LEARNING FROM EXPERIENCE:
LOCAL PERCEPTION AND TRANSBOUNDARY INSTITUTION BUILDING
ON THE LOWER GREAT LAKES, 1900-1972

A Dissertation
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Doctor of Philosophy
in History

By
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Washington, DC
March 26, 2018
This dissertation argues that between 1900 and the mid-1940s, Canada and the United States developed a suite of water institutions in order to manage the fisheries, water quantity, and water quality of the lower Great Lakes together. These included a range of agreements between the federal governments, between Ontario and the states along the boundary line, informal cooperation between many levels of government, and dense networks of people linked by work or residence to the shared lakes and to each other.

The goals and character of these joint water management tools changed in important ways, evolving into a second generation of institutions by 1972 that was exemplified by the Great Lakes Water Quality Agreement. Joint water management shifted in response to new awareness of the link between human health, ecosystem health, and pollution. This is particularly apparent in the history of joint efforts to improve water quality in rivers between Lake Erie and Lake Ontario. Goals for management also moved away from supporting commercial fishing and towards suppressing invasive species and supporting recreational fishing.

The driving forces behind these changes were anthropogenic environmental change in the Great Lakes region and changes in relationships between the political
jurisdictions there. As trends such as pollution, the destruction of wetlands, the introduction of invasive species, urbanization, overfishing, the expansion of agriculture, and increasing population density all accelerated, so did residents’ awareness of deteriorating water quality and their desire to limit and control the damage.

During this period, government in both countries was also changing and transboundary relationships changed with it. Canada’s foreign policy became more independent of Britain and the relationship between United States and Canada grew steadily closer. The federal governments, Ontario and the Great Lakes states expanded their capacity to make health, transportation and environmental policies. Gradually, state and provincial governments became important players in water management and began to interact directly around the lakes. At no point did the national governments of Canada or the United States decide to manage the lower Great Lakes proactively — in each case, changes evolved in response to local people’s perceived needs.
Acknowledgements

My decision to pursue this research owes much to the encouragement and inspiration of Professor Robert Bothwell at the University of Toronto and to the joyful curiosity of one of my first history teachers, Mr. Richard Baxter.

It would not have been possible to write this dissertation without the financial support of the Environmental History Fellowship at Georgetown University; the Larry Hackman Research Residency at the New York State Archives at Albany, New York; a Grant-in-Aid from the Georgetown Environmental Initiative; and the Mellon Sawyer Pre-Doctoral Fellowship at Georgetown University.

I am honored to have spent my time at Georgetown University under the supervision of Professor John McNeill, whose friendly patience, commitment to scholarly excellence, and enthusiastic support for creative and collegial discussion have become my standard for scholarship.

I am grateful to the members of my dissertation committee, Professor Joseph McCartin, Professor Dagomar Degroot, Professor Kurkpatrick Dorsey, and Professor Peter Campbell for their generous gifts of time and attention. Their interdisciplinary support has helped me reach into diverse areas of research much more accurately than I could have done alone.

I have benefited enormously over the past eight years from the ideas, support and community spirit of the faculty and students of the Georgetown History Department, and of the Environmental History workshop in particular. This dissertation has improved enormously thanks to the criticisms and suggestions of my colleagues, including Elena Abbott, Robynne Mellor, Soha El Achi, Sylvia Mullins, Jennifer DeVries, Chad Frazier, Alan Roe, Hillar Schwertner, Matt Johnson, Jackson Perry, Oliver Horn and Elizabeth Williams. The final year of writing was eased and enlivened by Dr. Carole Skinner and the members of her dissertation finishing group.

My family has supported this project from the first, and my husband, Yohann Paris, has accompanied me lovingly every step of the way. I am delighted to be able to acknowledge them here.
This dissertation is dedicated with love and gratitude to the memory of Elise Clare Reed Denning (1951-2010), to William Bruce Denning, and to Yohann Richard Jean-Bernard Paris
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# List of Abbreviations

## Archival Abbreviations

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<th>Abbreviation</th>
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<tbody>
<tr>
<td>LAC</td>
<td>Library and Archives Canada, Ottawa, Ontario, Canada</td>
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<tr>
<td>NYSA</td>
<td>New York State Archives, Albany, New York, U.S.A.</td>
</tr>
<tr>
<td>NARA</td>
<td>National Archives and Records Administration, College Park, MD, U.S.A</td>
</tr>
<tr>
<td>AO</td>
<td>Provincial Archives of Ontario, Toronto, Ontario, Canada</td>
</tr>
<tr>
<td>OHS</td>
<td>Ohio Historical Society, Columbus, Ohio</td>
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<td>RG</td>
<td>Record Group</td>
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## Organization Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>ADM</td>
<td>Assistant Deputy Minister</td>
</tr>
<tr>
<td>DM</td>
<td>Deputy Minister</td>
</tr>
<tr>
<td>FRB</td>
<td>Fisheries Research Board</td>
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<tr>
<td>GLBC</td>
<td>Great Lakes Basin Compact</td>
</tr>
<tr>
<td>GLC</td>
<td>Great Lakes Commission</td>
</tr>
<tr>
<td>GLFC</td>
<td>Great Lakes Fisheries Commission</td>
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<tr>
<td>GLWQA</td>
<td>Great Lakes Water Quality Agreement</td>
</tr>
<tr>
<td>GLI</td>
<td>Great Lakes Institute</td>
</tr>
<tr>
<td>HEPCO</td>
<td>Hydro Electric Power Company of Ontario</td>
</tr>
<tr>
<td>IJC</td>
<td>International Joint Commission</td>
</tr>
<tr>
<td>IWC</td>
<td>International Waterways Commission</td>
</tr>
<tr>
<td>JHC</td>
<td>Joint High Commission</td>
</tr>
<tr>
<td>PASNY</td>
<td>Power Authority of the State of New York</td>
</tr>
<tr>
<td>PBJD</td>
<td>Permanent Joint Board for Defense</td>
</tr>
<tr>
<td>PM</td>
<td>Prime Minister</td>
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<tr>
<td>RAP</td>
<td>Remedial Action Plan</td>
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<tr>
<td>OWRC</td>
<td>Ontario Water Resources Commission</td>
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Introduction

Lake Erie and Lake Ontario are in trouble again. Eutrophication, invasive species, heavy metals, bioaccumulative pollutants and climate change threaten these vast aquatic ecosystems. These are systemic and, in the case of climate change, global problems; solutions must be applied at the watershed level, or fail. The existing governance structures are not working: despite popular concern, regular binational reports on ecosystem health, new federal funding from both sides of the border, several revisions of the Great Lakes Water Quality Agreement, and the passage of the Great Lakes Compact, the response from the region’s inhabitants and governments is completely inadequate when measured in proportion to the problems.

There is some good news, however. We know what is wrong. We have decades of data and sturdy transboundary relationships to draw upon as we search for solutions. The barriers to effective action lie not in scientific or engineering research, but in the realm of political compromise and forward momentum. Yet even here, there is good reason to hope. We already possess a set of water management institutions that span the border and reach through every level of government, from local to international.

Over the course of the twentieth and twenty-first centuries, Canadians and Americans managed their shared waterscape using a variety of tools. A long series of more and less successful treaties, institutions, informal arrangements, infrastructure projects, research, monitoring and policies have created, in a process akin to ecological succession, a deep ‘soil’ of expertise, institutions and public support for joint American-Canadian environmental policy. Using all of this as a foundation, we can adapt our joint water policy to cope with the changing environment and to reflect our new goals.

The environment of the lower Great Lakes has changed a great deal within living memory. Shared American-Canadian goals for water management have changed before, also
within memory. People around the Great Lakes watershed learned, changed and adapted their shared governing to improve the ecosystem’s health and the health of all the people living there. We can do it again, if we try. As demonstrated in this dissertation, we will not even need to create new treaties, networks or institutions - we can adapt the ones we already have, using them as a foundation from which to build the necessary tools to cope with our new problems and pursue different goals without re-inventing the wheel.

The most effective way for people to regulate or respond to environmental change in a lake or a river is by approaching the whole watershed as a single unit. Any policy that only affects part of the watershed or some of its organisms will be undermined by the physical, chemical and biological connections within the basin. This is as true for a watershed that is shared by dozens of jurisdictions of many sizes, like the lower Great Lakes, as it is for a creek shared between two towns. Therefore, the most useful and direct way to improve ecosystem health in a shared watershed is through cooperation. In diplomatic, political, and economic history, international cooperation is typically regarded as a good thing, but environmental history demonstrates that cooperation is only as environmentally beneficial as the goals and methods of the cooperating parties.

This dissertation explores several related questions: What impact did American-Canadian cooperation have upon Lake Erie and Lake Ontario between 1900 and 1972? What goals did people living around the lakes have for their joint water policy, and how did they pursue them? How were joint water management policies created, and what factors mattered most to the final format of laws, treaties, institutions? To answer these questions, this dissertation examines the ways in which Canada and the United States tried to manage the lower Great Lakes between 1900 and 1972. It charts the development of the first generation of transboundary water management tools, in fisheries, water quantity and water quality from
approximately 1900 to 1954. Canadians and Americans constructed the first set of water institutions with the intention of developing the Great Lakes for human convenience.

The dissertation then explores the ways in which these transboundary tools evolved and multiplied in response to the changing lacustrine environment and changing goals of the people living around the lakes. During the middle decades of the twentieth century, a growing awareness of the connections between ecosystem health and human wellbeing drove shifts in Canada-US water policy. Between the 1940s and 1972, a second generation of institutions was established, overlapping with the tail end of the first generation, which reflected the addition of environmental quality to the two countries’ goals, in part by incorporating and repurposing the preceding set.

Geographic and Temporal Parameters

The five North American Great Lakes form a single massive water system, but the lakes differ significantly in their geology, biology, and in the character of human activities that occur on and around them, so that it would be extremely difficult to discuss the environmental history of all five Great Lakes simultaneously within the scope of a single dissertation. Academic historians have not yet written the twentieth-century history of the five Lakes, but several journalists and an ecologist have written narrative accounts of the changes in the entire basin during the past century.¹

This dissertation deals with the lower two Great Lakes, Lake Erie and Lake Ontario, and the channels that connect them to the three upper Great Lakes, to the St. Lawrence River, and

to each other. The two lower Lakes share a number of physical characteristics: relatively small size, a local geology of fertile soils south of the Precambrian shield that dominates much of the other Lakes' watersheds, and a temperate climate.

Lake Erie and Lake Ontario are both bisected by the Canada-US border and have hosted very similar human activities during the twentieth century, including mixed agriculture, manufacturing, and heavy urban development. As a result, their environmental histories resemble one another closely. By omitting a detailed environmental history of Lakes Huron, Michigan and Superior, I have chosen not to analyze the enormous resource extraction industries (timber and mining), which dominated those watersheds. In addition, because the international boundary does not pass through Lake Michigan, the management of that lake has not required the unusual level of transboundary cooperation that emerged along the shared lakes, and the people living by it did not share a transnational experience of environmental change. By narrowing the geographic scope of my research to the two lower Great Lakes, I can focus on the relationship between environmental change, human perception at the local level, and official policy responses across the international boundary. The range of environmental problems that the two countries share is enormous, but I have chosen to focus on fisheries, water quality and water quantity because they were most important to the people living at this time and also because they instigated some of the biggest, most significant changes in the watershed for other organisms. A large part of this dissertation focuses on the link between shared local experience of changes in the aquatic environment, and ways in which different levels of government collaborated to respond to local concerns.

The shared environmental history of Lake Ontario and Lake Erie is also important because, as the sites of more industrial activity, commercial fishing, and urban development than the other lakes, they were the first places that the U.S. and Canada tried to address pollution issues together. These two lakes have the longest, most active, most intriguing history
of transboundary pollution control efforts in the Great Lakes watershed, and some of the earliest transboundary water management efforts in North America. They are the locus of more than a century of ongoing, peaceful, and successful adaptation in response to anthropogenic environmental change. This dissertation aims to describe and explain the origins and progression of those changes.

As the Great Lakes and other parts of the world confront the unfamiliar problems of climate change, examples of successful change and institutional resilience provide an inspiring counterweight to the many dispiriting histories of environmental degradation. Furthermore, as water management evolved over the seventy-year period covered by this dissertation, new uses were found for old tools and institutions, a process which may provide insights into possible recycling or repurposing of current policies, institutions and agreements. It is clear from the history recounted in these chapters that the US-Canadian response to shared environmental problems succeeded - when it did succeed - thanks to a combination of agreed-upon data, local enthusiasm or concern, specifically designated budgets, expert staff, and political leadership.

The dissertation begins with the negotiation of the 1909 Boundary Water Treaty, which created the first transboundary water-management institution, the International Joint Commission (IJC). The Boundary Waters Treaty negotiations also marked the first time a Canadian went to Washington to deal with Americans directly on water issues. The chronological thesis of this dissertation is that Americans and Canadians created two generations of transboundary water management institutions on the Great Lakes between 1900 and 1972.

Between 1900 and 1972, the United States and Canada pursued shared water management goals using a variety of formal and informal means. Their first generation of water management institutions were designed to facilitate their shared enthusiasm for changing the direction and levels of the lake water to accommodate transportation and hydroelectric
development, and to advance their shared interest in supporting profitable commercial fisheries. The Boundary Waters Treaty of 1909 was the first part of the first generation of transboundary water institutions. The United States and Canada supplemented that initial treaty with various other institutions, treaties, and informal arrangements over the course of the first half of the twentieth century. The profitable development of the lower Great Lakes endured as the shared goal of all this cooperation until the mid-1940s, even as pollution problems multiplied and the lakes’ fish populations shrank and changed as a result of human activity.

Beginning in the mid-1940s, a second generation of management institutions began to emerge. American and Canadian goals for water management shifted over approximately thirty years, and in 1972 the two countries created the Great Lakes Water Quality Agreement, the first permanent institution to reflect their new consensus.

The second generation of Canadian-American water management institutions differed from its predecessor in that it reflected the residents’ new awareness of and attitude to human-caused environmental change, particularly as related to human and ecosystem health. Concern among citizens, experts, and policymakers drove a shift in goals for water management beginning in the 1940s, underlay a series of changes in transboundary water policy, and culminated with the first Great Lakes Water Quality Agreement in 1972. This water quality treaty was the first permanent central piece of the second generation of watershed management, which attempts to govern the Great Lakes as a single ecosystem. The 1972 agreement included the state and provincial governments, as well as other stakeholders such as municipal governments and representatives of various local industries, showing that a much larger number of parties were understood to be part of the transboundary relationship. The Great Lakes Water Quality Agreement was also the first treaty about reducing water pollution, an early indicator of the growing salience of environmental issues in the Canada-US relationship.
The United States and Canada did not abandon their older transboundary institutions, and their enthusiasm for development did not disappear when they added environmental quality to their goals for Lake Erie and Lake Ontario. Some institutions, such as the International Joint Commission, created in 1909, and the Great Lakes Fisheries Commission, created in 1954, have missions that reflect both first- and second-generation objectives. Others, such as the St. Lawrence Seaway Corporation that maintains the shipping lanes without reference to the role of shipping in enabling the spread of costly invasive species problems, are first-generation management tools that persist, almost unchanged. Still others, such as the multi-level Remedial Action Plans (RAPs) being executed under a revised version of the Great Lakes Water Quality Agreement, are entirely ecosystemic and designed to further newer water management goals.

This dissertation does not engage in deep analysis of the role of individual or group identities such as gender, race, sexual orientation or language group in shaping water policy. Where the diverse experiences of human actors are really germane to the main argument is with respect to questions of occupation, class, and residence. Although much of this history deals with scientists, politicians and bureaucrats, many other people are crucial to the events described in each chapter. For example: the differing views and experiences of fishermen versus hatchery managers versus scientists were important to changing fisheries policy. The growth of pollution abatement activities came largely as a result of residents’ complaints about the deteriorating quality of their local environment and drinking water. The two countries’ pursuit of water infrastructure and water control throughout the twentieth century was a multi-level response to the demands of constituents and organized interests around the Great Lakes, rather than a top-down policy that originated in Ottawa or Washington, D.C. While it is true that residents who are literate, politically engaged, and have time to write to their local utilities and elected representatives are not entirely subaltern, their lives are nevertheless far removed from diplomacy and international relations. The argument that unelected, inexpert, non-bureaucrat
residents played important roles in defining the extent and character of transboundary cooperation on water management, is an argument that seriously considers the agency of a much wider range of human actors than most diplomatic history.

**Thesis**

This dissertation argues that Canada and the United States developed their first suite of water institutions between 1900 and the mid-1940s in order to manage the lower Great Lakes together. This first generation included a range of bilateral agreements between the federal governments (treaties, memoranda of understanding, and informal agreements), arrangements between Ontario and the states along the boundary line, ongoing formal and informal cooperation between federal, state/provincial and local governments, and dense networks of people linked by work or residence to the shared lakes and to each other. These shared institutions dealt with three topics: fisheries, water quantity, and water quality. (There are other forms of water use, of course, but these are the three that basin residents tried to control jointly.) American and Canadian goals for water management changed in several important ways between the mid-1940s and the early 1970s, and the joint institutions and arrangements that they had made in the first decades of the century evolved to reflect them, producing the a qualitatively different group of institutions by 1972.

After 1946, joint water management shifted in response to a new awareness of the links between human health, ecosystem health, and pollution. This is particularly apparent in the history of cooperation to improve water quality in Lake Erie, Lake Ontario and the Connecting Channels. In addition, Canadian-American fisheries policy moved away from unstinting support for a commercial fishing industry on the lower Great Lakes, and towards joint efforts to suppress invasive species and support a recreational fishery. However, a shared commitment to altering the region’s hydrology to suit human convenience remained unchanged. The driving forces
behind these changes were anthropogenic environmental change in the Great Lakes region and changes in relationships between the political jurisdictions there.

During the same period, government in both countries was changing, affecting transboundary relationships. At the national level, Canada’s foreign policy apparatus became more independent of Britain during the first decades of the twentieth century. Both the Canadian and the American federal governments expanded their capacity to make policy concerning health, transportation and environmental issues. The diplomatic relationship between United States and Canada grew steadily closer and their regional economies became more integrated. The two countries’ formal military alliance began with Allied wartime production in World War II and continued through the Cold War. That alliance and postwar trade liberalization contributed to the region’s industrial economy and, indirectly, to the environmental impact of industry. During this time, states and provinces also developed their administrative capacity in all areas, including health, transport, urban governance, environment, and fisheries. Their bureaucracies became larger and more professional. Gradually, state and provincial governments became important players in the joint water management arrangements; they began to interact directly in the lower Great Lakes and to influence the two federal governments’ relations more heavily.

The impact of human activities on the lower Great Lakes’ environment during this period included: pollution, the destructions of wetlands, the introduction of invasive species, deforestation, urbanization, overfishing, the expansion and chemicalization of agriculture, and an increase in population density. Some of these effects were magnified by deliberate transboundary cooperation, such as the joint dredging programs and the construction of shared hydroelectric dams, while others were incidental.

As these environmental changes increased and accelerated over time, so did American-Canadian awareness of human impact on water quality. Local interest in managing water quality increased as pollution created new nuisances and health problems, and as it grew, so did
cooperative attempts to limit and control the damage. Transboundary water management arrangements always originated at the local level, driven by watershed residents’ shared experience of environmental change. At no point during the period 1900-1972 did the national governments of Canada or the United States decide to manage the lower Great Lakes proactively — in each case, changes evolved in response to local people’s perceived needs. Scientific measurements of pollution were influential in shaping American and Canadian opinions about the lower Great Lakes, but human perception was the decisive factor in driving policy change.

Chapters

The first chapter in the dissertation describes the creation of the Boundary Waters Treaty between 1900 and 1909. It outlines the rapid and widespread economic and demographic changes that occurred in the Great Lakes region during the last third of the nineteenth century and early decades of the twentieth century. The chapter shows that citizens of both countries who lived near Great Lakes wanted their governments to resolve the numerous water disputes that arose during this period of growth, and why existing diplomatic remedies were unsuccessful. The chapter then describes the negotiation of the Boundary Waters Treaty and the creation of the first permanent, joint water management organization: the International Joint Commission.

The second chapter traces joint efforts to change the lower Great Lakes’ hydrology between 1900 and 1972. Cooperative policies included developing hydroelectricity along the Niagara and St. Lawrence Rivers, many transportation infrastructure projects, and attempts to control lake levels. This chapter highlights the importance of shared goals: because policymakers and many residents agreed about the need to change the regional hydrology, the process was smooth and its impact very large.
The third chapter focuses on transboundary efforts to reduce pollution in the lower Great Lakes and connecting channels between 1900 and 1942. It describes the successful effort to research and reduce biological pollution and communicable diseases, and the first, failed attempts to cooperate to reduce industrial pollution.

The fourth chapter describes transboundary efforts to support the Great Lakes fisheries between 1900 and 1972. It traces the development of commercial fisheries on the lakes, various political efforts to support a profitable fishing industry, and the many reasons why fish populations crashed during the first half of the twentieth century. This chapter compares the two countries’ failure to create a fisheries treaty with local capacity building in hatcheries, and then describes the importance of an invasive species, the sea lamprey, in the creation of the first transboundary fisheries institution, the Great Lakes Fisheries Commission in 1954.

The fifth chapter explains how local perceptions drove changes in international water management during the last years of World War II. New kinds of pollution and unprecedentedly high levels of pollution created a local water quality crisis along the rivers that link the lakes. Local fact-finding was essential to the eventual binational response, which was to refer the question to the International Joint Commission. That reference became one of the foundations of the current, second generation of transboundary water management.

The sixth chapter describes the process by which goals for water management came to include a measure of ecosystem awareness between 1946 and 1972. It describes the growth in administrative capacity for water quality control at many levels, the shared collection and analysis of new data about water pollution, the changing culture of water management around the lower Great Lakes, and how these three trends interacted to produce the Great Lakes Water Quality Agreement in 1972.
Sources

This dissertation rests upon eighteen months’ research in six archives: Archives Canada in Ottawa, Ontario; the Archives of Ontario in Toronto, Ontario; the New York State Archives in Albany, New York; and National Archives in College Park, Maryland. I also spent three weeks at the Ohio Historical Society in Columbus, Ohio and one week at the Archives of Michigan in Lansing, Michigan. My work combines high-level political sources, documents from other levels of government, and locally produced materials for a multi-level approach. The governing structures of the Great Lakes basin resemble a three-dimensional patchwork quilt or a complex sediment bed, and I have used sources from many jurisdictions to show that the depth and breadth of transboundary interactions varied a great deal.

Many aspects of the transboundary relationship between the United State and Canada have been carefully considered in the diplomatic, political, economic and legal historiography. They are rather too purely Canada-US in many cases, neglecting the importance of relationships with other countries such as Britain and Mexico in shaping Canadian and American policy. They are also resolutely national, rarely delving seriously into the federal-provincial and federal-state relationships that matter so much in policy areas that affect environmental quality (especially health and municipal affairs) and which in the Canadian case are so closely tied to linguistic and regional politics. In my opinion, the diplomatic historiography is too far removed from material reality of ecology, and so the main contribution of my dissertation to diplomatic history is to make it more material. In particular, my work considers how humans’ desire for and reactions to environmental change can be catalysts for their behavior.

There were few archival obstacles to my research. However, it is worth noting that all of the records of the New York Conservation Commission, a predecessor to its Department of Environmental Conservation which operated for approximately thirty years, were destroyed in the 1950s.
Environmental historians have produced numerous accounts of the transformation of different regions of northern North America through industrialization, urbanization, and the expansion of industrial agriculture, though none have focused on Lake Erie or Lake Ontario.\textsuperscript{3} At the same time, authors of regional environmental histories have yet to devote much time or attention to the international and transboundary aspects of northern North America. My dissertation turns this ongoing discussion towards Southern Ontario and the Great Lakes states during the twentieth century. I hope that my work can further enrich this regional scholarship by exploring the deliberate interaction between citizens of the two countries. For example, there are numerous cases around the lower Great Lakes where international cooperation facilitated industrialization and resource extraction, and the long-term influence of these shared US-Canadian development projects is worthy of more serious analysis than it has received heretofore.

Scholars of military environmental history are considering the environmental impact and causal mechanisms of armed conflict. Matthew Evenden’s recent monograph, \textit{Allied Power} (2015), considers the impact of war production on hydroelectricity in Canada with detailed analysis of the roles that intersecting jurisdictions (provincial, national, international) played in determining policy.\textsuperscript{4} Although Evenden’s book discusses the role of the United States as a buyer of exported Canadian electricity and a partner in construction projects, he does not consider the environmental impact of the transboundary relationship itself. The question of how


\textsuperscript{4} Matthew Evenden, \textit{Allied Power: Mobilizing Hydro-electricity during Canada’s Second World War} (Toronto: UTP, 2015). Evenden concludes that the production imperatives of the Second World War accelerated the process of planning, financing and constructing new hydro projects in a way that was congruent with peacetime processes.
military alliance and transboundary cooperation interact with environmental policy-making is an important one, because these international relationships can focus or reorient a state’s attention and, by extension, its power. My dissertation examines the environmental implications of the Canada-US alliance and peacetime cooperation over a seventy-year period.

It is important to note that the massive Great Lakes development projects of the twentieth century have received some scholarly attention, especially the St. Lawrence Seaway and the hydroelectric plants at Niagara Falls. The environmental histories of these large construction projects, and Bogue’s Fishing the Great Lakes cover some of the same environmental issues that my dissertation addresses with balanced attention to both sides of the border and careful consideration of the various levels of intergovernmental cooperation.

However, my dissertation examines a set of water management topics within this international and transboundary context, rather than just one. This broader focus enables analysis of the different ways in which people experienced water around the lower Great Lakes.

At the same time, even the environmental historians of these vast bilateral projects have not been particularly interested in the details of bureaucratic policy-making, how subjects got onto political agendas, how treaty texts were written and how informal arrangements were made. This is problematic, because when we consider the history of water management in the Great Lakes in the twentieth century, the presence of ‘the state’ in all its levels and shapes is undeniably important. The presence of multiple jurisdictions is a barrier to action in the crowded Great Lakes basin, but the presence of the border has also been used by states and provinces

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as an argument for federal spending on water management there. Equally important, most of the policymakers, politicians, experts and citizens discussed in this dissertation were involved in more than one sort of water management. It is impossible to make a distinction between nation-building technocrats who executed infrastructure projects and encouraged polluting industries in the Great Lakes basin, on the one hand, and the people who strove to make a case for environmental protection and water quality monitoring, on the other. They were often the same people, and many hoped to have both a rich region and a healthy one. I hope that my analysis will contribute to the transboundary environmental history of the Great Lakes by presenting a more ambitious, more empirically accurate set of connections across the border and within the different levels of government.

At various points, this dissertation makes reference to interest groups that operated at national, state/provincial and local levels, including companies, voluntary non-governmental associations of many kinds, and local boards of trade and chambers of commerce. They show up indirectly in the documents, but it is not apparent that any collective organization had a clear, decisive impact on water policy. Instead, it appears that joint management evolved through communication among citizens, citizens acting collectively, scientists, and especially between civil servants and elected officials. (In the long run, I intend to look for additional archival material to refine my portrayal of these collective organizations and confirm this assessment.)

