal, "The IJC in Retrospect," in *The International Joint Commission Seventy Years On*, ed. Robert Spencer, John Kirton, and Kim Richard Nossal (Toronto: University of Toronto Press, 1981), 127.

54 Maxwell Cohen, "The Commission from the Inside," in Spencer et al., *The International Joint Commission Seventy Years On*.

55 Theodora E. Colborn, Alex Davidson, Sharon N. Green, R. A. (Tony) Hodge, C. Ian Jackson, and Richard A. Liroff, *Great Lakes, Great Legacy?* (Washington, DC: Conservation Foundation, 1990).

56 Alan M. Schwartz, "The Canada-U.S. Environmental Relationship at the Turn of the Century," *American Review of Canadian Studies*: *The Thomas O. Enders Biennial Issue on the State of the Canada-United States Relationship* 30, no. 2 (Summer 2002): 223.

57 Revised GLWQA of 1978 as amended by protocol on 18 November 1987. United States and Canada; signed at Ottawa 18 November 1987. See article vii.3, available at http://agrienvarchive.ca/download/GLWQ_agreement_revised_78.pdf.

58 1987 GLWQA, supplement to Annex 2.3, and Annex 11.4.

59 Sproule-Jones, *Restoration of the Great Lakes*.

60 United States Environmental Protection Agency, *State of The Great Lakes: What Is The State Of Great Lakes Coastal Wetlands?* (2006), available at https://archive.epa.gov/solec/web/pdf/coastal_wetlands.pdf.

61 Collingwood Harbour was delisted in 1994, Severn Sound in 2003 and, in the US, Oswego River was delisted in 2006. Spanish Harbour has been designated an AOC since 1999.

62 Environment Canada and United States Environmental Protection Agency, *State of the Great Lakes Report 2017* (presented at the Great Lakes Forum 4 October 2016, Toronto, ON).

63 J. Sanders and P. Stoett, "Fighting Extinction and Invasion: Transborder Conservation Efforts," in *Continental Ecopolitics: Canadian-American Relations and Environmental Policy*, ed. P. LePrestre and P. Stoett (London: Ashgate, 2006), 157–78.

64 Johns and Sproule-Jones, "Great Lakes Water Policy."

65 State of the Lakes Ecosystem Conference (2011); all documents are available at https://archive.epa.gov/solec/web/html/.

66 IJC, *15th Biennial Report on Great Lakes Water Quality* (Ottawa and Washington: IJC, 2011), available at https://www.ijc.org/en/15th-biennial-report-great-lakes-water-quality.

67 Canada, Commissioner of the Environment and Sustainable Development, Office of the Auditor General, "A legacy worth protecting: Charting a sustainable course in the Great Lakes and St. Lawrence River basin," in *Report of the Commissioner of the*

Environment and Sustainable Development (Ottawa: Minister of Public Works and Government Services, 2001), 301–14; and Canada, Commissioner of the Environment and Sustainable Development, Office of the Auditor General, "Safety of drinking water: Federal responsibilities," in *Annual Report of the Commissioner of the Environment and Sustainable Development* (2005), ch. 4.

68 Botts and Muldoon, *Evolution of the Great Lakes Water Quality Agreement*.

69 IJC, *Thirteenth Biennial Report on Great Lakes Water Quality*, 2.

70 Ibid.

71 Ibid.

72 Alliance for the Great Lakes, Biodiversity Project, Canadian Environmental Law Association, Great Lakes United, *Promises to Keep*, 5.

73 Carolyn Johns, "Transboundary Water Pollution Efforts in the Great Lakes: The Significance of National and Sub-national Policy Capacity," in *Environmental Governance on the 49th Parallel: New Century, New Approaches*, ed. Barry Rabe and Stephen Brooks (Washington, DC: Woodrow Wilson International Center for Scholars, Canada Institute, 2010), 63–82; Carolyn Johns, "Water Pollution in the Great Lakes Basin: The Global-Local Dynamic," in *Environmental Challenges and Opportunities: Local-Global Perspectives on Canadian Issues*, ed. Christopher Gore and Peter Stoett (Toronto: Emond Montgomery, 2009), 95–129; and Sproule-Jones, *Restoration of the Great Lakes*.

74 Chris McLaughlin and Gail Krantzberg, "An Appraisal of Policy Implementation Deficits in the Great Lakes," *Journal of Great Lakes Research* 37, no. 2 (2011): 390–6.

75 Johns, "Transboundary Environmental Governance."

76 IJC, "About the Great Lakes Quality Agreement" (2018), available at https://binational.net/glwqa-aqegl/.

77 Protocol Amending the Agreement Between Canada and the United States of America on Great Lakes Water Quality, 1978, as Amended on 16 October 1983, and on 18 November 1987; signed 7 September 2012; entered into force 12 February 2013. See article iv, available at https://www.ec.gc.ca/grandslacs-greatlakes/A1C62826-72BE-40DB-A545-65AD6FCEAE92/1094_Canada-USA%20GLWQA%20_e.pdf.

78 2012 GLWQA, article 4(l).

79 IJC, *About the Great Lakes Water Quality Agreement* (Ottawa and Washington: IJC, 2018).

80 2012 GLWQA, article 4.A.

81 2012 GLWQA.

82 Johns, "Transboundary Environmental Governance."

83 State of the Great Lakes 2017 reports are available at https://binational.net/2017/06/19/sogl-edgl-2017/.

84 Environment and Climate Change Canada and the US Environmental Protection Agency, *State of the Great Lakes 2017 Technical Report: Indicators to assess the status*

and trends of the Great Lakes ecosystem (2017), available at https://binational.net/wp-content/uploads/2017/09/SOGL_2017_Technical_Report-EN.pdf\.

85 IJC, *15th Biennial Report on Great Lakes Water Quality*.

86 J. P. Hill and D. Eichinger, *A framework for assessing the effectiveness of programs and other measures developed to address the objectives of the Great Lakes Water Quality Agreement* (Report for the International Joint Commission, 2013).

87 Carolyn Johns, Adam Thorn, and Debora VanNijnatten, "Environmental Regime Effectiveness and the North American Great Lakes Water Quality Agreement," *International Environmental Agreements: Politics, Law and Economics* 18, no. 3 (2018): 315–33.

88 IJC, "IJC calls on governments to set specific targets to accelerate Great Lakes restoration, protect drinking water and eliminate releases of untreated sewage," news release with Triennial Assessment of Progress Report, 28 November 2017.

89 Ibid.

90 Johns, "Transboundary Environmental Governance."

91 Michael Donahue, "The case for good government: Why a comprehensive review of the Great Lakes Water Quality Agreement is needed," *Toledo Journal of Great Lakes Law, Science & Policy* 2 (1999): 1.

92 IJC, *About the Great Lakes Water Quality Agreement*.

93 Great Lakes Executive Committee, meeting, June 2016.