Where possible, I have tried to explain how the water management agenda related to other kinds of policy and to the broader histories of the United States and Canada. The work of connecting environmental history to political and diplomatic history is important for several reasons: environmental histories are more accurate when they take account of the complicated political shifts that occurred on the many levels of the American and Canadian landscape, and historians in other fields can benefit from the addition of materiality and other species to their world-views. The one environmental historian whose work addresses multiple topics in
environmental management, as well as multiple layers of transboundary politics, is Kurkpatrick Dorsey in his *Dawn of Conservation Diplomacy.* Dorsey's monograph explains how conservationists and scientists in both countries made the case for joint management of migrating animals and shows that their shared ideas about conservationism facilitated cooperation.

In addition to extending this work temporally, I hope that my work can build upon his beginning in two other ways. First, I would argue that the shared conservationism that Dorsey identified is one of a series of shared ideas about environmental change and natural resource management that have enabled Canadians and Americans to work together in the Great Lakes basin. Their transboundary enthusiasm for hydroelectric development and transportation infrastructure during most of the twentieth century, and their shared perception of environmental degradation around Lake Erie and Lake Ontario have contributed, in the former case, to more rapid infrastructure development, and in the latter, to more effective pollution control. Second, I would argue that my dissertation shows that the perceptions of ordinary people have a greater role in shaping environmental policy than has been acknowledged – even before the advent of popular environmentalism in the late 1960s. In the case of the lower Great Lakes, the population's first awareness of environmental problems rarely arrived through quantitative analysis or scientific measurement - instead, it was the result of some person feeling, hearing, seeing, smelling or tasting a change in his or her surroundings, and only then was the machinery of quantitative analysis engaged. Whether a historian is considering politics, land use, resource exploitation, recreation, or some other aspect of environmental history, the role of ‘ordinary people,’ neither experts nor government agents, matters a great deal because it

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7 Dorsey’s monograph deals with ocean and freshwater fish, migratory birds, and pelagic seals.
usually constitutes the bulk of human activity at any given place or time. The role of human perception in shaping our impact on North America is an extremely important analytical theme that is not always addressed in depth.

The cultural shifts towards environmentalism of the late 1960s and 1970s had their greatest impact in policy, despite the undeniable influence of these trends on individual lifestyles, political participation, and spirituality. The relationship between environmentalist ideas, concern for ecosystem health, and the mechanisms of government is extremely important because of its impact on policy, law, treaties, and informal transboundary cooperation. I found that there was much more local concern, much earlier than I expected, and that sometimes the bureaucracies played catch-up to popular opinion. In addition to this process of policies catching up to citizen interest, however, it is important to recognize the role of government research and publicity in shaping the discourse around fishing, pollution, and water quantity manipulation. The environmental movement used the conclusions of publicly-funded monitors and researchers as ammunition to convince public and politicians that industrial waste should be controlled.

By themselves, neither better scientific understanding, government goodwill, nor popular concern was sufficient to improve matters. However, when these trends coalesced in the early twentieth century, some groundwork for ecosystemic water policy was laid. In the middle decades of the twentieth century, popular concern over the state of the water in the lower Great Lakes prompted a number of policy responses, and during later decades of the twentieth century, a growing body of scientific knowledge and deeper government cooperation made joint action easier. That alignment of socio-cultural movements with the deep, wide-ranging institutional apparatus that had grown up since 1900 enabled the United States and Canada to address eutrophication, invasive species and pollution problems around Lake Erie and Lake Ontario with notable success. This anti-declensionist story is a rarity within environmental history, and it remains important because a new generation of environmental issues threatens
the ecosystemic and human health of the Great Lakes. Canadians and Americans will need to adapt their robust set of formal and informal water management tools once again in order to hold onto the remarkable gains of the late twentieth century.

This dissertation centers on how water policy was made and how goals for water management changed. The government archives that I have used are inadequate for discovering subaltern voices, but essential to research this kind of policy development. In the case of the joint management of the lower Great Lakes, policy reflected the concerns and perceptions of the people who show up in these archives: a culturally homogenous group almost entirely comprised of literate, white men who spoke English or were French/English bilingual, with few perceptible cultural differences between Americans and Canadians.

As part of understanding how institutions were created and how they have evolved, it is essential to point out that the local people to whom the region’s political class responded were also largely white, male, educated and English-speaking. Although I make extensive use of the letters that citizens wrote to newspapers, to their elected representatives, to bureaucrats and to the staff of public utilities, I am aware that these documents only capture the comments made by the subset of people who felt sufficiently empowered to write to their governments.

There are many notable absences in the documentary record of transboundary water policy. Among the missing perspectives are those of the First Nations and Native American communities around the lower Great Lakes. During the middle and late twentieth century they included Mississaugas, the Six Nations of the Grand River (Iroquois), Oneida, Chippewa, Mohawk, Anishinaabe, Potawatomi, Ojibwe, Ottawa, Seneca, Odawa, Tuscarora, Onondaga and Cayuga. The absence of extended treatment of the First Nations/Native American role in the US-Canadian transboundary relationships is partly a function of the time period: between 1900 and 1972, there was little scope for First Nations/Native American agency in water management policy. If I have the opportunity to extend this work into the 1970s and beyond, it
would be imperative to examine the political involvement of First Nations and Native American people with transboundary organizations, mercury poisoning, and fishing rights, at the very least.

Although it is impossible to identify a person’s race from the available correspondence, it is also reasonable to assume that the transnational policy process lacked input from the many African-American residents of the cities around the lower Great Lakes, many of whom arrived during the Great Migration from the southern United States that began during the First World War.\(^8\) Detroit had a particularly large African-American community by the mid-1910s, many members of which were employed in automobile manufacturing. The lower Great Lakes were also the site of immigration, primarily from the British Isles, Europe and Russia, and it is likely that newcomers who did not speak English comfortably were underrepresented in policy-making.

The voices of people belonging to these groups, and to women, were under-represented in the politics of the period. As a result, to the extent that this dissertation addresses the lived experience of environmental change, its conclusions are limited because they do not include a detailed analysis of the different experiences of these groups and individuals. However, these limitations do not detract significantly from the main goal of the dissertation, which is to understand how the residents, bureaucrats, scientists and political leaders of United States and Canada tried to manage Lake Erie and Lake Ontario during a period of intense and widespread environmental upheaval, and how their perceptions of water problems shaped the transboundary institutions that they created together.

With respect to the main issues of joint water policy – control of levels, water quality, fisheries – there was not much deliberate differentiation on the basis of identity. The decision to

control the water level on Lake Erie was more significant for some organisms than others, but it affected humans in a broadly similar way, regardless of their race, class or gender. When municipal water utilities began to supply chlorinated drinking water, for example, men and women drank the same water within the boundaries of each municipality. At the same time, because the pace of installation and quality of water treatment and sewage treatment plants varied around the lakes, it is likely that the history of that infrastructure contains evidence of structural inequalities on both sides of the border.

In my judgment, occupation was a more important determinant of a person’s experience and understanding of the changing lakes than gender, race, ethnicity, immigration status, sexual orientation, religion, or citizenship. People knew the changes that were occurring and were exposed to the risks and environmental change through the work that they did. In order to understand these varying experiences of environmental change, and to account for the varying impacts of the changing aquatic ecosystems and changing policies on different people, further research would be necessary to devise an analytical approach that can capture the wide variety of experiences at different locations and times.

*Regional Geology, Ecology, and Demography*

Lake Erie and Lake Ontario are the smallest of the five Laurentian Great Lakes. Lake Erie has a slightly larger surface area than Lake Ontario (26,000 km² as compared to 18,960 km²), but Lake Ontario is much deeper and contains more water overall. Water enters the lower Great Lakes from the three upper Lakes, from streams and groundwater in their surrounding basins, and though precipitation, and then circulates through them quite rapidly, lingering for an
average of 2.6 years for Lake Erie and 6 years for Lake Ontario.\textsuperscript{9} Lake Huron flows into Lake Erie via the Detroit River, Lake St. Clair and St. Clair River, and Lake Erie flows to Lake Ontario by the Niagara River.

Lake Erie and Lake Ontario were formed during the retreat of the Wisconsin ice sheet at the end of the last Ice Age, between 13,200 and 11,800 years ago. They share many ecological characteristics, including fertile PaleoZOic soils that were shifted and sorted when the glaciers retreated. These arable lands are the first places that people settled and they are still where most people in the region live.

Humans first arrived on the shores of the lower Great Lakes approximately 14,000 years ago, as the last Ice Age was ending and before Lake Erie and Lake Ontario had reached their current forms.\textsuperscript{10} By approximately 10,000 years BP, the lakes had acquired their present shape and size.\textsuperscript{11} So far as archaeology can determine, these Paleoindians or Clovis people hunted, fished, and gathered food from the surrounding area as the largest mammals of the Ice Age died away and new flora and fauna moved into the warmer, postglacial areas around the lakes.\textsuperscript{12} Communities living around Lake Erie and Lake Ontario traded with people as far away as modern-day St. Louis by 300 C.E.\textsuperscript{13}

Around the year 500 C.E., corn began to be cultivated around present-day Detroit, and by 1000 C.E., it became the mainstay of the region’s agriculture. Between 1300 and 1430, beans and squash were introduced, forming the triad (corn-beans-squash) that provided “a

\textsuperscript{11} Fuller and Shear, \textit{Environmental Atlas}, 6
\textsuperscript{12} Riley, \textit{Once and Future Great Lakes Country}, 11.
\textsuperscript{13} Riley, \textit{Once and Future Great Lakes Country}, 13.
year-round diet based on farming."\textsuperscript{14} The population of the lower Great Lakes tripled during this period. The diverse nations that established themselves belonged to two linguistic groups: Algonquian and Iroquoian.\textsuperscript{15} Around 1500, just before the first Europeans arrived, the Algonquian nations around Lake Erie and Lake Ontario included the Algonquian, the Potawatomi (Fox, Miami, Conestoga, Delaware and Shawnee) and the northern Algonquian (Nipissing, Ottawa). The Iroquoian nations at that time included Erie, Wenro, Whittlesay and Petun nations, the Iroquois Confederacy on the southern shore of Lake Ontario and the Mohawk Valley (Seneca, Cayuga, Onondaga, Oneida, and Mohawk), and the Huron and Neutral confederacies between Lake Ontario, Lake Erie and Lake Huron.\textsuperscript{16}

When Europeans arrived in the early seventeenth century, the lower Great Lakes region was characterized by hardwood deciduous forests of oak, maple and other trees, as well as grasslands, wetlands, and brush forests. The impact of First Nations and Native American land use practices had begun to slowly reduce the forest cover (by about 10\% over 600 years) and in more settled areas, had selected for trees that bore useful timber, nuts, and fruit.\textsuperscript{17} The arrival of French and British explorers, fur traders and missionaries upended the social landscape around Lake Erie and Lake Ontario, as devastating epidemics killed an estimated two-thirds of the regional population in six years between 1634 and 1640.\textsuperscript{18} The new arrivals also shifted the dynamics of trade and warfare, so that the human population and land use of the entire region were transformed by the 1650s. From the mid-seventeenth century until the arrival of substantial numbers of European settlers in the early nineteenth century, an ‘unprecedented wilding’ took place around the lower Great Lakes, as long-established, large-scale land maintenance became

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\textsuperscript{14} Riley, \textit{Once and Future Great Lakes Country}, 15.
\textsuperscript{15} Riley, \textit{Once and Future Great Lakes Country}, 19.
\textsuperscript{17} Riley, \textit{Once and Future Great Lakes Country}, 14, 18, 26.
\textsuperscript{18} Riley, \textit{Once and Future Great Lakes Country}, 41.
\end{flushleft}
impossible for the small remaining population of survivors, refugees, fur traders and missionaries.19

At the end of the Seven Years’ War in 1763, the British took over from the French as the dominant European presence around Lake Erie and Lake Ontario. Following the outbreak of the American Revolution in 1776, there was a period of intense conflict among Loyalists, Iroquois and Americans around the two lakes, which ended with the Treaty of Paris in 1783. That treaty established the current boundary line between Canada-United States. Beginning in 1784, an influx of 40,000 British loyalists moved from the former American colonies into the lower Great Lakes region and began to practice their forms of agriculture.20 By 1850, newcomers of European descent outnumbered First Nations and Native American people by a factor of ten.21 With English-speaking settlers came a revolution in land use practices: First Nations and French agricultural patterns and villages disappeared as successive British lieutenant governors granted land and settlers cleared forests, dammed streams for mills, laid out towns and built roads and canals to link the lower Great Lakes to the Atlantic coast and the rest of the world.

In the nineteenth century, industrialization began and immigration into the region accelerated, accompanied by overall urbanization, demographic trends that continued through the early decades of the twentieth century on both sides of the border. Nineteenth-century immigrants to southern Ontario came overwhelmingly from the British Isles,22 while immigrants to the areas of Ohio, Michigan, New York and Pennsylvania within the Erie and Ontario watershed were mainly African-Americans from the southern United States (especially after

19 Riley, Once and Future Great Lakes Country, 45-46.
21 Riley, Once and Future Great Lakes Country, 81.
1870), from Canada, and from Europe. Immigration between the United States and Canada was not monitored closely before the Second World War and when the United States curtailed immigration in the mid-1920s, Canadians were specifically exempted from the restrictive national quota system.

It is intriguing to contemplate how the geography and limnology of the lower Great Lakes figure into the Canada-United States relationship. The U.S. has been consistently more responsive to Canada in Great Lakes matters than it has been to Mexico on Rio Grande or Colorado River issues, and more responsive on boundary waters issues than on many other topics: the Great Lakes relationship is unusual. Arguably, the physical and political geography of the lower Great Lakes have shaped transboundary relationships there: all water issues are always shared, all issues are transnational. The geography and hydrology play a role in politics by making collective interests more obvious and because both Canadians and Americans are constantly affected by the diplomatic arrangements on Lake Erie and Lake Ontario, bilateral relations have historically been tangible rather than abstract for the people living there.

The two federal governments' different attitudes to the region's problems have probably been based, in part, upon the relative importance of the lower Great Lakes to their national populations and economies. By 1900, there were approximately 4.2 million people living around Lake Erie and Lake Ontario: 2.2 million in southern Ontario and 2.0 million in the counties of

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Ohio, Michigan, Pennsylvania and New York that lie within the lakes’ watershed. This means that nearly half of Canada’s population lived in the Lake Erie or Lake Ontario basins (2.2 of 5.3 million, or 41%), while only 2.5% of the United States population lived there (2.0 of 76.2 million) in 1900. By 1970, the population around the two lakes had risen to approximately 15.9 million: 8.1 million on the US side and 7.7 million on the Canadian side. The American population had become a slightly greater proportion, 4% of the U.S. national total (8.1 million of 203 million Americans living in counties within the Erie or Ontario watershed), whereas on the Canadian side the population of 7.7 million had become a slightly smaller share, 35.6%, of the national population of 21.6 million. Throughout the 1900-1972 period, the residents of the lower Great Lakes represented only a small part of the population that the American federal government was trying to govern, while constituting a very large proportion of the Canadian population. Although it is difficult to acquire the historical statistics that would enable quantitative analysis of the regional economy relative to the national economies of both countries, it is reasonable to presume that the cities, farms and factories around Lake Erie and Lake Ontario represented a much larger proportion of Canada’s GDP than of the United States’ GDP. The incentive to focus federal-level attention on the region varied accordingly.

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For states and provinces, these demographic and economic calculations were different. For example, the city of Detroit, located on the Detroit River in Wayne County, Michigan, was a significant driver of Michigan’s economy. Strong concern for its safe water supply prompted state health officials to lobby Washington, D.C. for infrastructure funding and to coordinate with their counterparts on the Ontario side of the river long before such state-to-province cooperation was widespread. (See Chapter 3).

Millenia of human occupation and a century of industrialization shaped the geography of Lake Ontario, Lake Erie and their connecting channels, setting the physical parameters and the political boundaries within which Canadians and Americans tried to manage the space jointly together during the twentieth century.
Chapter 1—Remaking Relationships: the Creation of the Boundary Waters Treaty and the International Joint Commission, 1900-1910

In 1910, the United States and Britain (on behalf of Canada) signed the Boundary Waters Treaty into existence. Part of the treaty established the International Joint Commission, the first permanent, joint institution for managing fresh water along the Canada-US border. The treaty also resolved several urgent water disputes affecting the Great Lakes and laid out an order of priorities for water usage along the boundary. The Boundary Waters Treaty and the International Joint Commission have been central to all subsequent attempts to control the quality, quantity and flow of water along the United States-Canada border. They are the first and largest part of the first generation of water management institutions on the lower Great Lakes, a group that includes permanent joint organizations, informal networks, treaties and laws.

The goal of this chapter is to explain how this cornerstone treaty and influential commission came into existence, so that later chapters can examine the how the first generation gradually evolved into the second generation of more ecologically sound and socially inclusive transboundary arrangements by the early 1970s. Why were they created in 1910, rather than earlier or later? Why did they take the forms that they did? The answers to these questions lie in two very different sets of events: rapid transformations in water usage on the Great Lakes and shifts in global geopolitics.

At the turn of the twentieth century, rapid industrialization, urbanization and intensification of resource extraction around the Great Lakes prompted new disputes over transboundary water use between Canada and the United States. The existing methods for resolving these disputes were extremely inefficient and, in Canada, had little legitimacy. The general public and elected officials at the local, state, provincial and national levels saw the need for a better way to manage the disputes that mushroomed as more people tried to generate hydroelectricity, expand canals
and harbors, and divert water to growing cities and farms. In one sense, then, the Boundary Waters Treaty arose in response to local demand around Lake Erie and Lake Ontario.

At the same time, factors far from the Great Lakes watershed were increasing national leaders’ interest in improving relations there. Global shifts in military and economic power were changing relations among Canada, Britain and the United States, bringing American and Canadian policymakers into closer conversation. Officials from the two North American countries met more frequently and communicated more directly, and this new closeness enabled them to produce a durable solution to the boundary waters disputes fairly rapidly: the Boundary Waters Treaty to settle the existing disputes and the International Joint Commission to address future problems amicably. This placed management of the Great Lakes squarely in the hands of the Canadian and American governments, which were more directly responsive to the concerns of people living there than the British government had been, and engaged more people from in their management.

First, a brief overview of the economic development of the Great Lakes region will demonstrate how quickly and completely land use and water use changed there during the last decades of the nineteenth century. Then, an examination of the water disputes of the last half of the nineteenth century shows how they were closely related to this intensification of human activity and how businessmen, investors and local officials in the Great Lakes region pressed their governments to resolve these problems, raising their concerns at the highest levels.

Then, a brief detour into the geopolitics of the British Empire will examine the diplomatic roadblocks that prevented the proliferating water disputes in the Great Lakes from being addressed as they arose. It took time and changes in personnel before British officials in North America decided that helping the Canadians deal directly with the United States would serve their interests. Once that occurred, a small group of Americans, Canadians and Britons negotiated the Boundary Waters Treaty. Direct Canadian-American communication was crucial to the resolution of the problems, even though most of the negotiators were motivated by a desire prevent boundary waters issues from impinging on British-American relations. The coalescence of these two trends -
pressure for clear solutions to the disputes arising from rapidly changing resource use around the Great Lakes, and pressure to facilitate Anglo-American rapprochement - produced an unusually equitable treaty and a practical joint institution.

The Great Lakes Region Becoming a ‘Hearth of Industry’

A brief survey of economic history clarifies why a set of high-profile water disputes arose over places that had been farming communities or deep wilderness only decades before. The expansion and intensification of human activity in the Great Lakes at the end of the nineteenth century was part of a global transition from a coal-and-steam energy regime to the petroleum and natural gas regime.\(^1\) Many areas of economic activity saw rapid increases, including but not limited to: mining, logging, agriculture, iron and steel, fishing, pulp and paper, petroleum drilling and refining, electrical equipment manufacture and chemical production. As resource extraction and industrialization accelerated throughout the region, transportation networks in the form of railroads, roads, ships, harbor facilities and communications infrastructure expanded to move raw materials to workshops and to market. This infrastructure also drew regions that produced raw materials into closer contact with population centers around the Great Lakes. Another part of period of economic development was demographic change and urbanization; the population of the Great Lakes watershed rose in both rural and urban areas.

The following graphs give a quantitative sample of the region’s changes during this formative period. The first two graphs depict population growth, the third and fourth show the rapid growth of industry. The third graph shows deliveries of ore mined north of Lake Huron and Lake Superior, which more than doubled in ten years, hinting at the massive increases in demand for raw materials and in shipping capacity around the Great Lakes at this time.

Figure 1. American Population of Lower Great Lakes Watershed, 1840-1920

Figure 2. Demographic Change in Southern Ontario, 1871-1921

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Figure 3. Iron Ore Received at US Ports on Lake Erie, 1892-1903.  

Figure 4. Value Added in Manufacturing, U.S. Side of Lake Erie, 1899-1914.  

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So, how were these economic changes linked to politics and diplomacy? During this comprehensive acceleration in economic activity, there were many new opportunities to acquire wealth, and Americans, Canadians and Britons with investments in water infrastructure on the Great Lakes took an understandably avid interest in political decisions affecting the waterscape. Citizens of all three countries promoted ideas for infrastructure by lobbying their governments, publishing in the popular and professional presses, and by forming civil groups such as the St. Lawrence Seaway Association, the Lake Carriers Association, and the Deep Waterways Association. Their enthusiasm for new transportation infrastructure financed several expansions of the Welland Canal around Niagara Falls, enlarged the St. Lawrence River canals, and dredged the channels at Sault Ste. Marie.\textsuperscript{6} Other well-publicized schemes of the era included pressing for a St. Lawrence Seaway, an enlarged Lakes-to-Hudson River canal system, and a Great Lakes-to-Gulf waterway.\textsuperscript{7} Investors were equally pleased to buy stock in companies developing the hydroelectric capacity of the rivers on the lower Lakes, near cities that would use the electricity.\textsuperscript{8} Around the lower Great Lakes, the governments of cities, counties, states and province spent tax revenue and issued bonds to build harbor facilities and to ensure predictable lake and river levels for the convenience of shipping and hydroelectricity by dredging, damming and draining marshes.


\textsuperscript{8} For example, the Niagara River, the Rainy River, and the St. Lawrence River.
The Canadian, British and American governments of the day were in favor of development. Occasionally, fishermen and conservationists protested the impact of all these changes on local biota, and occasionally residents complained about the sounds, smells and dangers associated with new manufacturing and resource extraction. However, by and large the local, provincial, state, national and imperial governments in northern North America regarded it as their responsibility to facilitate these changes and to foster 'progress' that would make their citizens wealthier, healthier and more numerous. This chapter will not detail these numerous exercises in political maneuvering but it will show how the quick pace of economic development and the related boundary waters disputes legitimated high-level political attention to the countries’ shared hydrography.

At the end of the nineteenth and the beginning of the twentieth centuries, the Canada-US border, and in particular the Great Lakes region, was experiencing an enormous acceleration of economic activity, with concomitant environmental impacts and new opportunities to gain wealth and political power. Never before had North Americans tried to share the boundary waterways while also building new industries, founding new cities and tapping new energy sources. The Boundary Waters Treaty and the International Joint Commission are, in a sense, indirect products of the transformation of the Great Lakes region.

After the U.S. Civil War ended in 1865, the most innovative and quickly growing parts of American industrial activity slowly shifted from the Eastern Seaboard to Pennsylvania and the Midwest, and accelerating production of steel overtook iron as the one of the largest, most lucrative parts of the industrial sector. Investors from the Eastern seaboard, including well-known Progressive-era captains of industry like such as J.P. Morgan, expanded their holdings

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9 Files 702-4-2(1), 702-4-3 through 9, 11-13 (2), Box 436, RG 23, LAC, covering complaints from residents of southern Ontario to the federal Department of Fisheries, 1914-1953. See also Margaret Bogue, *Fishing the Great Lakes: An Environmental History, 1783-1933* (Madison: University of Wisconsin Press, 2000) 279-296.

westward. Oil and gas were quickly becoming the industrial fuels of choice, making the coalfields of Eastern Pennsylvania less important to manufacturers than they had been during the nineteenth century. Cleveland and Pittsburgh were the first western hubs of the rapidly expanding iron and steel industries, followed quickly by Chicago, Detroit, Buffalo and a host of smaller cities.

North of the border during the same period, British and American citizens, with a few Canadians, invested heavily to get raw and partially-finished materials from the Canadian hinterlands to American, British imperial, and international markets. In particular, American demand for iron ore drove a remarkably fast set of investments in extraction and transportation infrastructure on Lake Superior and Lake Huron. At the same time, many industries accompanied the iron and steel mills to the growing cities of Great Lakes, where proximity to oil fields, ore deposits, and cheap hydroelectricity facilitated metallurgy and chemical refining. A Minneapolis newspaper described a steelworks being built at Sault Ste. Marie in typically glowing terms, referring to the entrepreneur heading the group of Michigan and Ontario financiers there as a ‘Western Cecil Rhodes.’ Canadian-American joint ventures and ‘branch plants’ in Canada were common ways for American industrial firms to establish themselves in Canada, circumventing the restrictive laws governing transboundary corporations. Food processing, paper milling and small manufacturing grew rapidly in Southern Ontario cities such as Hamilton, Windsor and Toronto. Economic historians refer to this as the ‘Laurier Boom’ (1896-1914), naming the period for the

14 “Two Big Furnaces: Clergue, the Western Cecil Rhodes, to Outdo Previous Effort,” The Minneapolis Journal, 18 February 1901, 1 and “What Clergue is Doing at the Soo: Modern Steel Worlds with Electrical Power Furnished by New Canals - Associate Industries of Wonderful Character,” The Minneapolis Journal, 31 August 1901, 18.
Prime Minister, Wilfrid Laurier. US historians chronicle the same trends on a larger scale, though
the American accounts of the ‘Gilded Age’ and ‘Progressive Era’ in the United States address the
period’s social inequities earlier and in greater detail than the Canadian histories.

The aggressive extraction industries, industrialization and growing population all drove
massive changes in land use throughout the Great Lakes region. The lower Great Lakes had
undergone underwent significant deforestation during the nineteenth century, losing approximately
60% of its forest coverage before 1815 as farms and settlements expanded. This deforestation
affected the local hydrology in numerous ways: it changed the timing and magnitude of evaporative
losses to the atmosphere, altered soil moisture content, runoff and river flow patterns, increased
streamflow, and changed flood frequency. By the beginning of the twentieth century, the pace of
deforestation had slowed, and other human activities were having a greater impact on the aquatic
environment.

During the nineteenth century and through the first decades of the twentieth century,
Americans and Canadians worked hard to destroy the region’s wetlands so that they could create
farmland through draining wet places, facilitate transportation, and create new land for urban
building. Urban infill and rural drainage had similar impacts on the watersheds of Lake Erie and
Ontario, including shifts in plant species composition, loss of wildlife protection, decreased
biodiversity, reduction in fish, more floods and higher flood levels, and decreased water quality

16 “Starting in 1896, the beginning of an inflationary cycle for most of the advanced industrial world, the boom
reached its apogee during the first Canadian merger wave that began in 1909, only to die out with the world-wide
recession of 1913.” Gregory Marchildon, Profits and Politics: Beaverbrook and the Gilded Age of Canadian Finance
(Toronto: University of Toronto Press, 1996), 7.
17 Two excellent monographs dealing with the environment of the Great Lakes during this period are: William
Cronon’s Nature’s Metropolis: Chicago and the Great West (New York: W. W. Norton, 1991) and Harold Platt’s
Shock Cities: The Environmental Transformation and Reform of Manchester and
Chicago (Chicago: University of Chicago Press, 2005). For the broader history of this period, see also:
Elizabeth Sanders, Roots of Reform (Chicago: University of Chicago Press, 1999), Alan Trachtenberg, The
Incorporation of America (New York: Hill and Wang, 1982) and Richard Bensel, The Political Economy of
18 Dazhi Mao and Keith A. Cherkauer, “Impacts of land-use change on hydrologic responses in the Great
Lakes region,” Journal of Hydrology 374, no. 6 (June 2009): 71.
19 Mao and Cherkauer, “Impacts of land-use change,” 71-73.
downstream. More than 80% of the wetlands in Ohio and more than 90% of the wetlands in southern Ontario were gone by the mid-twentieth century. Wetlands ecologists working for the US EPA and the Canadian Ministry of Natural resources in the late 1990s regarded the wetlands of the small rivers and streams of the Great Lakes watersheds as a significant biodiversity reservoir for the region because they harbored 18% of the basin’s species or community types. By comparison, only 8% of the region’s species live in terrestrial ecosystems. The loss of a square kilometer of wetlands had a greater impact on regional biodiversity than the destruction or pollution of a square kilometer of field or forest.

As the acreage of cities and farmland increased at the expense of wetlands, people built factories and homes on the new ground. The early twentieth century was a period of intense, rapid industrialization Lake Erie and Lake Ontario. Steel plants and auto manufacturing grew quickly, along with their associated industries: metallurgy, petroleum refining, chemical production, banking, and goods and services for people employed in these industries all contributed to transformative urbanization and industrialization that began at the turn of the twentieth century and continued through the early 1960s. With these changes in the region’s economics came changes in the ecosystem: widespread chemical and biological pollution of local air, water and soil began to affect most species, including people. Furthermore, since the materials and products were not all consumed in the Great Lakes region, Americans and Canadians built a network of railroads, canals, harbors, roads and bridges to move them to distant markets, which also disrupted local water systems by changing the level, flow and direction of watercourses. While these changes were nearly unanimously lauded at the time, they also had drastic environmental implications and

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created powerful new incentives for people to own and control water resources, which gave rise to new conflicts.

_Proliferating Disputes_

Although no policymakers of the day appear to have stated it explicitly, diplomatic historians recognize a direct link between the proliferation of water disputes in the late nineteenth century and the rapid industrialization and urbanization on both sides of the border at that time. As water disputes began to represent an increasingly large proportion of Canada-US conflicts, the need to find a straightforward way to address them became pressing. The most contentious dispute concerned whether or not Chicago had the right to divert water from the lakes without consulting other users. Two others involved assigning shares of available hydroelectric generation capacity on shared rivers. A fourth was a dispute over irrigation water in which both parties were both upstream and downstream users. Examining the four disputes that received the most political attention, in descending order of relevance to the Great Lakes, will demonstrate how little institutional capacity existed to address water conflicts and why citizens of both countries were anxious for their governments to settle the disputes.

One of the longest-lasting, most acrimonious disputes in the history of the Great Lakes began in 1900 when the Sanitary District of Chicago opened a sanitary drainage canal to move the city's disease-laden sewage away from its drinking water supply in Lake Michigan. The Chicago Drainage Canal diverted a massive quantity of water away from the Great Lakes and into the Mississippi River watershed. When it opened, the canal removed 10,000 cubic feet per second and lowered the water levels on Lakes Huron, Erie, Ontario and Michigan by approximately six

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24 For example, Peter Neary noted that the question of boundary water use "had been brought to the fore by rapid industrialization at the turn of the century on both sides of the border." Peter Neary, "Grey, Bryce and the Settlement of Canadian-American Differences, 1905-1911," _Canadian Historical Review_ 49, no. 4 (December 1968): 359.
inches. This hindered navigation by creating new currents around Chicago harbor and by reducing the depth of shipping channels around the affected lakes, which were so shallow that the loss of those few inches required local governments to pay for expensive dredging in order to maintain their harbors’ usefulness. The Chicago Sanitary District did not consult any of the other jurisdictions bordering the Great Lakes during the construction of the canal and refused to change its plans in response to vehement private and public protests from both sides of the border. The downstream city of St. Louis protested and filed a lawsuit while the canal was still under construction, to no avail.

When the diversion began, Canadian shipping interests were extremely upset by the lower water levels on the lakes and in the St. Lawrence River. For the next two decades, they protested to their federal, provincial and local governments, via the British consulates and embassy in the United States, and in the popular press. South of the border, various affected groups protested and then filed lawsuits to shut down the canal or reduce its flow. The states and municipalities bordering Lake Michigan were particularly incensed because access to their shallow, sandy harbors were compromised. St. Louis tried to sue the Sanitary District again because the city experienced a dramatic spike in cholera and typhoid rates when Chicago’s diverted sewage entered its water supply. The US War Department filed suit after protesting fruitlessly against the


For contemporary coverage, see “Canada’s Waterways Must Not Be Sacrificed for Chicago Drainage,” The Globe (Toronto, Ont.), 27 June 1906. See also: “The Chicago Canal: Canada’s Case Has Not Been Fairly Stated” The Globe (Toronto, Ont.), 24 October 1906 and “Chicago Scheme Stoutly Opposed” The Globe (Toronto, Ont.), 28 March, 1912.

current created by the new canal, which prevented naval ships from docking safely in Chicago harbor. Only the War Department’s lawsuit produced any results: in 1929, the Supreme Court ruled that the sanitary canal had to diminish its diversion. However, in the years leading up to the creation of the Boundary Waters Treaty, the legal proceedings were in full swing and everyone with a financial or political interest in the Great Lakes was eager to know what kind of a precedent the Chicago diversion would set. Would drastic, unilateral change to the hydrology be permitted or prevented?

Other problems emerged as Canadians and Americans began to alter the flow of transboundary rivers to build hydroelectric power plants. In 1904, the Minnesota Canal and Power Company proposed the construction of reservoirs on Birch Lake, Minnesota, which was tributary to the Rainy River/Lake of the Woods system, a boundary water. None of the state, local or provincial governments in the watershed were empowered to decide how much water a power company could use in a boundary tributary, or on what terms, and they referred the question to the federal governments. Canada objected that the proposed dams would create lower water levels downstream, thus harming navigation and violating the 1842 Webster-Ashburton Treaty, which guaranteed that the river system should be ‘free and open’ to navigation. The issue remained unresolved while the company’s shareholders waited impatiently.

In the case of the Niagara River, the unresolved questions revolved around two issues: first, how to divide the rights to develop hydroelectric power at Niagara Falls, and second, whether or not to try to preserve the Falls as a ‘natural wonder’ while developing their power generation potential. The topic was widely covered because the Falls were such a popular tourist destination, but also because hydro dams had the potential to change water levels along the shipping route between Lake Erie and Lake Ontario. A newspaper report on the representations that the Lake Carriers Association made to Congress is good summary of the competing interests involved, and shows how closely linked the various issues were:

Cleveland, Feb. 10 - A delegation of twenty of the most prominent vessel owners on the great lakes [sic] will start for Washington Monday, accompanied by Harvey D. Goulder, the attorney of the Lake Carriers’ association. The object is to induce congress to take steps towards the formation with Canada of an international commission, which shall consider all matters affecting the water outlets of the lakes. The reasons why they are active at this time are the completion of the Chicago drainage canal, the completion of the Soo [Sault Ste. Marie] power canal and the proposed building of a dam in the Niagara river.

The report also shows that citizens around the lakes were publicly calling on their governments to manage their waters cooperatively.

Farther west, a pressing and intractable dispute emerged over the problem of sharing water for irrigation in the St Mary’s and Milk River system between Montana and the Northwest

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Territories (in present-day Alberta and Saskatchewan). The location’s hydrography is unusual, in that both countries are both upstream and downstream users of the two rivers. This dispute was indirectly related to the growth of industries and cities around the Great Lakes, because they were an important and growing market for the agricultural products of the plains. As demand there grew, it created increasingly large incentives to develop farms in the St. Mary’s and Milk watersheds.36

Canadian and American settlement began around the two rivers in the 1880s, but the region’s scarce water did not pose a problem until American farmers and land speculators asked the Montana government to finance irrigation canals in 1890. They wanted to divert water from the St. Mary’s River before it reached the Canadian border, send it by canal to the Milk River, and then use the added water to irrigate crops on the lower Milk River basin, after it had journeyed through Canada and come back south.37 American officials were enthusiastic about the proposals, while their Canadian counterparts protested that it would deprive settlers in the St. Mary’s River watershed of water for their farms.38 When it began to look likely that Montana would receive a Congressional appropriation for the project under the Reclamation Act, the Canadian federal agency responsible for the Northwest Territories undertook a well-publicized survey of the two watersheds on their side of the border.39 The implication of this survey was that if the Americans

36 For an authoritative description of the American side of this process, see William Cronon, Nature’s Metropolis, 97-104, 120-132, and 220-224. Although Cronon’s account focuses on Chicago, the other cities on the Great Lakes played similar roles in the trends of industrializing cities drawing on a large hinterland, and of hinterlands being transformed as new forms of transportation connected them to global commodities markets. For detailed coverage of these trends in Canada, see Wightman, The Land Between, 104 and 135-146 and Bliss, Northern Enterprise, esp. 243-252 and 285-288. In absolute terms, the expansion of agriculture and growth of manufacturing cities in Canada was less impressive than in the United States because the population was so much smaller. However, the rates of growth were equally impressive on both sides of the border.


39 “Reclaim Arid Lands: This the Subject of Secretary Maxwell’s Address to Commercial Bodies,” The St. Paul Globe, 11 March 1900, 8; “Funds for Irrigation” Eight Million Dollars Available for Reclaiming Arid Lands,” The Minneapolis Journal, 16 August 1902, 1.
diverted the St. Mary’s water to the Milk River, Canadians would simply divert it back through another canal once it reached their side. Press coverage from the period indicates that this subtext was widely understood.\textsuperscript{40} By 1904, this preemptive canal, locally known as ‘the Spite Ditch,’ was completed but not in use. The American Secretary of State, John Hay, complained to the British government about it, while local boosters in Montana and the Northwest Territories all protested that the other country’s developers were trying to ruin their settlements.\textsuperscript{41} It was all too easy for policymakers in Ottawa and Washington to imagine the tension on these rivers erupting into violent conflict.

These four disputes over sanitation, hydroelectricity and irrigation are ample proof of how much trouble Canadians and Americans were having as they tried, with reasonably good faith, to share the water resources along their boundary. Whether they were investors, farmers, ranchers, sanitary engineers, health officials, or fishermen, the need for cooperative water management was abundantly clear to people living in the Great Lakes region.

\textit{The North American Context}

There were several attempts to address the emerging water problems before the negotiations for the Boundary Waters Treaty began. In general, they show how little institutional capacity existed to resolve tensions over resource management as the nineteenth century gave way to twentieth; there were no established procedures, no technical experts, no budget, and not much political momentum. For example, in 1895, an International Irrigation Conference attended by Canadians, Americans, and Mexicans recommended that the United States, Mexico and Canada form a commission to settle boundary waters questions. The Canadian Cabinet responded

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to this suggestion a full year later, asking the British Ambassador in Washington to tell the
American Government that it was willing to consider, "‘appointment of an international commission
or otherwise,’ in the regulation of international streams for irrigation purposes."42 The United States
did not even respond. The same idea was raised when United States and Britain arranged the
Joint High Commission (JHC) in 1898 to address a long list of Canadian-American disputes that
included a study of fisheries problems along the boundary.43 Unfortunately, the JHC dissolved after
less than two years with no results.44

After the irrigation conferences and the Joint High Commission, the United States
Congress raised the issue of boundary waters disputes again in June 1902 when it passed a River
and Harbors Act which requested the President to invite the British government to form a
commission "... to investigate and report upon the conditions and uses" of the Great Lakes
watershed, to report on how diversions affected navigation interests there, and to recommend
improvements and regulations to safeguard navigation.45 The widespread, loud dissatisfaction with
the Chicago diversion was one of the reasons for creating the commission: opponents of the
diversion wanted a well-researched case to bolster their lawsuits, and proponents wanted an end
to the protests. President Roosevelt made the invitation, and the British Foreign Office conveyed it
to Prime Minister Laurier in Ottawa, who consented nearly twelve months later, in April 1903.46 The
International Waterways Commission (IWC) was created and the United States named its

Digest of Materials Relating to the Establishment and Development of the International Joint Commission.
Prepared for internal use of the Canadian Section of the IJC, Ottawa, Ont., 1967, 1.

43 Two Commissioners - Richard Rathbun, a scientist with the United States Commission of Fish and
Fisheries, and Dr. William Wakeham, a physician who worked on ships protecting fisheries in the Gulf of St.
Lawrence - produced a detailed report and proposals for fisheries regulation in the boundary waters for the
Joint High Commission in 1892. They did their best to create good recommendations for the enormous
geography and varied industries covered by their assignment. Unfortunately, the report was never used
because the Commission disbanded without result. Margaret Bogue, "To Save the Fish: Canada, the United
1429-54.

44 O.D. Skelton, The Life and Letters of Sir Wilfrid Laurier Vol 2 (Toronto: McClelland and Stewart, 1965),
360. See also Alvin Gluek, "Pilgrimages to Ottawa: Canadian-American Diplomacy, 1903-1913." Canadian
Historical Association Papers, (Ottawa: Canadian Historical Association, 1969): 65-83.

45 Quoted in Jordan, Annotated Digest, 1-2.

46 Privy Council Minutes, April 27, 1903, Canadian government. Quoted in Jordan, Annotated Digest, 3.
commissioners on October 2, 1903. However, a dispute over the Alaska Boundary put a damper on Canadian relations with Britain and the United States that autumn and the Canadian government chose to let the IWC remain incomplete.

By the turn of the century, interested legislators and jurists were trying to develop rules and structures to address the multiplying water disputes, but without much success. In order to understand the solutions that did emerge, it is important to understand the relationships among policy professionals in Canada, the United States and Britain.

*Changing British, Canadian and American Foreign Policies*

As the twentieth century began, British and Canadian policymakers were responding to the geopolitics of the day, trying to manage the roiling tensions that would soon ignite the First World War, Canada’s budding nationalist movement, and the rising power of the United States in global affairs. While these men (for they were, without exception, men) thought little of the environmental consequences of their policies, their decisions produced the negotiations for the Boundary Waters Treaty, which has had a profound impact on some of North America’s largest waterways.

During this period, Britain’s foreign policy towards the United States was one of rapprochement. As economic and military competition intensified between Britain, the United States and Wilhelmine Germany in the later decades of the nineteenth century, the British government felt less and less secure. It saw alliances as a cheap way to protect its increasingly

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47 One might expect a country’s founding politicians to have been the founders of its independence movement, but in the Canadian case, nationalism and the independence movement were not identical or even very closely related. When the Dominion of Canada was created in 1867, the architects of Confederation shared a conviction that their new country’s strong constitutional, cultural, and economic ties to the British Empire would do more to ensure its success than would total independence. Canada’s first Prime Minister, Sir John A. MacDonald, famously declared, “A British subject I was born, a British subject I will die,” which his contemporary biographers regarded as a statement of Canadian nationalism and anti-Americanism. By the early twentieth century, however, a Québécois MP, Henri Bourassa, had emerged as the leader of a growing movement for complete Canada’s autonomy in foreign policy, trade relations and military policy. In the historiography of Canadian politics, this movement for autonomy is generally described as the ‘nationalist movement,’ and it is in that sense that I am using the word here.
expensive Empire and the increasingly vulnerable British Isles, and hoped that a sturdy Anglo-American friendship would remove the need to defend themselves from North America and perhaps provide them with an ally in the case of a Continental war or German invasion.

In the interests of warmer relations, the British government made a number of conciliatory gestures towards the U.S. between 1870 and 1905. These included settling naval claims from the American Civil War, yielding to US preferences in a South American border dispute, supporting the Americans in the Spanish-American War, and giving the United States sole control over the Panama Canal in 1901, instead of sharing control with Britain as agreed in an earlier treaty. None of these gestures impinged heavily on Canada. The British desire for American friendship and their role as conductor of Canada's external relations did not come into open conflict until 1903, during the settlement of a Canada-US border dispute in Alaska.

The same considerations of imperial and domestic defense that drove the British to cultivate the United States also influenced intra-imperial relations. As the cost of the British Empire grew and the European security environment became more volatile, British and Canadian imperialists argued for a more centralized empire and more Canadian military spending. Some of them argued that centralization and joint defense would give the Dominions more influence in British foreign policy, while others simply hoped that they would make the empire safer. Prime Minister Lord Salisbury's governments (1885-86, 1886-92, 1895-1902) pressed for centralization and for Canada and the other dominions to defend themselves and develop the military capacity to support Britain.

The official Canadian response to British requests for help with imperial defense were wary because Prime Minister Wilfrid Laurier (1896-1911) knew that most French Canadians and some English Canadians were nationalists, opposed to greater imperial unity. After an intense debate, Canada sent a small number of volunteers to the second Boer War in South Africa (1899-1902). The same politically risky balancing act was required when the Colonial Secretary asked Laurier to form a navy. Canada had no use for a navy and many more pressing priorities, but the question
was hotly contested. For the most part, Prime Minister Laurier resisted London’s ongoing pressure, maintaining what one journalist of the time called “the policy of the ‘everlasting no.”’

The Dominion of Canada had become formally independent from Britain with an Act of Parliament in 1867, but its independence had some limits. In the last decades of the nineteenth century, Canada was internally self-governing, and was slowly becoming responsible for some aspects of its trade and defense. However, all international diplomacy was conducted by the British Foreign Office on Canada’s behalf. The Foreign and Colonial Offices corresponded with the Governor-General of Canada, a titled British subject who communicated with the Canadian Prime Minister and other politicians and civil servants. Officially, Canadians did not even speak for themselves to the British government.

Between Canada’s Confederation in 1867 and the start of the First World War in 1914, most of its external affairs were disputes or trade deals with the United States, the messy business of sharing a huge border. Boundary disputes ranged from minor housekeeping details like salvage fees for shipwrecks on the Great Lakes, to much more politically and commercially important differences over the Alaskan boundary, North Atlantic fishing rights, use and delineation of boundary waters, and pelagic sealing. Wilfrid Laurier’s governments, like all their successors and predecessors, monitored Canada's interests vis-à-vis the U.S. constantly and closely. Canada was a small, new, relatively poor nation with deep internal divisions, which wanted to conduct trade and settle disputes as favorably as possible, without loss of sovereignty or national unity. Unfortunately,

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49 "The British North American colonies gained the right to frame their own customs tariffs... in 1846." However, the 1854-1866 Canada-US reciprocity treaty was negotiated by the British; the colonists had only a limited role in negotiation of the treaty. Furthermore, the British government refused to allow their Embassy in Washington to keep Canadian attachés or spokesmen. John Hilliker, *Canada's Department of External Affairs, volume 1: the early years, 1909-1946* (Montreal: McGill-Queen’s University Press, 1990), 1.
50 The Governor-General of Canada acts as Canada’s head of state on behalf of the British king or queen. Before World War I, this job included handling delicate political relationships in addition to the ceremonial duties that continue to the present day, such as signing bills into laws and opening Parliament in Ottawa.
these Canadian priorities were represented in London and Washington by Britons with very British goals. A practical conflict arose: the Foreign Office’ valued smooth Anglo-American relations over good deals for Canadians and their position became more and more clear as the European security environment degraded in the decades preceding the First World War.

Canadians during this period wanted a booming economy and they elected and re-elected Laurier’s Liberal government repeatedly to further that agenda. Laurier famously declared that if the nineteenth century had been America’s century, the twentieth century belonged to Canada. His government tried to foster domestic industry, settle the northern and western parts of the country, and generally promote economic development. The Great Lakes region was the center of these development policies and it was apparent that the water disputes with the US were preventing them from being fully realized. The impracticality of having one bureaucracy represent two diverging sets of interests became increasingly obvious and that fact colored Canadian and British attitudes throughout the negotiation of the Boundary Waters Treaty.

American foreign policy in the late nineteenth century was much less conflicted. After the American Civil War (1861-1865), the United States conducted its international affairs with increasing confidence, asserting the supremacy of American over European interests in the Western Hemisphere. As the nineteenth century continued, the country’s economy grew stronger and its federal government began to pursue a more activist foreign policy. Under Presidents Harrison (1889-1893) and Cleveland (1885-1889, 1893-1897), the U.S. took a proprietary interest in Nicaragua, Hawaii, Brazil, Venezuela and Cuba.51 In 1898, President McKinley fought and won the Spanish-American War, taking over the Spanish overseas colonies of Puerto Rico, Guam, Cuba and the Philippines. McKinley and his Cabinet were determined to be enlightened imperialists, bringing civilization and liberty to the Caribbean and Pacific islanders and

51 For a good overview of the period, see George C. Herring, From Colony to Superpower: US Foreign Relations Since 1776 (New York: Oxford University Press, 2008), 303-324.
independence to Cuba. In 1899, President McKinley appointed Elihu Root, a Republican lawyer from New York with no military experience, to administer the new conquests. Root served as Secretary of War from 1899 until 1904 and as Secretary of State from 1904-1909, a key figure in all negotiations with Canada and Britain during those years.

At the same time that Canadians and Americans were coming into more frequent conflict over water, there were also boundary waters disputes on the southern border of the United States. Overall, the country's policy positions can be described as more self-serving than consistent. American policymakers advocated for mutual help where sharing served their citizens, and for unilateral action where that was more profitable for Americans than cooperation. An early dispute about the Rio Grande River is a case in point.

In 1895, the Mexican Minister of State protested to Richard Olney, the U.S. Secretary of State, that American irrigation was draining the Rio Grande, and argued that the United States must not construct water works that significantly reduced the volume of water without making a prior agreement with Mexico. The Mexican government had two legal bases for its argument. First, the United States and Mexico had signed a treaty in 1848 which guaranteed free navigation on the international section of the Rio Grande to citizens of both countries. Second, Mexican settlers' use of the water predated the American irrigation projects by more than a century, so they claimed the right of prior use in accordance with American domestic law.

Secretary Olney asked the Attorney General, Judson Harmon, for his opinion of Mexico's complaints. Harmon responded that even if American water use reduced the river's flow in the international section, the U.S. Government was under no international obligation to change it, "the existence of such a duty being inconsistent with the sovereign jurisdiction of the United States over

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the national domain.” This opinion became known as the Harmon Doctrine. A Canadian legal scholar summarized the broader application of his response, "the upstream state may divert at will and without restraint regardless of the effect produced upon the downstream state," within its own territory. The State Department did not try to apply Harmon’s uncompromising position, though his opinion was public knowledge. Historian Stephen McCaffery argues that a spectrum of legal opinions emerged at the end of the Industrial Revolution, as demands on shared water resources intensified worldwide. McCaffrey characterized the Harmon Doctrine as more of an extreme negotiating position than a legal doctrine.

The flexibility of American positions on water management is further evident when the Rio Grande case is compared to the situation in the western basins of the St. Mary and Milk Rivers, where the shoe was on the other foot. American farmers there were downstream, dependent on the Canadians upstream for an adequate supply of irrigation water. There, the two sides eventually found a mutually acceptable solution after a decade of wrangling. The American economy in the late nineteenth century was growing quickly, and, like their Canadian counterparts, US federal officials tried to help it along by financing infrastructure projects, shaping the legal environment to boost American opportunities, and generally facilitating ‘nation-building.’

The Alaska Boundary Dispute

A close look at the Alaska Boundary Award is the clearest way to see how US, British, and Canadian relationships interacted to obstruct conflict resolution. Also, the political fallout from the Award produced important changes in British policy which dictated the conditions for the

57 McCaffery “The Harmon Doctrine One Hundred Years Later,” 986.
negotiation of the Boundary Waters Treaty three years later, and many of the same people played important roles in both processes.

The Alaska boundary dispute was longstanding: the exact Canadian-American border was never satisfactorily delineated after the American purchase of Alaska from Russia in 1867. This ambiguity did not matter to either country until a gold rush erupted near the border between the Territory of Alaska and the Canadian Yukon Territory in the 1890s. Suddenly, access to the ports in the Alaska Panhandle became commercially valuable and controversial.

The American interpretation of the boundary had “a strong case arising out of use and occupation.” Prime Minister Laurier and the newly elected American President, Theodore Roosevelt, were both interested in the dispute. Roosevelt saw no reason be tactful; he was in the right and had the stronger army. Encouraged by prosperous times and conscious of anti-American sentiment among Canadians, Laurier refused several proposed compromises. There are some useful parallels between the gold rush and the rapid growth of the Great Lakes region which explain the award’s political significance and the spirit of the times. The United States and Canada saw national interest as linked to their citizens’ business ventures and were eager to protect them in the same way that they championed their populations’ interests in questions of power generation and water diversion along the forty-ninth parallel.

Attempts to negotiate failed, and in 1903 the United States, Britain and Canada agreed to refer the Alaska boundary dispute to a six-member panel of arbitration. The panel included three Americans, two Canadians and one Briton. Before Laurier agreed to the arbitration, the British ambassador to Washington assured him that the panelists would be "impartial jurists." In fact, the American panelists were all personally loyal to Roosevelt and two were well known for their anti-British rhetoric. The third appointee was Elihu Root, a well-respected jurist but also the serving

60 Hillmer and Granatstein, Empire to Umpire, 25.
Secretary of War. Laurier believed that the Americans and the British were both pushing him to agree to an unfair tribunal and he wrote to the Canadian representatives on the Tribunal that if the British panelist did not stand up for Canada, it would be, "the last blow to British diplomacy in Canada." For their part, the British did not object to the obviously biased American appointments because they were more interested in maintaining good Anglo-American relations than in the outcome of the dispute.

On October 20, 1903, the British panelist, Lord Alverstone sided with the three American panelists against the Canadians, and the Alaska Boundary Tribunal ruled in favor of the United States. The British government approved the verdict and exchanged ratifications with the US, not even bothering to notify Laurier formally about the decision until after the fact. This cavalier attitude did at least as much damage to British-Canadian relations as the actual decision. The detrimental effect of the Alaska boundary dispute on Canadian-American and Canadian-British relations should not be underestimated. The Canadian members of the Tribunal refused to sign the decision and wrote a scathing public letter explaining their dissent. The entire Canadian press and general public were incensed by what they saw as Britain's betrayal and policymakers, including Prime Minister Laurier, were as angry as the rest. British indifference to Canadian interests in Alaska deprived Canadians of their only diplomatic way to defend their interests with respect to their powerful neighbor. Laurier told his Parliament angrily that Canadians would have handled the affair differently, which reflected the general mood while absolving his government of responsibility.

The Alaska Award convinced Laurier that it was crucial to change the way Canadian-American relations were conducted, so that Canada could look out for its own interests.

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63 The British government named the Lord Chief Justice Alverstone and two Canadian Supreme Court judges, Sir Louis Jette and Douglas Armour, as their panelists. Mr. Armour died before the tribunal convened, and was replaced by A.B. Aylesworth, a Toronto lawyer who later became Wilfrid Laurier's Minister for Justice and his advisor during the negotiation of the Boundary Waters Treaty.
65 Hillmer and Granatstein, Empire to Umpire, 26.
66 Gluek, "Pilgrimages to Ottawa," 68.
However, rather than start an immediate foreign policy revolution, with all its attendant political risks, he awaited developments. His first, most thorough biographer noted, 

Nothing was more foreign to Sir Wilfrid's ruling bias than to urge any policy on general and theoretical grounds; not until a concrete issue arose would the demand for wider powers be renewed. When the occasion did arise, in the Waterways treaty with the United States . . . Canada's control over foreign relations was to be quietly, un-dogmatically but surely and steadily advanced.67 

Given Canada's relative weakness and the political difficulties inherent in any change of the diplomatic status quo, this was a practical choice. 

The Alaska Boundary dispute forced the British member of the arbitration tribunal, Lord Alverstone, to choose between Canada and the United States. The choice was not difficult, but the cost was high. Hearing the overwhelming Canadian recriminations, the Foreign and Colonial Offices acknowledged to themselves that Britain had two conflicting sets of good relations to maintain in North America and tried to minimize their involvement thereafter. A letter from the Colonial Office the following year refused to consider addressing a Canadian-American dispute directly, "[because] in her present temper we should get no thanks for taking the initiative."68 

Another, more constructive change of opinion also occurred. In addition to swearing off new initiatives, "[Canada's] open criticism of Britain's behaviour in that instance caused the British Colonial and Foreign Offices to determine that in future Canada would be consulted before any action was taken in matters involving Canadian interests."69 After the débâcle of 1903, then, Canada and Britain came independently to the same conclusion: the next Canadian-American dispute had to be handled very differently. Neither government tried to change the official diplomatic relationship, but the reality of the relationship changed. This evolution was not apparent for several years, but during the negotiation of the Boundary Waters Treaty it gradually became apparent Britain was giving Canada much more control over Canadian-American relations. 

In passing, it is worth noting that the Alaska Boundary Dispute did not have nearly as much of an effect on the United States as it did on Canada and Britain. The United States was happy with the tribunal’s ruling and appreciative of Britain's sustained interest in good relations. The American view of Canada as a weak if vocal neighbor was left unchanged. By providing a catalyst for a much-needed reconsideration of the Canadian-British foreign policy arrangements, the Alaska dispute brought an end to an increasingly untenable system and cleared the field for a new effort to resolve the water disputes on the lower Great Lakes and elsewhere along the boundary.

The Decision to Focus on Boundary Waters, 1905 - 1907

The group of diplomats that worked on Canada-U.S. disputes between 1905 and 1910 repaired the damage done in 1903 by establishing a new Canada-Britain-US working relationship, setting new precedents by concluding a set of treaties based on North American collaboration and by creating the International Joint Commission, an institution based on direct Canada-U.S. communication. Given the furor over Alaska, this abrupt reversal demands explanation. What changed, and why?

First, as key personnel in British government posts in North America changed, they approached Canada-US issues differently than their predecessors, reflecting the changing balance of their empire’s interests in North America and the growing urgency of Britain’s need for allies in a possible war with Germany. It is not often that a person can shift a whole country’s policies as quickly as Earl Grey changed the tone of Canada’s dealings with the United States when he arrived in Ottawa as the Governor-General of Canada, replacing his brother-in-law. He was the first prominent British official who actively employed the new, hands-off approach to Canadian-American disputes.

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70 Hillmer and Granatstein, *For Better or For Worse*, 35-36.
As Governor-General, Albert Grey handled Canada’s communications with the United States and Britain with almost total autonomy. The governor general’s staff had fewer than ten people, always including a military advisor and a personal secretary. Letters and telegrams came to Grey’s office directly, a far cry from his contemporaries in the British government or the US State Department. He then sent them to Prime Minister Laurier, who acted as his own foreign minister, also with a very small staff. This powerful appointment came with the expectation of circumspection, and many Governors General simply passed their correspondence along to the Canadian government. Earl Grey took a more involved attitude. One historian characterized him as being, "Of a restless and interfering nature . . . constitutionally incapable of playing the role of figurehead." Grey was a dyed-in-the-wool British imperialist with little interest in defending Canadian interests for their own sake and no sympathy for local nationalism. However, he was creative enough to realize that British-American harmony required sound British-Canadian and Canadian-American relationships. He used his post to improve Canadian-American relations for their potential benefit to the Anglo-American relationship. As soon as he arrived in Ottawa, Grey began to lobby Prime Minister Laurier to take action to improve Canadian-American relations. First, he asked the Prime Minister to appoint commissioners to the International Waterways Commission (IWC), which had been formally set up two years previously and then left in abeyance after the Alaskan controversy. The IWC was tasked with reporting on North American boundary waters problems, including irrigation and diversions. After a few months Laurier did as Grey asked. The IWC began its work and with that, the political and economic concerns of Great Lakes region and the global anxieties of the British Empire began to interact vis-à-vis boundary waters. The commission had a very limited mandate, but its reports laid groundwork for the actual Boundary Waters Treaty.

The head of the Canadian side of the International Waterways Commission was a prominent Ontario lawyer named George Gibbons. He believed that regular, frank communication between Canadians and Americans was essential to long-term harmony between the two countries. Regarding water disputes, he wrote to Laurier, “Once Americans come to deal directly with us they will play the game fairly. It is only because we have got John Bull along that they bully us. Once get him [sic] out of the game and there will be no prestige in tackling a little fellow who will kick their shins.” It is clear that Gibbons saw a correspondence between US and Canadian goals for water management despite their power differential and he expected the Dominion government to take responsibility for its citizens’ economic interests on issues such as hydroelectric power and diversions of water.

George Gibbons is an excellent example of the pressure that Canadians living around the Great Lakes brought to bear on their prime minister and Parliament during the late nineteenth and early twentieth century. He was a commercial lawyer and businessman from the agricultural town of London, Ontario. In addition to his legal practice, he was founder and president of the London and Western Trusts Company, the president of the City Gas Company of London, and director of the London Life Insurance Company. Though never elected, he was a well-known Liberal organizer and fundraiser. His official biographer described him as, “a key figure in a prosperous and tightly knit but provincially and nationally well-connected oligarchy.” Gibbons and his peers used their political connections and business ‘pull’ to raise their concerns about the dangerous Chicago diversion, the need for a good power-sharing deal at Niagara, and the federal government’s duty to safeguard Canadian interests. A case in point, Gibbons was recommended to Laurier for the IWC chairmanship by the Minister of Public Works by Charles Hyman, who was also the Member of Parliament for Gibbons’ hometown of London, Ontario.

Once they were finally appointed, the Canadian commissioners worked easily with their American counterparts. The national sections of the International Waterways Commission submitted four reports to the governments of Canada and the United States in 1906 and 1907, covering specific boundary waters issues but also including detailed recommendations for a permanent regulation system. The IWC recommended that the two countries agree on a set of principles for settling the Great Lakes disputes and set up a commission to enforce them, and drafted several lists of possible principles. The Canadian section’s recommendations were consistently more detailed and more forcefully presented than the American section’s reports to Washington, perhaps because of Gibbons’ vigorous chairmanship or perhaps because the opportunity to work directly with the US was so rare and valuable. Although the IWC was not empowered to take concrete action, its commission meetings were the first mechanism by which the concerns of interest groups from the Great Lakes watershed reached the briefing books and memos of the people who handled foreign policy for the United States, Britain and Canada. Their ideas reached a rarified audience of cabinet-level officials and their staffs, and many later became policy.

After activating the IWC, Governor-General Grey turned to dispute resolution and began to make encouraging official gestures to the United States. He visited to New York in March 1906 and invited the Secretary of State, Elihu Root, to Ottawa, events generally cited by diplomatic historians as the first public signs of a more positive tone in Canadian-American relations after the Alaskan controversy. They were certainly symbolic, but the launch of the International Waterways Commission was just as public and arguably much more significant in the long run.

The Beginnings of Direct Communication

At the same time, the Governor-General also began a direct correspondence with Secretary Root about ‘cleaning the slate,’ as he phrased it. The first fruit of their exchange was a list of Canadian-American disputes that the Secretary of State presented to the British ambassador
in Washington on May 3, 1906. It was the first comprehensive catalogue of disagreements since the Joint High Commission had adjourned in 1898. The list had sixteen items on it, of which half were related to marine and freshwater management, and four to the Great Lakes. The ambassador sent Root's list to Canada for comment through official diplomatic channels. The fate of that list, "[an] important document, which was destined to be the touchstone of Canadian-American diplomacy for the next five years," was a perfect illustration of the impractical arrangements that prevented a good Canadian-American working relationship. It took seven months for the list to go from Washington to the Foreign Office to the Colonial Office to Governor General Grey to Prime Minister Laurier and for Laurier's discouraging reply to reach Secretary Root. (At this time, a privately posted letter took less than a week to go between the capitals, and a telegram took hours. Technology was not the problem.) After seeing the need for direct communication so vividly demonstrated, Governor-General Grey asked the Foreign Office to add a Canadian attaché to Britain’s Washington embassy. The idea was rejected, but Grey began to write directly to the State Department and continued for the rest of his term, apparently without permission or censure. Britain’s government seems to have been pragmatic enough to wink at this bending of the rules, though not practical enough to change them outright.

Grey was also hindered by the British Ambassador to Washington, Sir Mortimer Durand, who either did not see or did not choose to act upon the coalescence of Canadian and British interests that Grey perceived. In April 1906, President Roosevelt wrote to his own ambassador in London that, "[Durand] seems to have a brain of about eight-guinea-pig power. Why, under Heaven the English keep him here I do not know . . ." Roosevelt and his Cabinet took no interest

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76 Neary, "Grey, Bryce and the Settlement of Canadian-American Differences," 358
77 See Appendix A for full list. Durand to Grey, enclosure. May 3, 1906. File 192A, 294-316, Vol. 93, Governor General’s Office, Governor General Grey Correspondence, LAC.
in him, and the Boundary Waters Treaty did not become possible until his more sympathetic successor arrived the following year.

In January 1907, Lord James Bryce took over as the British ambassador to Washington. He was unusually well-qualified for his post because he had travelled widely in the United States, had published a book about the country, and had a personal network in Washington that included Elihu Root and other members of the foreign-policy elite. As he became more familiar with his embassy, Bryce too realized that a large proportion of its business was purely Canadian-American. He held the same view of Canadian-American relations as Grey: that the resolution of their ‘parochial’ differences would be an indirect way to improve British-American relations and, like Grey, he corresponded directly with Ottawa and received no complaints from London about it. For the most part, he wrote directly to the Governor General, who passed on correspondence to Prime Minister Laurier as needed. Bryce’s innovative attitude was legitimated by, and indicative of, larger changes of opinion within the British press, policy élite, and electorate. Although this chapter will not detail the evolving politics of British imperial, naval and economic security, they certainly informed Bryce’s work.

In 1907, there came a particularly concrete example of these shifting British policies: Root and Bryce both visited Ottawa at Earl Grey's invitation, to meet Prime Minister Laurier and talk informally about U.S.-Canada disputes. The Foreign Office’s instructions to the Governor-General demonstrated their new wish to facilitate, rather than direct, Canadian-American dialogue: they told Grey that he must avoid saying or doing anything, “which would imply the intervention of His Majesty's government in the discussion.” It was very rare for Cabinet-level American officials to go to Ottawa, and the press credited Bryce with being the first British Ambassador to visit Ottawa officially. The visits made a very good impression on the Canadian government and shows how much the British wanted to reduce tensions.

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These exchanges are also a clear demonstration of the pressures that interest groups around the Great Lakes watershed had brought to bear upon Roosevelt and Laurier. Without significant domestic incentive, it is unlikely that their governments would have made these unusual efforts. In this way, the negotiations were a response to simultaneous pressures from below and from above. By 1907 the tone of North American diplomacy was positive and direct, the list of disputes was clear and all three parties knew one another’s starting positions.

Setting an Agenda

The form and substance of the Boundary Waters Treaty were the product of an extended period of negotiations in which Canadian, British and American officials all had vital roles. The speed of the negotiations and the detailed attention paid to them by the Secretary of State and the Canadian Prime Minister show how seriously both countries regarded the boundary waters issues. They saw a pressing need to settle the disputes so that people living along the boundary could proceed confidently with their nation-building investments, construction, and settlement, especially in the Great Lakes watershed.

To appreciate the effort it took to achieve this efficient result, it is helpful to understand how small Canada’s bureaucratic capacity was. Although official correspondence was moving more quickly between Ottawa and Washington than it had before, no one in Canada kept a record of the dialogue because there was no filing system. Prime Minister Laurier acted as his own foreign minister, but the additional work was onerous, and when the Prime Minister did not respond promptly to letters or cables, the negotiations had to wait. Canadian public servants noticed the deficiency during the Alaska boundary dispute, and a senior bureaucrat, Joseph Pope, had been arguing for a department of external affairs since 1900. Governor General Grey and Ambassador Bryce both asked Laurier to form “a sort of Foreign Office,” but got a non-committal response.84

After visiting Ottawa, Ambassador Bryce argued that the best way to work through the list of disputes was to start with the most easily resolved items. He hoped that removing the ‘lesser irritants,’ would “sweeten and soften the feeling between the two countries” before tackling the congenial setting to tackle the more controversial problems. With that plan in mind, Bryce and Grey tried to decide which of the most pressing disputes on the list would be the easiest to resolve: the North Atlantic fisheries, boundary waters, or pelagic sealing disputes. Of the three, boundary waters seemed to offer the best chance of success. The North Atlantic fisheries dispute was very old and convoluted, and it involved Britain and the colony of Newfoundland as well as the United States. The pelagic sealing dispute was complicated by intricate questions of compensation for Canadian sealers. Conversely, the boundary waters disputes were relatively new and bilateral rather than tri- or quadrilateral. Boundary waters also seemed attractive because the International Waterways Commission’s recommendations on the subject were recent and practical.

In May 1907 the Canadian, British and American governments asked the heads of the International Waterways Commission’s two sections, Canadian George Gibbons and American George Clinton, to draw up a draft boundary waters treaty. The normal procedure for the period would have been for the British Embassy in Washington to draft it and then ask for Canadian approval, but Gibbons and Clinton were a safe bet to test a new approach. They had been working together as co-chairs of the IWC for three years, they were intimately familiar with the relevant disputes, and both had legal training. In addition, George Gibbons was devoted to the topic as a resident of the region most affected, as a member of Laurier’s Liberal party, and as a Canadian nationalist. Given the public pressure that Laurier faced to get a good deal after the Alaska Award, those qualities made him a better representative of the Canadian position than any Englishman. The fact that a Canadian and an American produced the first blueprint of a treaty for settling

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boundary waters issues is a testament to the changes in official thinking after 1903, an indication of how clearly the regional interests had made their case at the highest levels of national politics.

*The Clinton-Gibbons Draft Treaty*

In September 1907, Clinton and Gibbons sent their first draft treaty to their respective governments. The draft focused on safeguarding navigation in three ways. First, it stipulated freedom of navigation for all citizens throughout the Great Lakes and St. Lawrence system, including Lake Michigan, Georgian Bay, and the entire St. Lawrence River. Second, it specifically prohibited the diversion of boundary waters except for domestic sanitary purposes or for use in a navigation canal. Finally, it prohibited diversions or obstructions of boundary waters that would cause injury to public or private interests in the other country, even if they were not harmful to navigation. This last provision was a direct response to the dispute over whether or not it was legal for the Sanitary District of Chicago to divert so much water that it affected shipping. As the lawsuits over the Chicago diversion inched along, people around the Great Lakes wanted to know that their livelihoods and investments would be insulated from drastic, unilateral changes in the future and the draft aimed to reassure everyone on that front.

According to Gibbons and Clinton’s draft, where diversion would not injure navigation, public interests or private interests, each country was entitled to half of the water in streams crossing the boundary. This clause was a crucial clarification for hydroelectric power development companies and the various municipalities and industries that wanted to buy electricity. The draft treaty also set limits for the water each country could divert above Niagara Falls to preserve their beauty. Finally, the treaty proposed a six-member treaty commission to determine the Canada-US boundary, to report on any other matters the governments chose to refer to it and, “to exercise such police powers as may be confided to it by concurrent legislation . . .”\(^{86}\) Clinton and Gibbons’

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provision for transboundary policing was deleted in later drafts, but its presence indicates that they expected enforcement measures would be needed.

With the presentation of the first Clinton-Gibbons draft, the negotiation of the Boundary Waters Treaty began in earnest. Elihu Root sent the draft treaty to his trusted legal advisor, Chandler Anderson, to review its legal and political implications. Elihu Root described Anderson’s role in the State Department as, “not as a mere assistant but a coadjutor of independent thought, and a competent negotiator in his independent contacts with the representatives of other powers.” In Ottawa, Prime Minister Laurier and his Justice Minister Aylesworth began revising their copy. Bryce and Grey sent a draft to London and kept the British government apprised of the negotiations, but the dealings were essentially two- rather than three-sided. From the summer of 1907 until the signature of the Boundary Waters Treaty in January 1909, James Bryce and his embassy staff took their instructions from Ottawa, working for Prime Minister Laurier, rather than on his behalf.

Comparing Objections

Analyzing the two sides’ objections to the proposed treaty provides a picture of how these lawmakers regarded environmental management and reflects the concerns of local stakeholder groups around the Great Lakes. For the American State Department, the central problem was whether and how much Americans’ freedom of action should be constrained, while the Canadians sought clear guidelines for management, so as to offset their comparative poverty and military weakness.

Chandler Anderson, the State Department lawyer, argued that the draft treaty was unacceptable because giving a transboundary commission so much agency would compromise private citizens’ control of their property, states’ control of their territory vis-à-vis the federal

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87 Elihu Root to President Hoover, 6 November 1931. Quoted in Jessup, 
Elihu Root, 97.
government and foreign countries, and the nation’s autonomy.\(^{88}\) He also argued that the Senate would never ratify a treaty that placed conditions on American freedom of action.\(^{89}\) He was particularly concerned that the United States would lose exclusive control over diversions from Lake Michigan and the St Mary's and Milk Rivers if waters tributary to boundary waters became subject to the commissioners’ permission and the Canadian government’s approval. The St. Mary and Milk Rivers dispute, as well as the lingering rancor over the Chicago diversion, figured prominently in Anderson's analysis. He also objected that the guidelines for commissioners were inadequate because “the Commissioners are left free to adopt their own ideas of justice and equity in the decision of questions arising thereon, which practically amounts to a power to legislate.”\(^{90}\) Anderson proposed instead that the new boundary waters commission should only be responsible for ‘contiguous boundary waters’ and should recognize that varying conditions along the border might require different responses.

Elihu Root accepted Anderson's opinion and presented them along with his own objections to Ambassador Bryce in the winter of 1908. Elihu Root was, by all accounts, a shrewd and conservative man.\(^{91}\) During the negotiations, he noted frequently that hydroelectric power generation was a new industry, and that no one knew much about how to manage it. Root was apparently reluctant to commit the United States to a definite course of action in a young policy area and he did not approve of having one set of water management principles for every case, which is precisely what George Gibbons and the Canadian government did want.

The Canadians believed that their citizens would be treated equitably in disputes with Americans if the treaty laid out such clear rules for settling them that the imbalance of power would not be a factor. As George Gibbons wrote to Prime Minister Laurier, many Canadians believed that, “there is only one way in which we will get fair play . . . that is by a permanent joint

\(^{88}\) Article II of Clinton-Gibbons draft treaty, 1907. Quoted in Jordan, Annotated Digest, 27.

\(^{89}\) Anderson memo, December 1907. Quoted in Jordan, Annotated Digest, 42-43.

\(^{90}\) Anderson memo, December 1907. Quoted in Jordan, Annotated Digest, 42-43.

Commission which will play the game fairly, and whose conclusions will be so justified by public opinions, even in the United States, as to compel their acceptance. Laurier agreed with Gibbons. He was concerned that he would be accused of selling his country to the Americans if the final treaty was not clearly beneficial to Canada. In addition, Laurier wanted the new treaty to address the detrimental effect of the Chicago canal on water levels in the Great Lakes, the Saint Mary's and Milk River dispute, and the Rainy River dispute. Finessing the Canadian determination to secure equal treatment despite the power imbalance was a consistently difficult part of the negotiations.

In late winter 1908, the Americans proposed creating a 'Joint Commission of Inquiry' that would do nothing more than provide reports and recommendations. Without the judicial and arbitral functions that Clinton and Gibbons' draft envisioned, the Commission of Inquiry posed no threats to sovereignty, and Anderson and Root thought it would be relatively simple to get it through the Senate. Laurier rejected the Root-Anderson proposal because it did not provide a set of principles on which to base future decisions, nor did it address any site-specific disputes.

Frustrated, the Prime Minister sent Gibbons to Washington in early February, where the Canadian lawyer successfully insisted on meeting with Secretary Root, a dramatic departure from standard practice. Gibbons then trumped this breach of protocol with productive talks: during Gibbons' visit, Root agreed with him that management principles were a good idea, but insisted that the Senate would never accept them. In return for this concession, Gibbons reported to Laurier that he, "urged the view that . . . we were not very particular what the principles were as long as they were uniformly applied." Gibbons reiterates that any treaty had to cover rights of navigation on Lake Michigan, provision for Niagara diversions, and settlement of the St Mary's and

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94 See page 10 of this chapter
95 Dispatch from Bryce to Earl Grey, February 3, 1908. Quoted in Jordan, Annotated Digest, 53.
96 Gibbons to Laurier, January 8, 1908. Quoted in Jordan, Annotated Digest, p 51.
Milk River irrigation dispute. Root and Gibbons did not come to any conclusions, and the treaty project seemed stalled. It is clear that both governments regarded future water disputes as a near-certainty, and that policymakers on both sides of the border were serious about responding to concerns of people living around the Great Lakes, even if they disagreed about how to do it.

*Persistence and Progress*

Some of the disputes could not wait for a treaty. Voluminous correspondence between and within the federal governments of Canada and the United States attests that the St. Mary’s/Milk River controversy was a top priority in February 1908. Over two weeks of intensive exchange, the governments agreed to assign two people to confer on the irrigation dispute. Laurier's Cabinet chose the Chief Astronomer, Dr. W. F. King, who had extensive experience with surveying and border delineation and the Americans appointed Mr. Newell, from the Bureau of Reclamation.\(^{98}\) It was becoming a habit to give specific tasks to small groups of Americans and Canadians, as they had done for the International Waterways Commission and for the Clinton-Gibbons draft treaty.

The three governments' persistence and flexibility during the spring of 1908 demonstrates their commitment to resolving disputes, but it also demonstrates the urgency of the situation. The broad treaty might be at an impasse, but they continued to work on other things, rather than let the work stop as they had done in earlier decades. That spring, Canada and the United States made progress on the irrigation dispute on the St Mary's and Milk River and the North Atlantic fisheries dispute, and concluded two minor boundary delineation treaties. They also signed the Inland Fisheries Treaty, hoping to prevent a repetition of the bitter disputes that were troubled the North Atlantic by setting out a common understanding about freshwater fishing. The treaty covered a group of lakes, rivers and bays that spanned the international boundary, including the Great Lakes.\(^{99}\) Under its terms, the United States and Canada agreed to set up an International Fisheries

\(^{98}\) Jordan, *Annotated Digest*, 60.

Commission which would draft a set of “uniform and common regulations for the protection and preservation of the food fishes of the boundary waters,” within six months. The broad scope and short duration of the commissioners’ assignment prevented them from accomplishing much. The treaty was an under-resourced dud that was abandoned unratified in 1914, but it did contribute to better Canadian-American and Anglo-American relations in 1908.

Encouraged by the signature of the new treaties and spurred by the pressing disputes, George Gibbons joined Ambassador Bryce in Washington, DC in May and June of 1908 to urge Root to settle all remaining boundary waters issues with a single treaty. Given that the British government repeatedly refused requests to hire an actual Canadian attaché, Gibbons’ recurring presence there is striking. Bryce valued his energy and his knowledge of the specialized subject matter, and the Foreign Office in London either tolerated or ignored the innovation. Ambassador Bryce's chargé d'affaires also felt that American prejudices against the British were an impediment:

I think it is possible that more will be conceded of the State Department to Canadians negotiating direct than would be if this Embassy if it is felt that there is no diplomatic triumph over England to be obtained out of any negotiation (there is ever yet a hereditary and traditional desire to give the lion's ear a tweak or his tail a little twist) in which Canada is involved.  

This comment strongly resembles Gibbons’ remark that the United States could have no interest in bullying a country like Canada, 'a little fellow who will kick their shins.' Clearly, the British Embassy believed that the water disputes and the need for an Anglo-American alliance were pressing enough to disregard diplomatic protocol and their imperial hierarchy.

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100 Dispatch, Bryce to Lord Grey, June 8, 1908. Quoted in Jordan, Annotated Digest, 65.
102 The perceived willingness of the Americans to deal more generously with a weak neighbor than with a strong empire seems odd, but it appears in the archival record regularly. The boundary waters negotiations definitely fit into Root's larger policy of strengthening the United States' relations with countries in the Western Hemisphere. During his time as Secretary of State, he cultivated relationships in Central and South America and promoted the Pan-American Union as a tool for good relations in the Western Hemisphere. In this context, the Roosevelt State Department may have regarded Canada more warmly as a neighbor in the New World than as a part of a European empire.
George Gibbons arrived in Washington in June 1908 with a memorandum carefully refuting every objection the State Department had made to Canadian proposals. Over the course of three days, he convinced the State Department officials to accept a treaty with explicitly stated principles for water use and a permanent commission to enforce them. Furthermore, Root agreed that Anderson would meet with Gibbons to write another draft treaty covering diversions and riparian rights. The coup made Gibbons' reputation as a negotiator. Chandler Anderson was one of the Secretary's most valued subordinates, and his assignment to the boundary waters treaty was a sign that the State Department had elevated the treaty to a higher level of official attention. The treaty was by no means finished, but the June discussions were the start of a new set of talks.

**The Final Draft and Informal Arrangements**

Like the International Waterways Commission, the Gibbons-Clinton team, and the King-Newell team, Gibbons and Anderson worked efficiently together and achieved a draft by mid-autumn. Fifty years later, an historian working for the International Joint Commission listed the points that they decided to include:

[F]reedom of navigation on the Great Lakes system, principles of international law governing the obstruction and diversion of boundary and transboundary waters, appointment of a permanent commission to consider and decide cases involving application of the principles, provision for the same body to act as an advisory board in respect to any matters in dispute arising with regard to property rights of any kind between the two countries, and creation of the same body as a permanent board of arbitration to which by consent of both countries any matter of dispute might be referred for final decision.

The Anderson-Gibbons draft treaty of fall 1908 was, in general terms and most details, the Boundary Waters Treaty. It bore a much closer resemblance to the Clinton-Gibbons draft treaty than to the Root-Anderson proposal, with clearly defined management precepts and a decisive role for a permanent, transboundary institution.

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The Anderson-Gibbons draft made boundary waters, defined as waters which form the boundary or which the boundary bisects, subject to the new International Joint Commission (IJC). Transboundary waters, which flowed across the boundary or were tributary to boundary waters, stayed under national jurisdiction, but citizens of the United States and Canada were granted the right to claim damages for injury caused by water use in the other country in Article 2 of the treaty.\textsuperscript{106} The negotiators fully expected that companies and individuals would use this reciprocal liability clause to sue each other for damages as a way to manage conflicts.

The Anderson-Gibbons draft treaty also set out an order of precedence for the use of boundary waters. It placed domestic and sanitary uses as the first, most important use, for the benefit of waterside communities. Navigation was the second priority because it seemed, "more important to the general welfare of the country" than hydroelectric power and irrigation, which came last because, Anderson wrote, "[they] benefit only a very limited number."\textsuperscript{107} According to Anderson's correspondence, the order of precedence was formulated to benefit the greatest number of people, that being a 'natural and reasonable' rationale which would secure maximum political support for the treaty.

Gibbons and Anderson also decided to include Ambassador Bryce's suggestion for a general arbitration clause as Article 10 of the treaty. It empowers the IJC to act as an arbitrator between Canada and the United States on any topic, if both countries request it. The U.S. and Britain had concluded an arbitration agreement in 1908 which applied to Canada through Britain, but the Boundary Waters Treaty created an arbitration mechanism exclusive to Canada and the United States. This new tool was intended to serve several purposes: from a British standpoint, it reduced the chances of another acrimonious tribunal like Alaska, and for regional interest groups around the Great Lakes, it provided a much more direct way to address grievances and conflicts. Altogether, it publicly decoupled British diplomacy from Canada-US dispute settlement.

\textsuperscript{106} Letter from Anderson to Root, June 2, 1908. Quoted in footnote in Jordan, Annotated Digest, 77.
\textsuperscript{107} Letter from Anderson to Root, August 26, 1908. Quoted in Jordan, Annotated Digest, 76.
The two negotiators, Gibbons and Anderson, assigned to the International Joint Commission the power to allow or prohibit diversions and prohibited transboundary pollution ‘to the injury of health or property’ on either side. When combined, these clauses and tools represent a serious effort to address the institutional gap that had become so apparent as Americans and Canadians intensified their impact on the Great Lakes basin and other boundary waters.

Since Gibbons and Anderson had successfully negotiated a broad structure for settling future disputes, Laurier and Root told them to move on to the more difficult task of settling the existing disagreements on the Niagara River, the St. Mary and Milk Rivers (that King and Newell had been working on), the Rainy River and the Chicago diversion.

In the end, the disputes about the Chicago diversion and the Rainy River were resolved informally and are not mentioned in the treaty. Laurier instructed Gibbons to include a clause about the Chicago diversion, but Chandler Anderson refused to include it in the treaty. The government of the United States was pursuing a lawsuit against the Chicago Sanitary District and the State Department believed that putting a clause about the Chicago Diversion into the Boundary Waters Treaty would raise the controversial topic of states’ rights in the Senate and prevent ratification of the treaty, in addition to further politicizing the already contentious suit.108 The Canadians accepted this reluctantly and hoped that the new treaty’s prohibition on unilateral diversions, as well as the arbitration and damages clauses, would be enough to prevent similar problems in the future.109

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109 Lawrence Burpee, the Secretary of the Canadian section of the IJC, explained to the Canadian Undersecretary of State for External Affairs, O.D. Skelton, that he did not want this compromise to become common knowledge: “There is also a rather important statement attributed to Mr. Root, which was printed in one of the Congressional Hearings on the Niagara situation and the relationship between the Chicago diversion and the amount of water permitted to be diverted at Niagara. I enclose a copy for your own information. You will see that it is not the sort of thing that we on the Canadian side are particularly anxious to spread abroad. Mr. Mackay may run across it himself, but I certainly would not help him to find it.” Letter, Lawrence Burpee to O.D. Skelton, July 2, 1926. Enclosure, Transcript of US House of Representatives debate about the River and Harbor Improvements Act, Congressional Record, May 22, 1926: 9812. Enclosure, File 1514-45, Vol 2845, RG 25, LAC. During the discussion, Rep S. H. Kunz of Chicago quoted Secretary Elihu Root as saying: “The great bulk of water [at Niagara Falls] goes to the Canadian side, and the Waterways Commission that was appointed some time ago to deal with the question of lake levels reports, I think, that some 36, 000 feet can be taken without injury to the Falls. . . . their [Canadian] limit would not be cut down below what it is, because there are three companies on the Canadian
Anderson and Gibbons made a quiet deal to solve the Rainy River dispute. The central question was whether the US could legally grant the Minnesota Power Company's request to divert water from the tributary of a boundary river. Under the Webster-Ashburton treaty of 1842, the river was to be 'free and open' to all citizens of both countries for navigation, and the proposed power dam would interfere with that navigation. In return for Canada's giving up its objections to the dam, Gibbons got Article 2, the reciprocal damages clause. He apparently decided that the Rainy River was a strategically useful loss, arguing that the new treaty would do a better job of protecting Canadian interests in diversion disagreements than Webster-Ashburton.

The last point to settle was the St Mary's and Milk River, where rival canal-builders had nearly come to blows over scarce irrigation water. Dr King and his U.S. counterpart, Mr. Newell, had drafted a clause earlier in the year, and Gibbons and Anderson accepted it as Article 6 of the Boundary Waters Treaty. It set out a highly technical management system for the St Mary's and Milk Rivers and their tributaries in Montana, Alberta and Saskatchewan. A Canadian and an American were to be assigned to measure and apportion the available water for each growing season. The Appointed Officers, as they are known, have been a linchpin of the region's agriculture ever since. Anderson and Gibbons submitted their final draft to Secretary Root and Prime Minister Laurier on December 3, 1908.

The Home Stretch: Formal Acceptance and Ratification

With the treaty drafted and all of the site-specific disputes resolved, the formal acceptance processes could begin in each country. Laurier accepted the treaty draft in January 1909 and

side who have works there. Then there is this further fact why we could not object to this 36, 000 cubic feet per second on the Canadian side: We are now taking 10,000 cubic feet per second our of Lake Michigan at Chicago, and I refuse to permit them to have anything in the treat about Lake Michigan. I would not have anything in the treaty about it, an and under the circumstances I though it better not to kick about this 36, 000. They consented to leave out of this treaty any reference to the drainage canal, and we are now taking 10,000 cubic feet per second for the drainage canal, which really comes out of this lake system."

praised it as an equitable arrangement.\textsuperscript{111} When the British Foreign Office received the approved draft, the diplomats there changed the language of the treaty to reflect Canada's formally subordinate diplomatic relationship with Britain.\textsuperscript{112} For example, every reference to 'the Government of Canada,' was replaced with 'the High Contracting Party' i.e. Great Britain.\textsuperscript{113} The British Government had no interest in altering the terms of the treaty, but neither did it have any intention of ceding its imperial prerogatives. The new Canada-U.S. cooperation that had grown so quickly between 1906 and 1909 was strictly operational, not official, but it was just as crucial to transboundary environmental management as the treaty itself. When compared to contemporary exchanges between Mexican and American officials, the value of these direct, relaxed connections is particularly evident.\textsuperscript{114} That collaboration, as well as local pressure for a reliable regulatory environment around the rapidly developing Great Lakes and British anxiety for an American rapprochement, were the driving forces behind the Boundary Waters Treaty.

After the treaty text was approved, British officials settled down to await the outcome of the North American ratification processes. In the United States, the Senate Foreign Relations Committee and then the rest of the chamber had to vote in favor of the treaty. In the Canadian-British case, ratification meant convincing Prime Minister Laurier to recommend ratification to Westminster.

Elihu Root was correct when he predicted that the Senate would oppose the Boundary Waters Treaty. Powerful constituents were paying close attention to it and the Senate Foreign Relations Committee raised a number of objections to the treaty which echoed the earlier complaints of executive branch officials about the first Clinton-Gibbons draft: basically, they saw

\textsuperscript{111} Neary, "Grey, Bryce and the Settlement of Canadian-American Differences," 380.
\textsuperscript{112} Jordan, Annotated Digest, 96.
\textsuperscript{113} Jordan, Annotated Digest, 96.
the treaty as a threat to both states' rights and national sovereignty. Their attitude was reminiscent of Attorney General Harmon’s opinion about the Rio Grande several years earlier.

The most inconvenient objection was raised by Senator Smith of Michigan, whose constituency included several companies invested in hydroelectric power generation along the boundary. He argued that the principle of equal division of boundary waters interfered with the proprietary rights of the Michigan citizens in the St. Mary's River at Sault Ste. Marie, where the river's flow was greater on the American side than the Canadian side. On February 15, Smith proposed a 'rider' or amendment to the treaty, stating that,

[N]othing in this treaty shall be construed as affecting, or changing, any existing territorial or riparian rights in the water, or right of the owners of the lands under, on either side of the international boundary at the rapids at Sault Ste. Marie, in the use of water flowing over such lands . . . [and] that nothing in the treaty shall be construed to interfere with the drainage of wet swamp and overflowed lands into streams flowing into boundary waters . . .

Smith’s amendment was a blatant effort to safeguard local interests. Part of the land along the St Mary's River at the Sault Ste. Marie belonged to the Chandler-Dunbar power company and was shortly to be expropriated by the U.S. Government for a shipping channel. The power company hoped that they would get a better price for their land if their Senator could keep riparian rights unchanged there. Smith’s rider is an excellent example of how much the advancing development of hydroelectricity, the accelerating transformation of shoreline and wetlands, and expectation of greater development around the Great Lakes was changing transboundary management at this time. As steam-, coal- and gas-powered engineering equipment made it possible to harness rivers more cheaply and easily, the boundary streams in the Great Lakes were becoming even more valuable.

As the committee discussed the treaty and proposed amendment, it received plenty of media interest. Under the headline, “Two Senators Almost Come to Blows,” one newspaper noted

115 Jordan, Annotated Digest, 100.
that the debate, “was the liveliest tilt seen in the Senate in many days.”\textsuperscript{118} Debate over Smith’s amendment was equally heated in Ottawa, where the addition caused immediate complaints from the Prime Minister.\textsuperscript{119} The Senate leaked the text of the Boundary Waters Treaty, and Canadian newspapers picked it up. Laurier faced loud demands for a debate in the Canadian House of Commons, but, as the Colonial Office unhelpfully reminded him, the Canadian legislators had no formal role in treaty approval and were prohibited from discussing the treaty in Parliament before it was finalized.

Wealthy, well-connected people expected to make money by altering the hydrology of the region to suit their purposes, and the public debate around the treaty was largely about whose interests would be helped or hurt. Secretary Root wrote to Laurier and Gibbons several times during the debate to reassure them, explaining that even with the amendment, "I am perfectly satisfied that the rights of Canada will be exactly the same . . . The very large private interests involved are apparently afraid of some occult meaning and effect of any words they don't devise themselves."\textsuperscript{120} However, Canadians were concerned about being bullied out of their share of the water by British indifference or American strength.\textsuperscript{121}

The US and Canadian officials were trying to impose order on a rapidly mutating set of interests and topics. In this context, the principles of usage as set out in the treaty (domestic and sanitary use, then navigation, then hydroelectricity and irrigation) had unprecedented weight. George Gibbons, Senator Smith, and the ‘interests’ that Root mentioned all shared an interest in the management of their home turf; the treaty was a major decision affecting local land and water use at a dynamic moment, not a casual excursion into a novel area of international law.

\textsuperscript{120} Letter, Root to Gibbons, 2 March 1909. Laurier Papers, CA 153654, LAC.
\textsuperscript{121} Neary, "Grey, Bryce and the Settlement of Canadian-American Differences," 376.
Despite Root's best efforts, the Senate Foreign Relations Committee approved Smith's amendment and it was included in the Boundary Waters Treaty when the Senate voted in favor of it in late February 1909. After the U.S. Senate's ratification, the treaty could not be substantially altered. The British government waited to submit the treaty to its Parliament for ratification until the Government of Canada gave its approval. In practical terms, that meant Prime Minister Laurier's approval. To convince the prime minister that the Smith rider did not hurt Canada's interests, the Canadian and American proponents of the treaty presented him with favorable opinions from a variety of policymakers, including the US Attorney General, the Canadian Justice Minister and Minister of Public Works, Gibbons, Bryce, Grey, the Chief Astronomer, and all six IWC Commissioners.

Despite this impressive litany of affirmation, Laurier studied the treaty for a full year and engaged a private engineer for an outside opinion. The last of Laurier's several detailed enquiries involved the St Mary's and Milk Rivers. It is a good example of how he navigated the pressures placed on him by Canadians trying to profit from the boundary waters. Laurier asked the executives of the Canadian Pacific Railway (C.P.R.) if they would accept the treaty's solution to the St. Mary's and Milk disputes. The railroad was the majority stockholder in the Alberta Railway that served the area. The President of the C.P.R. wrote back that the treaty protected the company's interests 'amply.'122 This made it easier for Laurier to accept it.

While the Boundary Waters Treaty awaited ratification, the disputes it was designed to settle remained unresolved. In the spring of 1910, Gibbons and the other Canadian members of the International Waterways Commission observed irritably to Laurier that the issue of power development on the St. Lawrence River at Cornwall, Ontario would be much easier to settle if the Boundary Waters Treaty were in force.123 The urgency of the existing problems and the likelihood

of their multiplication may have helped push Laurier to a decision. He finally approved the Boundary Waters Treaty a few days after receiving their letter, and it was ratified in London before being signed into action on May 13, 1910 in Washington, D.C.

**Conclusions**

The old saying that 'an ounce of prevention is worth a pound of cure' seemed particularly apt in the context of the Boundary Waters Treaty. After thirty years of attempts to cure Canadian-American disputes, the Boundary Waters Treaty was a laboriously built remedy that finally included a measure of prevention. The Boundary Waters Treaty and the International Joint Commission were not the only preventatives created between 1905 and 1909; the improved communication that developed in the course of the negotiations was also an important factor in easing future disputes. The treaty had a dual purpose: to resolve several existing disputes and provide a structure for addressing similar problems in the future. Under its terms, the St. Mary’s-Milk River and Niagara disputes were resolved. The tensions over development on the Rainy River and at Chicago, while not actually in the treaty, were unofficially but lastingly resolved during the negotiation process.

In the aftermath of the Alaska Boundary Award, British foreign policy makers and the Canadian government recognized that Britain could no longer conduct Canada's political relations with the United States without encountering serious conflicts of interest. The practical solution was for Canada to handle its own negotiations in North American disputes, though Britain still technically conducted all of Canada’s external affairs. While the governments of United States, Britain and Canada began to realize the need to change their style of diplomacy, North Americans were looking for ways to resolve their proliferating boundary waters disputes. Old conflicts over borders and fishing were not being resolved, and as the Great Lakes and other border regions were more intensely developed, new sources of tension arose. In this way, the Boundary Waters Treaty is the result of a hybrid process, driven from below by residents’ concerns and from above by international geopolitics. From 1895 onwards, ideas about boundary waters management
emerged at international conferences and were incorporated into official communications and legislation. The three countries set up the International Waterways Commission in 1903, and its recommendations heavily influenced the final Boundary Waters Treaty.

The direct Canada-US negotiation process and the practically bilateral treaty that it produced improved relations between Canada and Britain, Canada and the United States, and Britain and the United States. All three governments were encouraged by the creation of the International Joint Commission to look after a policy area that was prone to disputes. Elihu Root, writing to George Gibbons in 1910, remarked, “The public has no adequate conception of the tremendous scope and importance of the thing which has been done as a preventative of controversy in the future,” referring to the IJC’s potential role as an arbitration mechanism.

In retrospect, it is ironic that policymakers in all three countries were so excited by the possibilities inherent in the IJC's expandable mandate. Politicians and early historians of Canadian-American affairs hoped that Article 10 arbitration clause would make the new commission into a “miniature Hague Tribunal,” where Canada-U.S. disputes could be solved judicially. In fact, the arbitration clause has never been used. Several factors probably combined to prevent its use. The IJC’s first Commissioners were not the people that the drafters envisioned. Following elections in both Canada and the United States, the new Prime Minister Robert Borden and President William Taft chose to appoint members of their own networks and George Gibbons, who had expected to be one of the first chairmen, never served on the commission. At the same time, World War I and its aftermath contributed to a general shift away from arbitration by disrupting earlier patterns of Western international relations, creating widespread disillusionment with pre-War diplomacy, and producing transformative changes in Canadian political culture.

The experience of producing the Boundary Waters Treaty and the other agreements in this period also indirectly promoted the creation of the Canadian Department of External Affairs. In

125 Jordan, Annotated Digest, 127.
1909, a bill to form the Department of External Affairs was introduced and passed with very little fanfare, making Canadian external communications faster and better organized. Governor-General Grey was upset that the bill gave the new office responsibility for 'the conduct of all official communications between the government of Canada and the government of any other county in connection with the external affairs of Canada,' because he did not want the office of the Governor-General to be superseded by a purely Canadian unit.\textsuperscript{126} His worries about redundancy were fully justified - Canadian historians regard the Department of External Affairs as an important step towards foreign policy autonomy.

By reducing the distance between the managing authority and the people experiencing environmental change, these arrangements began to make the transnational governance of the lower Great Lakes more democratic and more closely aligned with conditions there. This process, of creating institutions that responded to the concerns of people living around the lower Great Lakes, continued as the century progressed and as the need to manage the direction, flow and deteriorating quality of the water became more important on both sides of the border. In September 1907, George Gibbons predicted that if the Boundary Waters Treaty got through the Senate, it would be "the best thing that ever happened to this country and . . . the only way of preventing friction between ourselves and the Mother County as well as between Great Britain and the United States."\textsuperscript{127} His prediction turned out to be reasonably accurate: the IJC became an important tool for creating mutually acceptable policy. However, it is equally true that the IJC’s work during the twentieth century would please someone with Anderson’s original objections about sovereignty and jurisdiction. Because the U.S. and Canadian governments hold the organization’s purse-strings and appoint the Commissioners, the IJC’s independence only goes so far. The issues at stake on Lake Erie and Lake Ontario, as well as on other shared waters, have been too important for politicians to hand over as much control to the IJC as its creators envisioned.

\textsuperscript{126} Quoted in Hallett, "The 4th Earl Grey," 252.
\textsuperscript{127} Gibbons to Laurier, 24 September 1907. CA 129648-129649, Laurier Papers, LAC.
Chapter 2 — Eager Beavers: Joint Efforts to Change the Lower Great Lakes’ Hydrography, 1909-1972

This chapter seeks to analyze how Americans and Canadians cooperated to change the hydrography (water location, level, direction, and flow), of the two lower Great Lakes during the period from the signature of the Boundary Waters Treaty in 1909 until the conclusion of the Great Lakes Waters Quality Agreement in 1972. Before the treaty, human changes to Lake Erie and Lake Ontario were an uncoordinated set of public and private efforts. After 1909, intergovernmental cooperation became a significant driver of change, affecting the shape, pace, cost, and politics of people’s efforts to adjust the hydrography to suit their preferences.

Over the sixty years following the signature of the Boundary Waters Treaty, people from both countries worked together to transform the Great Lakes watershed, using a variety of public works mechanisms under joint bilateral, federal, state, provincial and municipal management, and also using the International Joint Commission (IJC) to coordinate private development. Because Americans and Canadians at all levels shared similar goals for water management, and because the Boundary Waters Treaty provided framing guidelines, drastic hydrographic changes occurred with minimal social friction, more quickly, and with lower implementation costs than separate, parallel development processes would have required. The funding, technicians and administrative cooperation from multiple levels of government were a crucial reason why the lower Great Lakes watershed changed so much, so rapidly during the early and middle decades of the twentieth century.

Shared Goals

Broadly speaking, these cooperative water management projects sought to make shipping easier, faster and cheaper; to generate more hydroelectricity; to prevent floods; and to provide clean water to cities, towns and farms, all with the overarching intention of ‘nation
building’ through faster economic growth and higher living standards. The goals of nation building through water management shifted over the decades, from ambitious modernization projects in 1910s and 1920s, to a greater concern with human labor during the Great Depression. During the Second World War and during the 1950s, dramatic landscape alteration was again promoted, followed in the 1960s by recognition of the need to control pollution. Despite these variations, governments on both sides of the border actively supported projects to change the region’s hydrography to suit human convenience during the entire 1909-1972 period.

Throughout this period, there was constant support for nation-building through altering hydrography. Little dissent emerged before the mid-1960s. There were disputes about how much canals or other alterations cost, and whether it was worthwhile to pay for them. There were doubts about whether waterway improvements on the Great Lakes would be negated by competing routes, like the Gulf-to-Lakes waterway. There were questions about how to achieve equity of benefits from development along the boundary and protests when that principle seemed to be ignored, as with the Chicago Diversion. Canadians suspected that private investors would export electricity to New York’s industries state at the expense of southern Ontario’s manufacturing sector. However, there was near-universal agreement that the alterations themselves were a good thing. This prevailing attitude could be described as a consensus of opposition to natural variability and a commitment to adjusting the ‘unimproved’ landscape. Citizens, investors and policymakers agreed that improving the waterways was a nation-building project, and that it was right for Canada and the United States to spend money to facilitate transportation (though occasionally provinces and states also executed transport projects.) Flood control and irrigation projects were more locally managed around the Great Lakes, generally financed at the state, province or municipal level but still universally described as ‘improvements’ and often as contributions to a growing national community and economy.
Neither country interfered with the other's debates about hydroelectric regulation, and the arguments used in the debates were similar on both sides of the border. On Canadian side, the provincial government held responsibility for regulating electricity and, as in fisheries policy, the federal government was not involved in debates about development, rate-setting, private versus public investment, or subsidizing rural access. On the American side, the division of responsibility was more complicated, as state governments struggled with the Federal Power Commission (1920) to define their roles in electricity provision and manage concerns over the cost, access and quality of hydroelectric infrastructure. Neither country seriously considered leaving hydroelectric capacity undeveloped, and jurisdictions on both sides of the border spent time, money and energy trying to get as many people and businesses connected to as much electricity as possible, as fast as possible. Like canal building, maintaining shipping routes, controlling floods and providing clean water, power generation and distribution were regarded as unquestionably beneficial for the Great Lakes region. These convictions held steady for sixty years, supported by, among others, the elected officials and political figures of the time, industry representatives, municipal authorities, and professional experts like engineers, economists and planners, not to mention the population at large.

The consensus was not limited to elected officials and experts.¹ Cross-boundary associations of people sprang up to argue for or oppose different projects, including a transboundary association of businessmen from Great Lakes harbor towns who opposed a proposed Gulf-to-Lakes waterway, a group of supporters of the Gulf-to-Lakes proposal from Illinois and states bordering the Mississippi, and a variety of national- and local-level transnational associations supporting navigation and hydroelectric development along the St. Lawrence River. These larger transboundary groups were not alone.

At the municipal, state, and provincial levels of politics, various groups advocated for government investment in hydroelectricity at Niagara Falls, flood control along different rivers, and harbor improvements to enliven local economies. Occasionally these discussions appear in the national Parliamentary and Congressional records of River and Harbor Acts, canal and merchant marine department budgets, etc. At every level, changing the waterways to suit people’s economic goals was regarded as a good idea, and debates centered around cost-benefit analysis, optimal routes and occasionally competition between regions for investment by higher levels of government.

Concern over water levels was widespread and recurrent, but never a source of international tension. If the Lakes were too low, then transportation and shipping routes suffered from reduced capacity, as did hydroelectric generation. If they were too high, it was bad for valuable harbor infrastructure such as wooden piers, and the risk of floods increased for farms and cities. The perceived solution to this unpredictability was to study the variation and formulate plans to correct it with alteration and engineering, not to adapt human activity to a varying natural space.\(^2\) Concerns such as these were another source of cooperation, although they produced data sets and professional connections rather than infrastructure. It is also worth noting that accusations of one country causing the concerns of the other are almost completely absent. Even the most organized and environmentally-focused opposition - the conservationist defenders of Niagara Falls’ beauty - were appeased by plans to develop the waterscape with attention to their concerns. This lack of controversy is important to recognize because it facilitated the rapid development of administrative capacity for water management.

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\(^2\) With the notable exception of Toronto’s response to Hurricane Hazel (October 15, 1954). After the extremely anomalous hurricane did considerable property damage and claimed a number of lives, the province of Ontario amended legislation to enable the Conservation Authorities to acquire land. The Toronto regional Conservation Authority banned private construction on floodplains and bought land to create parks along watercourses. As a result, there are number of pleasant ravine parks there.
At various points, academics and government officials in the watershed cooperated to study levels and flows, often prompted by concern over high or low levels. For example, New York state sponsored a study of lake level change, as did the IJC and the US Army Corps of Engineers.\textsuperscript{3} Numerous scholars on both sides of the border published analyses of lake levels, water policy and law, fisheries management, and related topics during the twentieth century, but I have not found any peer-reviewed work prior to 1990s that questioned the nation-building rationale for joint, Canadian, American or local changes to the Great Lakes’ hydrology.

Whether improving upon nature for personal gain, for the sake of the nation’s future resources, or for the present public good, these people shared a common conception of ‘improvement.’ That consensus facilitated projects of alteration, since the same projects could be described as serving all of these goals (profit, progress, conservation).\textsuperscript{4} The only question was how much alteration the communities (national, local, or otherwise defined) could afford to pay for, and who would get what, at what cost. The watershed-wide consensus about development goals reduced those costs and facilitated action.

\textit{Turning Goals into Action}

In the course of arranging joint infrastructure projects to serve their shared goals, people on both sides of the border developed new norms and administrative tools. This chapter will examine the mechanisms by which Americans and Canadians cooperatively altered the lower


Great Lakes between 1909 and 1972: joint federal agreement, IJC-approved private development, unilateral federal action, and state, provincial or municipal action. The two federal governments’ most innovative mechanism was part of the Boundary Waters Treaty: the new bilateral institution called the International Joint Commission (IJC). The two countries and the Commission developed patterns of decision-making, funding, and staffing that delegated many project approvals and maintenance briefs to the IJC, and it became a key piece of transboundary management infrastructure after 1909. Disparate departments within the two federal bureaucracies found ways to collaborate on national projects, and the United States and Canada also pursued direct bilateral infrastructure projects, and sometimes consulted before undertaking internal projects in bodies of water that adjoined boundary waters. The two countries coped differently with the question of how state and provincial governments should be involved in regulating electricity markets, but both found ways to provide increasingly large amounts of hydroelectricity to their citizens. State, provincial and municipal governments also invested in flood control, irrigation, urban water projects, and in the process, they, too, developed more administrative capacity for water management.

So, in this rather copacetic fashion, the watersheds of the two most heavily populated Great Lakes were utterly transformed in a few short decades. As a result of damming for electricity generation and flood control projects, the channels between the lakes and the rivers around the basin went from varying water levels to controlled uniformity. Because most wetlands ecosystems revolve around seasonal variations in water levels along shorelines and in river mouths, this change reduced the number and extent of marshes and warm, shallow spaces along the lake shores. This in turn affected a range of organisms that spend all or part of
their life cycles in wetlands. Overall, the reduction of wetlands habitat reduced biodiversity and population levels for many aquatic species, including many kinds of commercially valuable fish.  

Controlling lake levels was not the only human activity that contributed to the loss of wetlands, however. The many projects for dredging channels, filling marshes, straightening watercourses, and paving riverbanks and harbors that went forward during this period had similar effects. Continuing change in land use practices, such as deforestation, expansion of farming, and urbanization, also affected water levels and wetlands in this period. The location, flow patterns and cleanliness of waters near the shore were most heavily affected because that war where most humans lived and worked, while the water of main bodies of the lakes changed much less. The role of wetlands in fish life cycles and in water quality maintenance was not well understood at the time. Although not deliberate, these trends are directly linked to the regional population’s increasingly heavy investment in many kinds of water control infrastructure.

All of these changes had consequences for humans, both intended and unintended. Over the course of the sixty years of cooperative development, the costs of shipping and passenger travel went down, harbors became easier to use, and the cost of electricity dropped. Floods became less frequent, although more severe when they did occur. The commercial, First Nations/Native American, and recreational fisheries suffered and, in many locations, disappeared. The quality of life in urban areas diminished along with local water quality.


However, these changes were often accepted with complaisance because of their contributions to increased industrial profits, urbanization, agricultural productivity, and population. The adjustments made to the lower Great Lakes after the 1909 Boundary Waters Treaty did, in fact, speed shipping, moderate and direct water flows to populated places, and provide electric power, and their unintended consequences are only beginning to be recognized.

Before Canadians and Americans began a sustained effort to manage the water quality of the lower Great Lakes, they spent forty years working together to transform them for human convenience and to maintain those convenient arrangements. To understand their joint efforts to address environmental quality, we must first examine its predecessor: the long, mutually profitable effort to maintain control over the quantity and direction of the Lakes’ waters. Its success is both dismaying and encouraging for twenty-first century North Americans, whose goals for management are now more numerous and, to some extent, contradictory. Policymakers’ and citizens’ vision for the lower Great Lakes now includes longer time horizons and a less exclusively anthropocentric understanding of the linkage between human health and ecosystem health, while most basin residents still hope to maintain some version of the past century’s investments in transportation routes, power generation and supply infrastructure.

_Federal Governments Acting Together_

During the period between the signature of the Boundary Waters Treaty in 1909 and first Great Lakes Water Quality Agreement in 1972, multiple bilateral projects went forward simultaneously around the lower Great Lakes, affecting their water levels and flows. For geographic and political reasons, these projects clustered in three zones: the St. Clair River/Detroit River connection between Lake Huron and Lake Erie, the Niagara River and Welland Canal connection between Lake Erie and Lake Ontario, and along the St. Lawrence River, from Lake Ontario downstream as far as Montreal. In these three zones, waterborne
transportation was restricted; only engineering projects could enlarge the shipping corridors, and in both countries, the federal governments were responsible for maintaining canals and shipping routes. Two of the three zones, Niagara-Welland and the St. Lawrence, also had valuable hydroelectric potential, and national governments were key players as the relatively new power source was developed and distributed along the boundary.

Direct bilateral collaboration was the route for a significant proportion of the changes to the lower Great Lakes during the first half of the twentieth century. The first time that Canadians and Americans agreed to change the Lakes’ hydrography was the conclusion of the Boundary Waters Treaty in 1909. That agreement set specific rules for sharing hydroelectric power generated at Niagara Falls, and laid out a process for applications to change the levels and flows of boundary waters in the future. It was a fairly comprehensive solution to an economic and diplomatic problem that had become increasingly pressing in the early years of the twentieth century: who would profit from the economic development of the boundary waters?

The Boundary Waters Treaty was only part of a larger transnational vision for water management shared by the two federal governments. Not long after the International Joint Commission started its treaty-mandated work, a State Department lawyer, J.B. Moore, wrote to the Canadian and British governments, laying out a comprehensive program of ‘improvements’ to their shared waters and asking for Canadian input. The letter, which became a reference for both countries over the next decade, is a remarkably detailed document, outlining a supremely controlling vision of the Great Lakes and a few other boundary locations. In his letter, Moore suggests the U.S. and Canada use the IJC to decide to what extent “the enlargement of the existing Canals and the creation of new canals, under projects already adopted, or under

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8 See Chapter 1.
9 Letter from J. B. Moore, Counsellor to Sec. of State, to Ambassador Sir Cecil Spring Rice, Feb. 24, 1914, file 4800-6, pt 1, Vol 3658, RG 12, LAC.
consideration” would require increased or new diversion of water from the original connecting channels of the boundary waters of the St. Lawrence and Great Lakes systems; how such diversion would affect the water levels, the available channels, and the currents of the Great Lakes and connecting channels; and what benefits and injuries, “are liable to result therefrom to the navigation or to other business interests of properties of the two countries.”

Moore’s letter then lists a long series of effects to consider when contemplating these management questions which, to a contemporary observer, look almost like an environmental impact assessment checklist.

Moore’s letter imagines a management regime that maintains lake levels, not only by controlling water flowing downstream, but also by diverting between watersheds to adjust water supplies or simply, ‘to reduce trouble.’ Moore comments on the relative benefits and damages of waterways improvements, to roads, railroads and shipping by water, and expresses the hope that the two countries, with Britain, will be able to decide,

What level would be most beneficial to all interests concerned in both countries, to be fixed and maintained during and after the close of the navigation season, the benefits and damages to overflowed or drained lands, and to other affected business, the possibility and desirability of establishing compensating and regulating works to maintain and regulate these water levels.

The letter continues, describing how cooperative management could support commercial fisheries, and balance the needs of navigation and power generation with the impact of such improvements on scenic features “and upon interests of the travelling and home public by change in character of water flow.” Moore envisions the urban and suburban development that new hydroelectric capacity and industrial development could bring, and, noting the cost of new hydroelectric capacity, proposes that Canada and the United States look into cost-sharing mechanisms and ways to share the responsibility for generation, transmission and distribution of

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10 Ibid., p 2
11 Ibid., p 3
electricity between state, provincial or federally owned utilities. The scope of Moore’s list is high-
Modernist in its breadth of vision and enthusiasm for drastic change. For historians, it is a
convenient summation of the goals for water management shared by engineers, federal
officials, businessmen, waterfront mayors, and many others along both sides of the boundary in
the early twentieth century. In some ways, this detailed vision of water management for
maximum benefit is an example of ‘binocular’ shared goals of the Canadian and American
governments on this topic, rather than a single state’s vision.12

Moore sent his proposal just before the First World War broke out, and the Canadian
government did not respond in detail until 1919. The Dominion was far from disinterested, but
the scope of Canadian participation in the First World War was enormous and absorbed the
Canadian federal government’s entire capacity for foreign policy.13 The enthusiasm, optimism
and sense of necessity that Canadians and Americans felt for adjustments to the Great Lakes

12 In his influential monograph, Seeing Like a State (New Haven, Yale, 1998), James Scott described the
powerful organizing influence of modernist state discourse during the nineteenth and twentieth centuries. Other scholars have proposed definitions for the ‘nature state’, ‘development state’, or ‘resource
management state,’ to describe the ways in which governments reconfigure ecosystems and landscapes. The American and Canadian version of ‘state’ vision on the lower Great Lakes shared many of the
characteristics of Scott’s modernist state, albeit with two governments rather than one. It is also worth
noting that neither the U.S., Canada, nor their constituent states or province was particularly coercive for
its time, and the projects that they executed together were enthusiastically promoted by many of the
people living in these watersheds. There were almost certainly opponents of the dams, canals and
dredging who were not heard, but overall it is more accurate to describe these projects as supported and
pushed along from below, rather than imposed from above, as Scott proposed.
13 “On account of the war this matter remained in abeyance.” p 1. Memo for Minister of Public Works,
July 29, 1919, file 2756-8a, Vol. 4319, LAC, Ottawa, Ont. It is difficult to overstate the impact of the First
World War on Canadian politics. The Canadian war effort precipitated a domestic Conscription Crisis in
1917 and, following the war, Canada leveraged its wartime contribution to re-negotiate its relationship
with Britain. Canadians served in the armed forces during the First World War at approximately the same
rates as citizens of the UK, and approximately twice the rate of American citizens (Percent of population
in armed service: 7.8% (Canada), 8.6% (UK) and 4.6% (USA)). Desmond Morton, Tabitha Marshall and
“Great Britain,” Ute Daniel, Peter Gatrell, Oliver Janz, Heather Jones, Jennifer Keene, Alan Kramer, and
Janz, Heather Jones, Jennifer Keene, Alan Kramer, and Bill Nasson, eds. 1914-1918-online. International
outlasted the disruptions of World War I and the changing international relations of its aftermath.

For an example of this attitude, consider a letter written by a Canadian engineer, Mr. M. Coutlée, to his superior in Ottawa, in 1921,

It is only 20 years since the 14 ft St. Lawrence canals were finished and yet they are considered obsolete. Half measures therefore seem hardly suitable for a great international undertaking in the rapidly growing valley of the St. Lawrence. The danger in not having power available for the electro chemical work of the future is that such industries may be placed elsewhere. . . . The scheme outlined in the report represents a splendid piece of engineering and those connected with it are to be congratulated.14

The report mentioned is the International Joint Commission’s engineering report on possible changes to the St. Lawrence River. In addition to supporting development of the river in principle, Coutlée was confident about the project because he trusted the data and cost-benefit calculations provided by joint fact-finding. This kind of shared research and information gathering by the federal governments facilitated agreement about water management on the lower Great Lakes.

As mentioned earlier, one of the water bodies that the federal governments cooperated to alter most frequently was the St. Clair River/ Detroit River corridor, where they worked to deepen, straighten, and broaden the shipping channel between Lake Huron and the lower Great Lakes. Since the mid-nineteenth century, each country had been maintaining a channel on its own side of the river.15 After the Boundary Waters Treaty, this maintenance became cooperative and more frequent. The first joint improvements to the channel were made in 1912 along Livingstone Channel, after referring the IJC to study the technical question of how the Livingstone Channel in the Detroit River could be excavated without affecting waterfront

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14 Coutlée to Lafleur, Sept. 27, 1921, p. 4. Folder 2756-1, Vol 4319, RG 11, LAC.
15 Channel maintenance began on the St. Clair River, in 1855, when a channel was dug through the riverbed and then dredged frequently (1866-73, 1886-92). The shipping channel on the Detroit River was dredged on both sides of the border between 1876 and 1890. The United States also worked to connect Lake Erie to the Hudson River and so to New York City, building the Erie Canal in 1825 and enlarging it in 1862 and 1903-1918.
communities. It is important to note that they did not apply for permission to change the river. They referred an engineering question and used the resulting report. The International Joint Commission served to approve or deny private applications for altering the boundary waters, but the federal governments did not submit their decisions to its authority. The US Army Corps of Engineers and the Canadian federal Department of Public Works government also undertook maintenance of the 1912-1914 channel improvements between 1919 and 1921, without further reference to the IJC, and dredged the St. Clair River together in 1926.

After an appropriation in the U.S. River and Harbors Act of 1930, the two governments developed a detailed engineering plan to deepen the Detroit River again between 1931 and 1934. There is no evidence of disagreement about ways or means, though there was mutual concern about maintaining the Lake levels above and below the shipping channel. In addition,

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18 Correspondence and documents, March 17, 1931 - March 12, 1932. File 4800-3, part 2, Vol. 3658, RG 12, LAC. Correspondents: District Engineer, Maj. Jas Bagley, Army Corps of Engineers; US Secretary of War, Patrick Hurley; First Secretary of US Legation in Ottawa, B. Heath Riggs; Canadian Secretary of State for External Affairs, RB Bennett; Chief Engineer for Canadian Dept of Public Works, K. M. Cameron; Canadian Undersecretary of State for External Affairs, O.D. Skelton; Chief of Canadian Section, Joint Board of Engineers, D. W. McLachlan; Deputy Minister of Canadian Dept of Railroads and Canals, V. I. Smart. Correspondence and documents, January 10, 1934 - July 3, 1934. File 4800-3, part 3, Vol 3658, RG12, LAC. Correspondents: US Secretary of War, George Dern; First Secretary of US Legation in Ottawa, Pierre Beal (to Feb 1934) and Warren Robbins (after Feb 1934); Canadian Secretary of State for External Affairs, RB Bennett; Canadian Undersecretary of State for External Affairs, O.D. Skelton; Deputy Minister of Canadian Dept of Railroads and Canals, V. I. Smart; Canadian Assistant Deputy Minister of Marine, E. Hawken.

19 Ibid.
perhaps because of the Great Depression, the officials negotiating the work in the 1930s discussed questions of equitable procurement and employment policy for the first time, such as whose citizens would be doing the digging at each point in the project. In a brief memorandum in response to a request from the International Hook Drillers Association, the Canadian government noted that in the past, they had allowed Americans to work on their side of the boundary and that Canada benefited from the work without paying for it.\footnote{Memo, Deputy Minister for Public Works, March 12, 1932. File 4800-3, part 2, Vol. 3658, RG 12, LAC.} Similar questions came up between 1932 and 1934 as the two governments worked to dredge and maintain the St. Clair River channel. The American federal government was using Public Works Administration funding, and the employment policies were more stringent than in past years. However, it seems evident that even during the economic nationalism of the Depression years, labor on these shared pieces of infrastructure did not become a bone of contention.

The engineers’ discussions give a sense of how they planned to change the St. Clair and Detroit rivers during their “improvements”: they removed shoals from the shipping lanes and built eight sills, or submerged weirs, to prevent the loss of the shoals from changing lake levels.\footnote{Letter, First Secretary of US Legation, Pierre Beal to Canadian Secretary of State for External Affairs, February 2, 1934. Enclosure: Memorandum from US Secretary of War George Dern to US Secretary of State, Jan 20, 1934. File 4800-3, part 3, Vol. 3658, RG 12, LAC.} (Weirs are like underwater speed bumps which raise the level of a lake or river.) They dredged the shipping channel and the Canadian Prime Minister exchanged a series of letters with the US Envoy in Ottawa, debating where to dump the excavated material, noting that filling the “only remaining deep holes” in the St. Clair River might interfere with other channels and a bay being used by local salt company.\footnote{PM Bennett to US Envoy Robbins, April 19 and 20, 1934. File 4800-3, part 2, Vol. 3658, RG 12, LAC. Correspondence between D.W. McLachlan, Canadian Section of Joint Board of Engineers for St. Lawrence Waterways Project, and John Read, legal advisor for Canadian Dept of External Affairs, Dec. 7, 1933. File 4800-3, part 2, Vol. 3658, RG 12, LAC.} These concerns over lake levels and a single salt
mining plant seem to have been the only references to the possible impact of the project. Later research in hydrodynamics and ecology indicate that these changes likely affected the river’s flow, the amount of suspended sediment in the river, and the pattern of sediment deposition along its bottom and sides, with significant repercussions for the local communities of aquatic plants, fish, and nesting birds.²³ It also facilitated the movement of invasive aquatic species, both by allowing the passage of more and larger ships, and by widening the rivers themselves.

The two countries exchanged diplomatic notes regarding dredging and disposal of the spoil (dredged materials) in St. Clair River, Lake St. Clair and the Detroit River in 1956 and again in 1957. From an engineering standpoint, the St. Clair and Detroit River channels are not as impressive as the construction of the St. Lawrence Seaway or the damming of Niagara Falls, world-class projects of their eras. The Huron-Erie linkage channels are simple to maintain, a forgettable, repetitive chore. However, the repeated, almost routine execution of this joint chore is the reason that Lakes Erie and Ontario are linked to Superior, Huron and Michigan. The two countries’ willingness to cooperate on the channel maintenance over the decades is the reason that the current landscape seems so ‘natural’ and transportation through it so cheap.

The second zone in which Canada and the United States cooperated regularly during the 1909-1972 period was the Niagara River, which links Lake Erie to Lake Ontario. The Boundary Waters Treaty divided the river’s flow in a mutually satisfactory way, and each country allowed private investors to build turbines at the Falls and transmission networks to nearby industries and homes. The two countries set up the International Niagara Board of Control in 1923 and recreated it in 1925 to advise the governments about how to manage the famous

waterfalls’ aesthetics versus maximum hydroelectricity. In 1950, after wartime power shortages fed growing agitation for new hydroelectricity, the two national governments signed a new Treaty for Diversion of the Niagara River and, in 1953, created an IJC management board to oversee its enactment. Concern over lake levels was a major topic between Canadian and American officials as they worked to expand hydroelectric capacity along the boundary.

In addition to the massive works along the Niagara River, both federal governments hoped to harness the St. Lawrence River for power generation and expand its shipping capacity. After the First World War ended, they began to explore these dual possibilities. The United States had proposed this as part of its schedule of comprehensive improvements in 1914, but the war delayed action even as wartime production demonstrated the demand for more electricity on both sides of the border. In April 1919, following an American reminder through the British Embassy, the Canadian Chief Hydrographer wrote to the Canadian Chief Engineer of the Department of Railways and Canals, recommending that the Dominion Power Board take on the task of drafting an IJC reference. There followed a year of discussion by letter, which produced a reference to the IJC to study possible improvements to the Great Lakes-St. Lawrence River system in 1920, followed by detailed analysis of their reports.

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25 Memo, Assistant Deputy Minister A. St. Laurent for Min. of Public Works, July 29, 1919. Folder 2756-1-8a, Vol. 4319, RG 11, LAC.
26 Letter from Wm. Stewart to W. A. Bowden, April 25, 1919. File 4800-6, pt 1. Vol 3658, RG 12, LAC. (As mentioned earlier, a reference was a formal request for the International Joint Commission to investigate and report on a given topic.)
27 See correspondence and documents, April 25, 1919 - May 22, 1920. File 4800-6, part 1. Vol. 3658, RG 12, LAC. Correspondents: Chief Engineer, Canadian Dept of Railroads and Canals, Mr. Bowden; Deputy Minister for Canadian Dept of Railroads and Canals, Graham Bell; W.J. Stewart, Canadian Dept of Marine; Canadian Deputy Minister of Marine, A. Johnston; Canadian Minister of Railroads and Canals, Mr. Reid; Canadian Minister of the Interior, Arthur Meighen; President of Canadian Privy Council, N. W. Rowell; Under-Secretary of State for External Affairs, Joseph Pope; British Ambassador to USA, R. C. Lindsay; Governor-General of Canada, Duke of Devonshire; US Secretary of State.
The rapid, voluminous correspondence on this topic demonstrates the enthusiasm of many policymakers and technically trained civil servants for waterways improvements. A sample of these exchanges indicates that provincial, state and private interests were studying the St. Lawrence’s potential as eagerly as the federal governments. A report from the Canadian federal engineer, Mr. Coutlée, in 1921 noted that the Ontario hydroelectric utility had been studying the St. Lawrence river since 1906 and that in 1918, as the war ended, “intensive studies of the river and shores were begun . . . This included studies of the discharge, soundings of the river, and topography of the shores and ice observations.”

He went on to note that the Consulting Engineer for New York, “who is supposed to represent Standard Oil, Dupont, and other interests,” had designed power plants at Niagara and had a different opinion from ‘The Hydro’ of Ontario about how to handle the ice.

The competing opinions notwithstanding, Canadians and Americans maintained their interest in the project for the next thirty years and conducted several more engineering surveys and two treaties in 1932 and 1940 before the end of the Second World War. In addition, they exchanged a series of diplomatic notes during the Second World War agreeing to temporary increases in the outflow from the St. Lawrence River at Lake Ontario, which permitted more hydroelectricity to be generated but raised the levels in Lake St. Francois above Montreal. They agreed to build the St. Lawrence Seaway and Power Project, which opened in 1959.

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28 Coutlée to Chief Engineer Lafleur, Dept of Public Works, 23 December 1921. Folder 2756-1-8a, Vol 4319, RG 11, LAC.
29 Ibid.
construction, maintenance and toll regime have been shared by means of a purpose-built St.
Lawrence Seaway Authority and occasional formal diplomatic notes.31

Since so many American and Canadian officeholders agreed that the St. Lawrence
should be developed for power in 1918, why did it take until 1959 to execute the project? The
cost was certainly a factor, but a potential environmental issue also mattered, though not
because people were concerned about ecology at the time. Damming the St. Lawrence meant
rebuilding a heavily-used transportation corridor, and any changes in river levels had the
potential to damage valuable harbor infrastructure. In addition, new shipping channels had the
potential to disrupt traffic flows, and many riverside communities and transshipment points were
(correctly) concerned about losing their livelihoods, while railway companies feared new
competition. So, balancing development of hydroelectricity and navigation were further
complicated by the need to coordinate with these provincial, state, municipal and civil society
groups. Electricity was a contentious topic on both sides of the border, but in Canada the
question of exporting power was also related to a recurring foreign policy conundrum: how could
the Canadian government help its citizens build an independent country with strong industries,

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31 Diplomatic notes exchanged: 1959 — Exchange of notes re. tolls on St. Lawrence Seaway [incl.
Exchange of notes re. dredging in the Wolfe Island Cut (on the St. Lawrence River) to improve shipping
channel. 1962 — Exchange of notes to suspend tolls on Welland Canal. 1967 — Exchange of notes to
apply a lockage fee to ships going through the Welland Canal.
when the gravity-well of the much larger American economy was right next door, heavily 
influencing patterns of trade and investment? Ottawa officials agreed that the St. Lawrence 
projects should go forward, but their execution was much more complex than maintaining the 
St. Clair River/Detroit River corridor or the sharing the Niagara River.

The pursuit of their shared goals for water management led both countries to develop 
their administrative capacity for the task. As they began to navigate these policy areas, 
corresponding much more frequently and in greater detail than they had before the Boundary 
Waters Treaty, the foreign affairs units of each country drew upon internal expertise. Water 
management arrangements were a fairly technical and unusual task for the State Department 
and for the infant Department of External Affairs in Canada. To get data collected, decisions 
made, and agreements drafted in this non-traditional area of cooperation, the foreign affairs 
mandarins needed to draw upon engineering, scientific, legal and other technical expertise to 
achieve their goals. The Army Corps of Engineers (US) and Department of Marine and 
Fisheries and Department of Public Works (Canada) provided engineers, while each 
government’s Justice Department provided legal help.32

The career of Mr. William Stewart is a good example of this capacity-building and shows 
how the same people made decisions that affected all three shared zones: the St. Clair/Detroit, 
Niagara, and the St. Lawrence Rivers. Stewart was working as Canada’s Chief Hydrographer in 
1912, as part of the Department of the Naval Service, when a minute of the Privy Council 
assigned him to assist the newly formed Department of External Affairs as they tried to look out 
for Canada’s interests vis-à-vis the newly formed International Joint Commission.33  He had 
been part of the IJC’s predecessor, the International Waterways Commission, in 1907.34

32 At this time, both countries called their cabinet-level justice division the Justice Department.  
33 Privy Council Minute 2924, 19 October 1912. File 4800-6, pt 1, Vol 3658, RG 12, LAC.  
34 Dispatch from British Ambassador James Bryce to Governor General of Canada, Earl Grey, May 1911.  
File 2756-1, Vol 2780, RG 11, LAC.
Stewart’s work on international water policy lasted until his death in 1925, encompassing nearly every issue of the day. He travelled frequently as part of this liaison work, including to IJC meetings and to Washington, DC, provincial and state capitals, and he eventually asked for funding for his incidental expenses because he was out of pocket on a regular basis.\(^{35}\) His superiors agreed that his expenses should be covered, establishing a precedent for funding this kind of work.\(^{36}\) When it came time to replace him, three ministries corresponded at length before deciding that there was no better way than to have an assigned ‘go-to’ technical expert person.\(^{37}\) Over these first decades, Canadian and American foreign policymakers and IJC Commissioners established norms for borrowing the help they needed, and their administrative capacity for water issues grew, became more legitimate and normalized, and more regularly funded.

This bilateral diplomacy and capacity-building is more difficult to trace than the carefully written rules of procedure followed by the International Joint Commission, the Niagara Control Board, or the Seaway Authority. However, the pattern of exchange between foreign policy bureaucrats over the decades between 1909 and 1972 is plain: the two governments shared the goal of adjusting the Great Lakes to suit human convenience, they consulted regularly on engineering projects, and they shared the costs of maintaining the Connecting Channels between Lake Huron, Lake Erie, Lake Ontario, and the Atlantic Ocean. The pattern of bilateral


\(^{36}\) Privy Council Minute 593, March 12, 1907. Privy Council Minute 383, February 16, 1907. See also correspondence, May 12 - November 27, 1912. Correspondents: W. J. Stewart, Engineer for Canadian Dept of Public Works; Canadian Deputy Minister of Public Works; Canadian Undersecretary of State for External Affairs, J. Pope. File 2756-1, Vol. 2780, RG 11, LAC.

\(^{37}\) Memoranda, May 9 - June 1, 1925, Canadian Dept of Public Works, file 2756-4, Vol 2746, RG 11, LAC.
cooperation sped and smoothed the process of ‘improving’ three major river channels for hydroelectric power and shipping, with concomitant effects on those watercourses.

The International Joint Commission: Growing into its Job, Approving Private Development

The International Joint Commission (IJC) was created in 1909 when the federal governments of the U.S.A. and Canada, with help from British diplomats, concluded the Boundary Waters Treaty to resolve a set of water disputes and prevent future ones. The IJC’s format was extremely practical, given that for much of the twentieth century, Canada and the United States had little capacity to administer research into topics like freshwater biology and very small budgets for water policy. It is also important to recall that Canada did not formally control its own foreign policy until 1931. From Confederation in 1867 until 1931, it was a self-governing British Dominion. In order to give Canadian policymakers some autonomy while preserving the diplomatic protocol of the British Empire, the Canadians frequently dealt with the American foreign policy establishment through single-issue bilateral or multilateral organizations during the late nineteenth and early twentieth centuries. These proxies included the IJC, whose Commissioners and staff advanced the two federal governments’ shared goal of facilitating industrial growth and shipping around the Lakes, while largely avoiding disruption of the complicated web of imperial, national, state and provincial relationships that overlapped there.

During its first decades, the Commission’s members, federal civil servants, and politicians shaped the new organization. It developed a reputation for technical expertise, detailed reports and for (sometimes) preventing the development of the boundary waters from becoming a political football. The IJC’s capacity to manage the expectations and interests of capitalists and communities along the boundary line made it a valued tool as Canadians and Americans worked to ‘improve’ the heavily used lower Great Lakes. It became one of the most autonomous and long-lasting proxies for Canada-US diplomatic relations, with a lot of influence
in Great Lakes matters. Its work there focused on the same three zones that absorbed so much bilateral attention during the period from 1909 to 1972: the St. Clair/Detroit River connection, the Niagara River, and the St. Lawrence River.

In order to understand how the International Joint Commission’s work complemented the joint activities of Canada and the United States, it is essential to understand who the Commissioners were and how the organization worked. The IJC’s early organizational meetings dealt with the kind of grey minutiae that may seem self-evident; it may seem obvious that the Commission needed an operating budget, or that the federal bureaucracies should share engineering staff when studying new technology. However, the funding and infusions of political will that enable flexibility within large institutions can make or break policy initiatives and they cannot be assumed to follow simply because a treaty is ratified. Because the IJC and the federal governments made an effort to get the expertise they needed, setting up patterns of cooperation and streams of funding, it was possible for them to execute their policy of transboundary hydrographic alteration.

The International Joint Commission is formed by six commissioners, three appointed from each country. The first American Commissioners were George Turner of Washington state, James A. Tawney of Minnesota, and Frank S. Streeter of New Hampshire. The British Ambassador James Bryce described them doubtfully to Earl Grey, the Governor-General of Canada, in 1911;

If appointments on this Commission are to be looked upon as party patronage and to be given as consolation prizes to politicians who have suffered defeat in their constituencies probably no better choice could have been made . . . But it may be questioned whether [they have] . . . that judicial detachment and conciliatory disposition on which the success of the institution will depend.38

38 Dispatch from British Ambassador James Bryce to Governor General of Canada, Earl Grey, May 1911. File 2756-1, Vol 2780, RG 11, LAC.
Sources indicate that by appointing these three, President Taft hoped to achieve a balance of regional perspectives, in addition to maintaining the patronage network that Bryce described.\textsuperscript{39} All of the American Commissioners were Republicans with legal training and political experience, lifelong members of the white, Protestant, male elite. Their biographies attest to excellent connections in Washington, D.C. and their home states, professional and service club memberships, and Ivy League educations.\textsuperscript{40} Tawney, as a former Majority Whip and former Chairman of the House Appropriations Committee, was particularly well-connected.

A dramatic Canadian election intervened between the signature of the Boundary Waters Treaty in 1909 and its implementation in 1911, changing the anticipated Canadian appointments. Conservative Prime Minister Robert Borden refused to confirm the commissioners that Laurier had selected on his way out of office. Instead of appointing the treaty’s architect, the Liberal insider George Gibbons, Borden chose Thomas Chase-Casgrain of Quebec, Henry Powell of New Brunswick, and Charles Magrath of Alberta. In many ways, they resembled their American counterparts, though their antecedents and experience were slightly more varied. Chase-Casgrain and Powell were both lawyers and professors of law, and both had been elected to both the provincial and federal parliaments. However, Thomas Chase-Casgrain was also a French-Canadian imperialist (a very unusual combination), a Catholic, and a dual citizen, born in Detroit to an American mother. The third Canadian commissioner was Charles Magrath, an engineer from Western Canada, where he built a career surveying the Northwest Territories before entering politics, first as mayor of Lethbridge and later as a federal


MP and Cabinet minister. Taken together, the three Canadian commissioners were white, male members of Borden’s Conservative Party, well-connected and reliable members of the country’s upper class.

Overall, the first six Commissioners were reliable rather than radical, sincerely interested in furthering their governments’ development goals through the novel mechanism of the bilateral IJC and in reducing the social frictions and costs of water use along the boundary. Except in Magrath’s case, their understanding of international relations was heavily influenced by their careers in law, as opposed to diplomatic or military service.

The six Commissioners worked together and with their federal governments to define the parameters of their job during the first year of their appointments (1912), setting the pattern and tone for decades to come. The first few gatherings began the tradition of holding meetings every six months, alternating between Washington, DC and Ottawa. In addition, the chairmen and commissioners stayed in touch between meetings, and the national sections corresponded and met together. Early agendas included setting appropriate rules of procedure for internal decisions, establishing a public hearing process, and exchanging views about how activist the organization should be.41 The British Ambassador to the United States, James Bryce, attended the early meetings and sent a detailed report to Ottawa, commenting that the American Commissioners were a group of “somewhat purist and impractical" lawyers who imagined the new organization as a law tribunal, to which the Canadian Commissioners, “prudently demurred for various reasons," including the fact that one of them was an engineer who felt that he would be useless on a legalistic Commission, and also that the federal governments were unlikely to accept the role as plaintiffs before a tribunal that they funded and appointed.42 Despite Bryce’s

41 Memo from Casgrain to Sec. of State for External Affairs, Dec. 11, 1912. File 1912-6, Vol 1117, RG 25-A-3, LAC.
42 Bryce to Grey, Jan. 19, 1912, p. 3 File 1912-6, Vol 1117, RG 25-A-3, LAC.
initial misgivings, it appears that the Commissioners were able to adapt their initial preferences and ideas: after several meetings they created their own purpose-built rules of procedure, with less stringent rules of evidence than a court and a consensus model of decision-making. Overall, their compromises created a “simpler, more flexible, and elastic” organization, while maintaining some characteristics of a judicial tribunal.43

The original Commissioners’ correspondence and speeches from 1912 make it quite clear that, rather than see themselves as representatives of their respective governments, they believed themselves to be impartial jurists, helping with North American nation-building. Chairman Tawney’s remarks at the first IJC meeting are characteristic:

As members of this Commission, we are, therefore, neither Canadians nor Americans, but we are each and all representatives of all the people on both sides of our international boundary line. . . . We have a great responsibility . . . to vitalize the international powers conferred by the Treaty, realize the aspirations and hopes of the two peoples here living under law, and the destinies of two nations that now dominate the richest land on the globe.44

Tawney’s vision of the IJC as an extra-national facilitator depended on a foundation of shared goals, a basic agreement that water should be used to further the countries’ nation-building projects. Within the context of that shared vision, the International Joint Commission was a new tool to help the two countries manage their increasingly complicated, increasingly profitable relationship and shared watersheds.

After sorting out their internal workings, the Commissioners and their staff began to establish themselves with their respective federal governments, making the practical arrangements that turn treaties into action. The American section’s office space, clerical staff, and salaries were provided through the State Department budget. Despite several attempts to

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get legislation through Congress that would have made the IJC’s funding a permanent ‘adjunct’
to the State Department, its funding remained contingent on each year’s appropriations.\textsuperscript{45}

The Canadian Section achieved greater independence in its funding: in 1912, the
section’s Secretary, Mr. Burpee, successfully argued that the Commission should submit its
expenses directly to Canadian Auditor General, rather than go through the Public Works Dept.
accountant.\textsuperscript{46} Overall, the IJC Commissioners were quite successful in leveraging their
experience and connections to get their new organization comfortably seated in relation to the
federal bureaucracies. Chairman Casgrain complained vehemently to the Canadian Under-
Secretary for External Affairs, that he was constantly being embarrassed in front of his
colleagues because the Canadian government was so much slower than the United States to
appoint Commissioners and respond to IJC requests for comment or information.\textsuperscript{47} His
arguments eventually bore fruit and the following year, in 1913, the Canadian Commissioners
began to provide confidential briefing material to elected officials and lobbied successfully for
better office space and payment of their rent arrears.\textsuperscript{48}

According to the Boundary Waters Treaty that established it, the International Joint
Commission has two functions: to report on questions referred to it by the U.S.A. and Canada,
and to review applications to change the levels or flows of the boundary waters. During its first
years of operation, the IJC established systematic ways of dealing with referrals and
applications, and, in the process, further clarified its role and that of the various governments.

\textsuperscript{45} Correspondence between Sen. Cullom, Chairman of Foreign Relations Committee and Secretary of
State P. Knox, May and June 1910. File 1910-29, Dept of State, box 6601, 711.42155/114, NARA.
\textsuperscript{46} Correspondence, October 1912. IJC Secretary Burpee., Minister of Public Works, F. D. Monk.,
Accountant for Public Works, Mr. Kingston, Deputy Ministers of Finance and Public Works. File 2756-1,
Vol 2780, RG 11, LAC.
\textsuperscript{47} Casgrain to Pope, Oct. 9, 1912. File 1912-6, Vol 1117, RG 25-A-3, LAC.
\textsuperscript{48} Casgrain to Pope, Jan. 5, 1914. Casgrain to Borden, Dec. 6, 1913. Burpee to PM Secretary Blount,
A crucial early decision in this process was taken in 1914 by Canada, the U.S.A. and the IJC: they agreed that anyone applying to the IJC for permission to change levels or flows would have to be approved by their respective governments before applying to the Commission. This reduced the independence of the fledgling Commission, but it was not a surprising restriction, given that the governments were paying the IJC’s operating costs and given that many of the technical experts working on IJC cases were also government employees. The approval requirement for applications may also have been a way for the national governments to assure themselves that states and provinces would not be able to develop water resources without federal input. The IJC’s technocratic approval process made it easier for boundary waters projects to become reality quickly and smoothly, which facilitated changes in the lower Great Lakes.

Approving Projects in the Lower Great Lakes

Between 1909 and 1972, the International Joint Commission completed twenty-six cases pertaining to the Great Lakes, of which twenty related to changing hydrography. The governments used the IJC twice for navigation projects in the Detroit River/St Clair River zone. In 1912, the Commission recommended a site for dikes to compensate for dredging in the Detroit River to facilitate navigation. One of their contributions was to recommend a different location for dikes to compensate for dredging in Detroit River, to facilitate navigation without disrupting the harbor of the riverside town of Amherstburg, Ontario. A couple of years later, the

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49 Minute of the Privy Council, Feb. 9, 1914. File 4800-6, pt 1, Vol 3658, RG 12, LAC.
52 “A Reference to investigate and report on the necessity, in the interest of navigation, of building dikes and compensating works at Bois Blanc Island or elsewhere in the Detroit River to compensate for
Commission approved similar works to dredge the St. Clair River channel and compensate for lowering Lake Huron by building a submerged weir (a low underwater dam). These references and applications show how the IJC contributed to the bilateral management of the St. Clair River and Detroit River corridor: their research and reports improved and facilitated the joint construction projects that the two federal governments wanted to undertake.

The International Joint Commission also completed numerous studies along the Niagara River and approved several building projects there. The first came in 1925, when the Commission approved a private company’s application to build the Peace Bridge over the Niagara River, connecting Buffalo, New York to Fort Erie, Ontario. The groups that executed this and other projects that the IJC approved were private companies, often owned by both Canadians and Americans. The case of the Peace Bridge gives an insight into the collaboration of public and private finance that worked on both sides of the border to create the new infrastructure. ‘Actuated by high civic motives’, in the words of the project’s chief engineer, the national governments of Canada and the United States and the State of New York agreed to issued $4,500,000 in bonds to pay for the construction. The bonds were supplemented by $50,000 in stocks, which were held by a joint board of twenty-five directors, of whom nine were Canadian and sixteen were American. The twenty-five directors were in charge of building and operating the Peace Bridge, using tolls to repay the bond issue and profit from their investment.

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53 Memos 16-20, Bound volume, “Waterways Problems,” Prepared by Leonard Burpee for Mr. King, September 17, 1923. No pagination. Vol 1, RG 51, LAC. See also, Vade mecum, “The application was approved, dredging was completed but the submerged weir was never built. The dredging was expected to lower Lake Huron about one-eighth of an inch.”

54 Vade mecum. 1925, 21A: 21A “An Application by the Buffalo and Fort Erie Public Bridge Company for permission to construct and maintain a bridge over the Niagara River between Buffalo and Fort Erie.” Approved, completed. No further management.

55 Edward Lupfer, “Peace Bridge Will Link Nations: Great Span Over Niagara River is Now Approaching Completion,” New York Times, October 10, 1926. Lupfer was the chief engineer for the project.
When it was completed, the Peace Bridge was the only ‘vehicular bridge' between Niagara Falls and Duluth, Minnesota (as opposed to rail bridge). The project’s chief engineer noted in 1927 that there were four vehicular bridges in the Great Lakes system, two at Niagara Falls, one at Lewiston, NY and one at Montreal, all privately operated. Completed in 1927, its tolls have paid for its construction and maintenance many times over, and its presence reduced transportation costs for the regional economy substantially.56

In 1950, as the United States and Canada were making their new treaty for water diversion at Niagara Falls, the IJC reported to the governments about how to maintain the waterfalls’ appearance while generating additional power. They recommended several remedial water control structures, which were built and overseen by a subsidiary IJC board, the Niagara Board of Control (est. 1953). In 1961, 1963, 1964, and 1967 the IJC completed three new references and an application from the Hydro-Electric Power Commission of Ontario and the Power Authority of the State of New York, all related to the same question of how to get maximum hydroelectric development at Niagara with minimum impact on the site’s aesthetics. By providing the technical expertise needed to strike this balance, without rippling bilateral or local politics, the IJC’s work smoothed the way for Canada and the United States to reshape the lower Great Lakes’ hydrography.

Infrastructure such as the Peace Bridge and the Niagara dams sped up the process of transboundary economic integration and growth around the lower Great Lakes in the early

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56 Transportation economists praise the impact of the Peace Bridge unreservedly, because it “expanded the range over which goods can be marketed. It has made production and distribution processes more efficient, created opportunities for economies of scale and increased specialization, changed logistics systems, and reduced costs.” F. X. Malady and M. L. Lar. “Endogenous Regional Economic Growth Through Transportation Investment.” Transportation Research Record: Journal of the Transportation Research Board, No. 2067. (2008: Transportation Research Board of the National Academies, Washington, DC): 110-119. The Peace Bridge is the second-busiest crossing point on the Canada-US border, after the Detroit-Windsor tunnel and bridge. In 1991, before NAFTA, $23 billion worth of goods passed over the bridge. After NAFTA, the trade it carried amounted to $45 billion, with more than 60% increase in traffic. David Chen, “Border War over the Peace Bridge,” New York Times, April 27, 1999.
decades of the twentieth century, and the IJC simplified the process, by making sure that private
development of shared resources was not a source of Canada-US tension. In so doing, the
Commission’s actions also accelerated the environmental impact of these pro-development
water management policies.

During the first half of the twentieth century, the International Joint Commission also
devoted a substantial amount of its time to the international section of the St. Lawrence River.
The development of the St Lawrence River was a politically complex topic and the IJC’s work
there was only a small part of the maneuvering surrounding it. A confidential memo from 1912
summed up the attitude of the Canadian federal government:

Canada is vitally interested in the boundary waters from the neighborhood of Montreal to Fort
William on Lake Superior. Every cubic foot of water diverted from the St. Lawrence drainage
system has a bearing on the commercial life of Eastern Canada. The channel from Montreal to
Quebec has cost the country large sums of money and to preserve all the water for the St.
Lawrence that the catchment area of its system produces is essential to the business life of
Montreal. Equally important with that is the development of navigation to inland ports as far west
as Fort William.57

This is a good summation what the lower Great Lakes and St. Lawrence meant to Canadian
diplomats and ‘high policy’58 experts throughout the interwar period: they were a transportation
route and a potential power source, but water quality was too insignificant to mention. The
memo also highlights the primacy of Québec in Canadian politics and Montreal’s place as the
country’s largest city and port, critical to nation-building goals. Ottawa could not ignore
Montreal’s interests any more than Washington, DC could ignore New York City.

In 1918, the International Joint Commission received two applications to develop parts of
the international section of the St. Lawrence River for electricity. Both applicants, the New York
and Ontario Power Company and the St. Lawrence River and Power Company, were private

57 Pope to Blount, Feb. 8, 1912, p 1. File 1912-6, Vol 1117, RG 25-A-3-a, LAC.
58 In the international relations/political science sense: during most of the twentieth century, military and
diplomatic issues were considered ‘high policy,’ while everything else was ‘low policy.’
companies with stockholders and officers from both countries. Wartime power shortages prompted the two governments to allow the applications, although there were some protests from shipping companies and rival hydroelectric companies.\(^{59}\) The commission approved one application, allowing some weirs to be built.\(^{60}\) (In this case, the weirs raised the river level just above the dams, thereby sending water through the turbines from a greater height, producing more electricity.) The outcry also prompted the governments to send the IJC a reference in 1920, asking how to improve the St. Lawrence River for both navigation and power generation.\(^{61}\) Proponents of development along the river used the reports from this reference as a basis for proposals until the Second World War.

The governments also referred questions about the feasibility of several large projects to the International Joint Commission. In 1937, for example, the organization reported on the practicality of making a deep waterway to connect the St. Lawrence to the Hudson River, recommending that it not be done until after construction of a deeper St. Lawrence Seaway.\(^{62}\)

Between 1952 and 1959, the St. Lawrence Seaway was constructed by the Canadian and American governments by means of a treaty, while a combination of federal, provincial and state funding paid for new hydroelectric plants under the aegis of the International Joint Commission’s St. Lawrence Board. The power plants were built according to plans that the IJC had itself recommended as part of a 1952 reference study of ways to control high and low water


\(^{61}\) *Vade mecum*. 17R: “A Reference to investigate and report on improving St. Lawrence River navigation and power between Lake Ontario and Montreal.”

\(^{62}\) *Vade mecum*. 37R “A Reference to investigate the practicability of a deep waterway from the St. Lawrence River to the Hudson River via Lake Champlain.”
levels in Lake Ontario. The question of water level control came up again in 1964, when the IJC completed a reference studying whether or not the level of the Great Lakes could be regulated to reduce high and low levels. It concluded that more research was needed, and this led to several more binational studies of water levels and usage after the conclusion of the Great Lakes Water Quality Agreement in 1972. By reporting on the large, vague questions that the federal governments submitted to them as references, the IJC provided detailed, mutually agreeable, and highly technical options for water management.

In the course of its work on the St. Clair/Detroit River corridor, the Niagara River and the St. Lawrence River, the IJC expanded an aspect of its organization that has become essential to water management around the Great Lakes: the technical board. Since the first ones were created to oversee navigation and power projects on the Rainy River (west of Lake Superior) in 1912, IJC boards have been small groups of technical experts. Appointed in equal numbers from Canada and the United States, board members were (and are) often career civil servants from federal, state, provincial or municipal bureaucracies, who held their board appointments simultaneously with their government jobs. IJC boards supervise the management of a given body of water on behalf of the Commission and the federal governments, and board members conduct the studies and write the reports for which the IJC is known. Between 1909 and 1972, the IJC created more than a dozen boards, six of which were specific to the lower Great Lakes and St. Lawrence River. This mechanism became so prevalent because it facilitated sharing technicians, expertise, and money between the various levels of government.

The International Joint Commission was not the only bilateral organization that Canada and the United States used to facilitate development around the lower Great Lakes during this period, though it was one of the most influential, as well as the most flexible, independent, and

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63 Letter and memorandum, Chase Casgrain, Canadian Chairman of the IJC, to Canadian Secretary of State for External Affairs, December 11, 1912. File 1912-6, Vol 1117, RG 25-A-3, LAC.
long-lasting. For the Niagara River and the St. Lawrence River, two of the three heavily used corridors that were the subject of so much cooperation, they created specific binational organizations. The International Niagara Board of Control, created in 1923 and recreated in 1925 to advise the governments about how to manage the famous waterfalls’ aesthetics versus maximum hydroelectricity. It had the same name as the IJC board created in 1953 (see above).

A constellation of organizations grew up to facilitate the two countries’ joint endeavors on the St. Lawrence River. Canada created the St. Lawrence Seaway Authority in 1951, before the United States agreed to share the navigation and power project. When the United States joined the project in 1954, the enabling legislation created a new federal agency, the St. Lawrence Seaway Development Corporation to match its Canadian counterpart. At the same time, the public electricity entities for New York and Ontario, PASNY and HEPCO, finalized plans to work with the two federal governments on the hydroelectricity parts of the Seaway. These four entities, two for navigation and two for power, worked with the International Joint Commission to oversee the construction of the Seaway and then to maintain it and collect tolls. All of these groups maintained the tradition of equal representation from both sides of the border, headed by appointed career politicians and staffed by career civil servants from multiple levels of government, aided by occasional private consultants.

65 Three subsidiary IJC boards were created for this task: the St. Lawrence River Joint Board of Engineers (est. 1956 as part of an IJC application), the International St. Lawrence River Board of Control (est. 1952 as part of an IJC application), and the International Lake Ontario Board of Engineers (est. 1953 as part of an IJC reference).
Unilateral Action, Without Objections

While cooperative ventures did hasten adjustments to the Great Lakes, they were not the only kind of change. It is indicative of the post-1909 consensus on means and ends that neither country, nor any of their states or provinces, protested the other side’s rearrangements in the watershed. During the 1909-1972 period, the two federal governments each made changes to the hydrography of the lower Great Lakes. Their unilateral efforts, like their bilateral ones, focused on the transportation links and hydroelectric infrastructure. With the exception of the Chicago diversion, which predated the Boundary Waters Treaty and was a recurring source of tension and complaint, these projects were accepted easily by the other jurisdictions even when they had basin-wide impact.\textsuperscript{66}

Canada’s expansions of the Welland Canal between Lake Erie and Lake Ontario are the most consequential unilateral change that either country made after signing the Boundary Waters Treaty. The Welland expansions in 1914, 1931 and 1960 increased transportation between the lakes significantly. Canada’s other federal projects in the region included a series of harbor improvements in 1913,\textsuperscript{67} developing the Welland Canal for hydroelectricity,\textsuperscript{68} considering a canal linking Lake Huron to Lake Erie via Georgian Bay,\textsuperscript{69} building hydroelectric dams on sections of the St. Lawrence River that were not international in 1918\textsuperscript{70} and 1922-23\textsuperscript{71}


\textsuperscript{70} File 2756-3, Vol. 2746, RG 11, LAC.

\textsuperscript{71} M. M. Mahoney, Canadian Ambassador to USA, to O.D. Skelton, January 27, 1938. Folder 2756-1-8a, Vol 4319, RG 11, LAC.
and making numerous studies of lake levels and the power potential of the St. Lawrence River.\textsuperscript{72}

The United States government executed fewer unilateral projects in the Great Lakes, largely because of geography: the connections between the Lakes were either on the international boundary or in Canada, as were most potential hydroelectric sites. However, the U.S.A. did change the outflows at Chicago Sanitary and Ship Canal through its judicial branch at several points,\textsuperscript{73} developed its side of Niagara Falls, and conducted studies for a Lakes-to-Gulf waterway in 1926 and 1933.\textsuperscript{74}

Within their separate jurisdictions, as when they worked together, Americans and Canadians were trying to achieve very similar results. They wanted shipping and power to be cheap and widely accessible, for cities and farms to have water when and where they needed it, but not where it was not wanted. Sometimes, these projects were further complicated by the need to coordinate with provincial, state and municipal groups.

\textit{State, Provincial and Municipal Action, with Some Consultation}

During the same period, state and provincial governments were engaged in studying and altering the watershed for irrigation, flood prevention, water supply, hydroelectric generation, and transportation. In 1939, Manitoba proposed laying out a procedure whereby states and


\textsuperscript{73} Letter and enclosures, Canadian Legation, Counsellor M. M. Mahoney, to Undersecretary for External Affairs, O.D. Skelton, January 27, 1938. Folder 2756-1-8a, Vol 4319, RG 11, LAC.

provinces could do studies and surveys of transboundary waters. Over the next two years, the idea went from Winnipeg to the US federal government, and from the US Public Health Service, to Public Health Departments of Minnesota and North Dakota, before being passed along to the Canadian federal government. In the end, they came up with a draft “Procedures to be followed prior to caring on Joint pollution studies of International Waters by States and Provinces contiguous to the International Boundary between the United States and Canada” in December 1941. It does not appear to have become a regular part of the bilateral relationship, perhaps lost in the scramble after the US mobilized for war after Pearl Harbor (Dec. 7, 1941) but the process of creating such a protocol is indicative of the state-to-province connections that were developing.

The province of Ontario and New York state both took part in developing hydroelectric power on the Niagara River. Ontario supported power development on the Welland Canal and St. Lawrence River, purchasing the Depew Falls hydroelectric plant in 1930. The Toronto

75 Letters, Jan 27, 1939 through Dec. 19, 1941. File 370-J-4, part 1. Vol 272, RG 29, LAC. Correspondents: N. A Robertson, Canadian Undersecretary of State for External Affairs; Canadian Ambassador to USA, Dr. W.A. Ridell; Deputy Minister of Canadian Dept. of Pensions and National Health, Dr. R. E. Wodehouse; Dr. J. J. Heagerty, Director of US Public Health Service; Mr. J. J. Read, Office of Canadian Undersecretary of State for External Affairs; Dr. John Phair, Chief Medical Officer, Ontario Dept of Health; Lawrence Burpee, Secretary of Canadian Section of IJC; Cordell Hull, US Secretary of State; A.O. Stanley, Chair of US IJC Section; Stephen Gibbons, Acting Secretary of the US Treasury; Dr. A. J. Chesley, Executive Officer, Minnesota Dept of Health; H.A. Whittaker, State Sanitary Engineer for Minnesota; G. H. Ferguson, Chief of Canadian Public Health Engineering Division; Dr. Draper, US Surgeon General.

76 Drafted by Dr. J. J. Heagerty, Director of [US] Public Health Services and Mr. Tarbett, Sanitary Engineer for US PHS. Sent by Heagerty to DM R. E. Wodehouse, December 16, 1941. File 370-J-4, part 1, Vol. 272, RG 29, LAC.


78 Because the Welland Canal was a piece of transportation infrastructure, the federal Department of Railways and Canals kept track of precisely which industries had access to hydroelectricity from the
Harbor Commission reshaped a significant portion of Lake Ontario’s shoreline between 1913 and 1915.\textsuperscript{79} The city also put stringent land use controls in place after a disastrous hurricane in 1952, and began to study lake levels in 1948.\textsuperscript{80} New York State devoted resources to flood control on the Genesee River above Rochester in the 1910s, while Ontario managed the Thames and Grand Rivers to reduce flooding beginning in the 1940s.\textsuperscript{81}

None of these were transboundary controversies, but where provinces and states disagreed with their federal governments, progress slowed. There was a persistent tension between the US federal government and the state of New York over control of the hydroelectric generation on the Niagara and St. Lawrence. The state wanted to be involved in the development of more hydroelectricity, the federal government didn’t permit it. Similarly, while the Hepburn government in Ontario feuded with the WLM King administration in Ottawa, projects to develop the St. Lawrence projects as other waterways stalled.\textsuperscript{82} These disagreements were less about whether or not to develop hydroelectricity, and more about which governments would have control over the new energy source.

These conflicts between jurisdictions serve as counterexamples that further demonstrate the boost that smooth cooperation gave to other infrastructure projects. If money and technicians had not been so easily shared between the federal governments and the IJC, or if

\textsuperscript{81} Treatise “Water: Diversions, Flood Control, Conservation,” Vol. 7, J.R. MacNicol Fonds, LAC.
federal/provincial and state/fed cooperation had not been present, it is unlikely that the Great Lakes watershed would have changed so much, so fast, and with so little political friction.

Physical Changes in the Watershed

The cooperative efforts of Canadians and Americans had long-lasting, significant effects on the lower Great Lakes. The greatest changes that can be ascribed to deliberate, joint management efforts were, not surprisingly, concentrated where people were trying to change the direction, level and flow of the water. Between 1909 and 1972 period, dam projects shifted the water levels in the Niagara River and the St. Lawrence River from natural seasonal variation to a controlled uniformity. The St. Clair/Detroit River channels retained slightly more seasonal variation because the Huron-to-Erie connection was not dammed, but water level variation there was considerably dampened by cooperative hydroelectric development on the St. Mary’s River between Lake Superior and Lake Huron.

Cooperative development of transportation and power generation infrastructure also contributed to the ongoing destruction of wetlands around the lower Great Lakes. The destruction of the region’s wetlands, already affected by beaver trapping, accelerated when European pioneers began clearing large swathes of land for agriculture in the eighteenth century and continued at an increasingly quick pace through the nineteenth century. If carefully drained, wetlands made good farmland and before germ theory was widely accepted, wetlands were sometimes seen as public health problem. In addition, despite the belief that water could

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83 “Dredging, control structures, locks, dams, hydroelectric facilities, canals, and diversions have altered the hydrology of the Great Lakes-St. Lawrence System. Dredging and control structures have had the largest impacts. . . . Control structures at the outlets of Lake Superior and Lake Ontario keep the levels of these lakes regulated within a range that is smaller than the range of levels that would occur under natural outflow conditions.” Brian P. Neff and J. R. Nicholas, Uncertainty in the Great Lakes Water Balance (Washington, D.C.: U.S. Geological Survey Scientific Investigations Report 2004-5100, 2005), 2.
purify sewage, wetlands were not understood as important to urban water quality until late in the twentieth century.

At Point Mouillée, a decrease of 80% in wetlands occurred between 1935 and 1980, mainly between 1940 and 1950, when dams were built along the Huron River. That prevented water levels from varying naturally, which reduced sediment loads to the delta wetlands and also made the wetlands more vulnerable to erosion. The following graph shows the reduction in wetlands areas at the river delta at Point Mouillée, Ohio.

![Graph showing reduction in wetland areas at Point Mouillée, Ohio, 1935-1980.](image)

**Figure 5. Historical Extent of Wetlands, Point Mouillée, Ohio, 1935-1980**

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In southern Ontario, a study commissioned by the Canadian and Ontarian governments estimated that before European settlement, the area would have been 25% wetlands, covering more than two million hectares. In 2002, approximately 56,000 hectares of pre-settlement wetlands remained, representing a loss of 72% for the southern Ontario region overall, with the great majority lost before 1967. The majority were around Lake Erie, a smaller percentage around Lake Ontario. The majority were converted to other forms of land use, mainly farmland and urban areas. The following graph shows the reduction in the extent of wetlands around southern Ontario during the nineteenth and twentieth centuries.

![Figure 6. Historical Extent of Wetlands, Southern Ontario](image)

Since the early 1800s, human activity has created disturbances that altered wetland ecosystems. Changes include deforestation, agriculture, changes in fire regimes, introduction of exotic and/or invasive species, and shoreline development. The deliberate, mutually satisfactory

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87 Ibid., Appendix C, Township Statistics, pp C1-1 through C1-10.
88 Ibid., p 7.
projects of dredging, filling in and straightening out of the Lakes’ shores and connecting channels during the early and middle twentieth century continued this reduction of wetlands areas, and also contributed to the overall hardening of shorelines. The detrimental effects of these changes on fish life cycles, storm water control and water quality were not well understood or highly valued until very recently.

In recent years, as ecologists and resource managers have become more aware of the role that wetlands play in moderating the impact of heavy precipitation and in improving water quality, more research has been conducted into the lower Great Lakes’ historical wetlands. There is ample scientific literature documenting the impact of hydrological engineering on water systems, but taking a closer look at parts of the transformation of the lower Great Lakes gives a sense of the magnitude of the impact that people had upon this particular watershed as they worked together to reshape it.

For example, one study of historical variations in wetlands vegetation, conducted in 2010, observed that the variation in Lake Ontario’s water levels decreased after regulation began. The authors explained the importance of water levels and flows as follows: “The natural flow regime of a large river ecosystem encompasses all hydrologic relationships, including the magnitude, duration, and periodicity of water levels, and has a major influence on the physical, chemical, and biological environment.”89 Over the decades, the steady water levels chosen by humans reduced the extreme low levels that had occurred at 30-40 year intervals, and eliminated the St. Lawrence River’s 7-10 year cycles of low to high.90 Over the course of the twentieth century, under the regulated water regime, the composition of wetlands and shore

vegetation changed, with much more emergent vegetation (i.e., plants with branches and leaves above the water line), less biodiversity, fewer animals, and a much smaller proportion of flooded, mixed, or wet meadows. In addition, an invasive shrub species, *Typha*, accounted for a much greater proportion of vegetation. The author stated unequivocally, “All hydrologic characteristics considered (magnitude, duration, and periodicity of water levels) demonstrated major alterations relative to predictions of unmanaged levels.” In addition to the diminishing area of wetlands, the character of the remaining marshes and swamps has been affected by humans’ preference for uniform lake levels.

It is important to remember how positively these changes were regarded when they were made. The Toronto Harbor Commission created a scrapbook in 1915, carefully documenting the dredging, straightening and swamp drainage and landfill. The project was cheerfully described as a combination of harbor deepening for Toronto’s port that would make it an ‘ocean port’ if the St. Lawrence Seaway was built, and as ‘reclamation’ that would create 646 acres of new land for lakeshore factory sites “thus like Seattle, killing two birds with one stone.” There is no mention of malaria control as a rationale for the improvements. The massive dredging machines are identified by their affectionate nicknames, and although twenty-first century eyes can imagine the rich wildlife and intricate ecosystem services that were being churned up and thrown away with every ton of mud and marsh grass, there were no protests at the time. The photograph below shows one of the dredges at work in Toronto Harbor in 1914.

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92 The only reasons described are intent to become an ‘ocean port’ and also, “The general scheme will also provide for the reclamation of Ashbridge’s Bay, six hundred and forty-six acres on the lake front, to be used for factory sites. The scheme involves the deepening of the harbor and pumping the material into Ashbridge’s Bay, thus like Seattle, killing two birds with one stone.” p 4. “Commission Bulletin,” IJC, No. XIV, November 30, 1913. File 1914-2, Vol 1137, RG 25, LAC, Ottawa, Ontario. These projects definitely killed many birds through habitats destruction.
Figure 7. Dredge “Shuniah” in Toronto Harbor, 1914

Andrew Audubon Merrilees fonds, R5500-32-8-E. Group E, Sub-series IV, Photographic albums of land and water transportation “One Hundred Selected Photographs Showing Progress of Construction during 1914.” Toronto Harbor Commissioners, Engineering Department, 1915. “One Hundred Selected
The destruction of wetlands and wholesale reconfiguring of lakes and rivers were received cheerfully because they encouraged the region's economic growth. From an economist's perspective, the cooperative changes to the lower Great Lakes' hydrography were a great success for both sides of the border. The costs of shipping and passenger travel went down, the cost of electricity went down, harbors became deeper and easier to use, bridges facilitated trade, and the risk of floods diminished. As a result, industry, cities, farming, and population increased on both sides of the border. The lakes' commercial, First Nations/Native American, and recreational fisheries all suffered, as did public health, and the quality of life in urban areas changed. At the same time, people valued wetlands, recreational spaces and diverse native biota much less than they valued the homes, jobs, cities and manufactured goods that were created during the lower Great Lakes' industrialization and urbanization.

One of the best examples of the mixed results of this period of drastic change is the evolution of the Welland Canal between Lake Erie and Lake Ontario. Its locks allowed ships to go around the enormous Niagara Escarpment, a transportation link so highly valued that Canadians renovated the canal twice during the 1909-1972 period, with larger locks and shorter routes each time. The volume of traffic through the Welland Canal rose with each enlargement of the locks, as seen in the graph below.

Photographs Showing Progress of Construction during 1914." Toronto Harbour Commissioners, Engineering Department, 1915. LAC.
The shipping passing through the Welland Canal represented an exchange of goods and services between the region’s mines, forests, fields and factories, and the larger world’s markets, economic forces that had a powerful impact on human activity in the watershed. However, the ships in the canal were also environmental actors in their own right, carrying ballast water and portmanteau biota\textsuperscript{95} of all sorts into the Lakes, and leaving motor oil, various


\textsuperscript{95} Historian Alfred Crosby coined the term, ‘portmanteau biota’ in his monograph, \textit{Ecological Imperialism: The Biological Expansion of Europe, 900-1900} (New York: Cambridge University Press, 1986). He argued that the successful establishment of permanent colonies by European powers in North and South America was partly due to the impact of their various ‘portmanteau biota.’ These biota were the diseases, plants and animals that the colonists brought from Eurasia across the oceans, both inadvertently and on purpose.
fuels, and sewage in their wake. The Canal itself affected the watershed because it acted as a passageway for aquatic organisms that had not been able to bypass Niagara Falls before. The sea lamprey is the best known, but not the only species to use the route.

In the three zones which received so much attention, the connecting channels of the St. Clair/Detroit River, St. Lawrence River, and Niagara River, the overall effect of humans’ efforts were transformative. Although parts of these channels look like ‘natural’ rivers or streams, and parts are appreciated by anglers, hunters or vacationers for their outdoor recreation potential, they are overwhelmingly man-made rivers. For nearly a century, their appearance and functions have been shaped to human preferences. A report from the United States Geological Service listed the alterations to the Detroit River as a result of dredging: more over 96.5 kilometers of shipping channels was created, over 46 million cubic yards of material were removed, and approximately 85 hectares of above-waterline ‘compensating works’ were made, resulting in a permanent 20-25 cm drop in the levels of Lakes Michigan and Huron. Another study noted that the dredging projects deepened the St. Clair and Detroit River channels by an average of eight meters by 1978.

Another indirect result of the new infrastructure, cheaper hydroelectricity and higher volumes of traffic through the lakes, was that water quality in inshore areas and connecting channels declined significantly, and at an accelerating pace, with negative effects on biodiversity, abundance and health for aquatic species, and on human health. The causes,

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96 ‘Compensating works’ is a technical term used by engineers to refer to a group of installations in a channel or river. In this case, the Detroit River installations included cofferdams (enclosures to keep water out of a given location), dikes (walls or embankments) and spoil banks (piles of excavated material, deposited and shaped so as to facilitate transportation).

97 Bennion and Manny, *Construction of shipping channels in the Detroit River*.

consequences, and bilateral response to the changes in water quality are the subject of the next chapter.

Conclusions

The hydrography of the lower Great Lakes changed a lot after 1909. Many river/water systems worldwide were affected by large engineering endeavors, but the Great Lakes are notable for how early and how intensively they were developed. Most projects of comparable size were executed after World War II. The main reason that the Great Lakes underwent such changes as early as they did was transboundary cooperation.

What were the reasons for this amount of cooperation? In many other locations around the world, cooperative development of hydrographic features would probably have reduced costs, sped up ‘improvements’ and certainly reduced friction. However, there are few places where engineers and bureaucrats and local governments did cooperate in comparably deep and sustained ways. So, why did it happen on the lower Great Lakes? Did the nature of the shared lakes produce a different sort of cooperation? Did something else prompt experts and engineers to behave cooperatively?

It is not clear that geography was any more conducive to cooperation in the Great Lakes than elsewhere. The location of the Canada-US boundary through the Great Lakes certainly prompted joint investment in transportation corridors and hydroelectric dams, but similar boundary lines exist in many more contentious places. Instead of environment or geography, I would argue that a shared vision for land and water use, combined with political and economic incentives, created the conditions for cooperative transformation of the watershed.

There were powerful economic incentives for cooperative development of the lower Great Lakes. Hydroelectricity and the shipping of raw materials and finished goods were quickly-growing, highly profitable sectors of the region economy on both sides of the border.
Very, very, little attention was paid to negative effects of the infrastructure projects, and opponents from competing industries had limited success in preventing investment in canals and dams.

Joint activities became politically and legally easier after the Boundary Waters Treaty of 1909 laid ground rules for water management. In addition, during the 1909-1972 period, governments at all levels were developing new administrative capacity for water management, with dedicated funding, political will to invest in water infrastructure, new science, and innovative institutional arrangements like the IJC and Seaway Authority.

Supporting all of this transboundary political activity was a shared set of goals and beliefs about the value and purpose of water management. Canadians and Americans during this period had very similar goals for their nations. They also saw water in term of measurable, quantitative characteristics like direction, volume, and level. This shared worldview facilitated agreement on issues such as hydroelectricity, because sharing meant allocation, rather than finding a way to accommodate two different sets of priorities in one space. One result of the administrative capacity developed during this period is that it reduced water to numbers, as created by technical experts, mainly engineers.

The shared managerial, technocratic attitudes and the administrative capacity developed in these years have become the underpinnings on which to sustain more complex negotiations as goals for water management changed. The people who worked on different bodies of water and different projects are the crucial links that make it possible to argue that there was an evolving binational vision for water management in this space and time. The same people who worked on the disruptive ‘improvements’ also worked on pollution abatement.

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As pollution and invasive species became higher priorities, in the later 20th century, the habits of bilateral projects, cooperation through the IJC, and mutually acceptable unilateral efforts all helped residents of the Great Lakes watershed imagine a cooperative response to new challenges. The first inklings of what other uses these water quantity tools could be put to emerged during the period 1909-1942, when the first attempts to manage water quality were made. Instead of rearranging rivers, it became necessary to consider rearranging human behavior, and to plan on decades of remediation rather than a few years of construction. In a watershed full of borders, any barrier to consensus is a significant barrier to improvements in environmental quality, and vice versa. The establishment of the early shared norms was an important foundation for later, more ecologically thoughtful projects.
Chapter 3 — Early Attempts at Cross-Border Pollution Control, 1900-1941

This chapter analyses early attempts by Canadians and Americans to manage pollution in Lake Erie, Lake Ontario and the connecting channels between 1900, the beginning of the period when officials began to negotiate directly about boundary waters, and 1941, when the two countries concluded their first direct military alliance. The collaborative increases in industrial production during the later years of the Second World War created massive new forms of pollution and led directly to new forms of joint pollution management, as the following chapter explains.

Between 1900 and 1941, water quality in the lower Great Lakes deteriorated drastically as a result of three kinds of anthropogenic pollution: agricultural, human biological, and industrial. Some researchers of the time recognized farming as a source of biological pollution, and European-style monocrop farming had been contributing to increased runoff and nutrient loading on the lower Great Lakes since the seventeenth century. However, it is not apparent that Canadians and Americans tried to address transboundary agricultural pollution at all during this period, and so this chapter will not address it.

Conversely, many people living around Lake Erie and Lake Ontario during this period noticed the growing human biological and industrial pollution and sometimes tried to stop it through lawsuits, by appealing directly to polluters, and by lobbying various levels of government to enforce existing laws, to make new regulations, and to install water quality infrastructure.

Where the link between transboundary water pollution and human health was clear, as in the case of human sewage pollution, Canadians and Americans were able to respond effectively and cooperatively to the shared problem. Unfortunately, in the vast majority of cases of industrial pollution, worrisome contamination was apparent in the region, but the link between
pollution and human health was unclear to residents and policy professionals. In these cases, a combination of factors prevented coordinated responses.

In the case of biological pollution, American and Canadian attempts to control human sewage made good use of the newly created International Joint Commission, prompted new forms of transboundary cooperation, and ultimately led to effective problem solving through joint research and new water treatment infrastructure over a course of approximately thirty years, roughly 1895-1925. This unusually straightforward story demonstrates how quickly people could act when a clear threat to health existed, shows the usefulness of the new Boundary Waters Treaty and related International Joint Commission, and also highlights the importance of scientific consensus as a support for action. The joint research and reporting gave the jurisdictions of the lower Great Lakes a very clear definition of the problem and a technological solution to it. Once that consensus existed, the only question was how to finance the installation of water treatment plants.

Chemical and biological pollution from industries along watercourses and shorelines became the subject of increasing concern after 1900 as well. Expressions of concern from members of the public, from urban governments, and from public health officials grew more frequent and despite the lack of effective response to industrial pollution, a variety of data was collected in support of the evidence of the human senses. These attempts to bridge the gap between what people noticed and what was recognized as proof of harm are a hallmark of pollution research during this time. Simply put, environmental science and medicine were playing catch-up to the enormous and steadily increasing quantities of diverse pollutants being released into the lower Great Lakes and connecting channels. In some cases, attempts to

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understand and address industrial pollution led to new forms of transboundary cooperation, new knowledge and new institutional capacity. However, the growth of the problem far outpaced remediation efforts and water quality overall deteriorated dramatically, affecting human health, environmental quality, and biodiversity throughout the region.

**Biological pollution and communicable disease**

Canadian-American cooperation with respect to the control of biological pollution focused on urban sewage control and reducing the spread of communicable diseases. The two countries’ joint effort took the form of a reference to the International Joint Commission in 1912: an assignment to “examine and report on the extent, causes and location of pollution in the boundary waters and to recommend possible remedies or means of preventing the pollution of these waters.”

2 To understand why the reference was made that year, it is useful to place it in its broader cultural context. By the turn of the twentieth century, urban population growth combined with inadequate sanitation had produced an unusually high rate of waterborne illness, particularly typhoid fever, around the lower Great Lakes. Many people living there, in both Canada and the United States, were involved in the Progressive movement and the closely related Sanitation movement, which agitated for better sewage control. When the I.J.C. received its pollution reference, its work fit into the larger trend of social reformers, public health officers, and sanitation activists already trying vigorously to improve water quality by changing the politics, social norms, and infrastructure of the region.

The fervor of the sanitation movement was commensurate with the risk of lethal infection that residents faced every day. Epidemic of waterborne disease were frequent and devastating; for example, typhoid killed 4,500 people in Chicago in 1891, the second-highest typhoid death

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rate in the United States. In cities and towns around the Great Lakes, morbidity and mortality rates for typhoid and other communicable diseases were higher in 1900 than national averages on both sides of the border, and much higher than in European cities. Typhoid and other ‘filth diseases’ affected people of all income levels and races. One newspaper editorial described the situation succinctly:

A pungent saying is that for every fatal case of [typhoid] some health officer should be hanged. The saying is more clever than just. No one can find fault with the average health officer. He is generally an enthusiast. But . . . Without an aroused public opinion the best a health officer can do is to carry on a campaign of education and suppress his tendency towards ill-temper.

Plants for sanitary sewage disposal cost money. Often people are more interested in saving their own money than in saving the lives of people with whom they are not even acquainted. The time will come, and not before many years, when the presence of typhoid fever in any community will be regarded as a civic disgrace.

This appeal to civic duty and call for the expenditure on better infrastructure for the common good is characteristic of the period and the place. Water users along the international boundary had been concerned about waterborne disease and sewage disposal for decades before the Boundary Waters Treaty and International Joint Commission were created in 1909, and it is likely that the framers of that agreement had these issues in mind when they inserted Article IV

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5 This was the term used at the time by sanitation activists. See, for example, a Toronto News editorial, reproduced in IJC Bulletin, May 20, 1914. No. XVII-XIX, p 6. File 1914-2, RG 25, LAC.
into the treaty, which prohibits transboundary pollution and provides a mechanism for claiming damages from it.

Although providing clean water was largely a municipal issue, the federal governments of Canada and the United States also responded to the problems of sewage control in various ways. Building on some earlier efforts, the American federal government created a federal Public Health Service (US PHS) in 1912. The Service which began to collect statistics, recommended legislation to control infectious diseases and even treated patients in some special cases. In the boundary waters, including the Great Lakes, the two countries engaged their newly-minted water management tool: the International Joint Commission. As shown by a Canadian bureaucrat’s frank memo to his superior in June 1912, the governments were aware that neither had much of a grasp of the transboundary situation, and the IJC seemed like an efficient way to remedy the lack:

Apart from the ordinary domestic sewage . . . along the boundary waters there are the discharges of manufacturing plants, abattoirs, etc., which are loaded with acids or other matters causing pollution of waters and highly injurious to health.
This is a vast question . . . the Minister can do nothing in this matter until the reference is accepted and some suggestions made by the Commission . . .

It is apparent that, even while he argued that his department knew nothing about transboundary pollution, the author, an Assistant Deputy Minister for Public Works, had a number of ideas about its character, sources and impact. Policymakers in both countries hoped to fill that gap with more concrete information before trying to address the problem and so, in the autumn of 1912, the governments of Canada and the U.S. gave the IJC its pollution reference.

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7 A large chunk of the USPHS’ budget and effort in its early years went towards sailors’ hospitals along the Atlantic coast, Gulf Coast and Mississippi River. Malaria, STDs and other things, because shipping was a major carrier of infectious disease and perhaps also because sailors were usually far from their families and were outside other land-based social networks (churches, etc.).
8 Memorandum, June 1, 1912, from Assistant Dep. Minister for Public Works to DM for Public Works, p 2. File 2756, Vol 2780, RG 11, LAC.
Although they did not control it, the Commissioners of the IJC were deeply involved in defining the terms of the 1912 reference, both before it was formally given to them and afterwards, as they executed it.\(^9\) Lawrence Burpee, who worked as Secretary to the Canadian section of the IJC from its creation until the late 1940s, later wrote a confidential memorandum for an incoming Commissioner, describing the struggle over the breadth of the reference. Under its terms, the U.S. and Canadian governments agreed to limit the IJC’s investigation to pollution of boundary waters “on one side of the boundary which extend to and affect the boundary waters on the other side.”\(^10\) This was narrower than the terms of Article IV of the Boundary Waters treaty, because it left out all waters flowing across the boundary. However, the first part of the reference included “all injurious pollution . . . on one side of the boundary only or on both sides.”\(^11\) Thus, it was not clear whether or not the reference included bodies of water like the Red River, which flows north from North Dakota into Manitoba, and which was the site of serious water quality concerns in the early twentieth century.

In the end, the two federal governments and the IJC agreed to define the scope of the inquiry more precisely, limiting their reference to cases of pollution of the boundary waters upon one side of the boundary which may extend and affect the boundary waters upon the other side,”\(^12\) and that the governments agreed to use that definition. Writing for a small, confidential audience, Secretary Burpee was one of the only people who would have

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\(^9\) See correspondence, October 18-November 16, 1912. File 2756-1, Vol. 2780, RG 11, LAC. Correspondents: Sec of State for Ext Affairs, British Ambassador to USA and Governor General of Canada, US Secretary of State, Canadian DM of Justice, Canadian Minister of Justice.


\(^11\) Ibid., p 3.

\(^12\) Ibid., p 3.
been in a position to assess what ‘the Commission’ thought at this point in its history because he acted as the Canadian section’s institutional memory, keeping records of all its meetings. His mournful tone is an interesting side-light to the secondary literature about the pollution reference, which is frequently praised as being a big, important investigation.\(^{13}\)

Burpee’s memo also explained that the actual work of the reference ended up being broader than its terms stipulated, because it was not possible to investigate only border-traversing pollution. After the Commission had laid out its research plan and consulted ‘a number of bacteriological experts,’ it became clear that the narrow interpretation of the reference was “neither practicable nor desirable,” because:

That interpretation, carried to its logical conclusion meant the assumption of a tangible boundary down the middle of, for instance, the Detroit River, and the ascertaining of definite areas of pollution which, reaching and crossing that boundary, were of such a nature as to cause injury to health property on the other side; and it meant the ignoring of all pollution which did not meet this definition.\(^{14}\)

It may seem entirely obvious that, in the words of a much later IJC Commissioner, “You might as well attempt to remove the impurities from one half of a barrel of rain water while leaving the other half untouched as for either country to attempt to prevent or remove pollution from its particular part of the Detroit River while leaving the other half untreated and untouched.”\(^{15}\)

However, the 1912 pollution reference was the two countries’ first attempt to manage pollution jointly and pollution abatement technology was in its infancy: even the simplest terms had to be defined.

The execution of the IJC’s investigation led to unprecedented collaboration between multiple jurisdictions in the Great Lakes and at other points along the boundary. The


\(^{15}\) US Chair of IJC A. O. Stanley to Adams, Exec Secretary-Engineer of Stream Control Commission for state of Michigan, April 1949, p 6. File 26, Box 8, Series A1118-80, NYSA.
commissioners began by hiring two ‘well-known sanitary experts,’ Dr. Allan McLaughlin of the new United States Public Health Service and Dr. Charles Hodgetts of the Canadian Commission of Conservation. They first reached out to local governments along the entire U.S.-Canada boundary during the summer and fall of 1912, trying to identify where there was pollution. Later that year, they extended their enquires to include state and provincial governments, which did not necessarily supervise the municipal responsibility of water treatment at that time. McLaughlin and Starkey also conferred and collected opinions from their peers about possible parameters for “an adequate investigation of the whole question.” The work of defining the pollution investigation was a new kind of close, technical cooperation for the Commission. Its only other work up to that point had been approving civil engineering projects.

The bacteriological research that the Commission designed and executed in 1913 and 1914 was an enormous project. As Senator Wesley Jones (R-WA), explained proudly to the US Senate in 1915, “It was the most extensive bacteriological examination of water ever made. Over 19,000 samples of water were examined and 17 field laboratories were employed . . .” The size and quality of the sampling effort still impress biologists and historians today.

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17 December 11, 1912, letter and memo from Th. Chase Casgrain (Canadian IJC Chairman) to Sec of State for External Affairs. File 1912-6, Vol 1117, RG 25-A-3-a, LAC.

18 Ibid.


20 ‘From our current perspective, over 80 years later, it appears that this water quality survey is still one of the most extensive that has ever been conducted in the world, particularly when considering the numbers of samples collected and analyzed over such a great distance in such a short time period.” Durfee and Bagley, “Bacteriology and Diplomacy”, 6.
scientists who made the pollution study were drawn from federal, state, provincial and local governments from both countries.21

After conducting its vast field study in 1913 and 1914, the Commission’s laboratories began to process their data and soon presented their results: pollution was widespread and dangerous, the worst was due to inadequate control of human sewage, and both countries were polluting the boundary waters. Once the “causes, localities and extent of pollution” had been discovered, IJC held a conference in New York City in May 1914, with the US and Canadian sanitary engineers, to examine the reference’s second question: possible remedies.22 After that conference, plans were made for investigations and field work for possible pollution abatement strategies, which eventually produced a Report to the IJC on Remedial Measures in 1916. In addition, in 1914 and 1917, the Commission held public hearings on both sides of the border, from coast to coast. Testimony from those hearings was worked into its Final Report, submitted to the federal governments in 1918. The IJC’s report identified thousands of places where drinking water sources were contaminated by human sewage and its authors strongly recommended that cities and towns should either chlorinate their wastewater before discharging it, or chlorinate drinking water before distribution. The report was extremely influential in the Great Lakes region, in part because there was already significant interest in the problem, and in part because its recommendations were well-publicized plans to correct a long-standing, deadly problem and they expressed a clear consensus, backed by the best science of the time.

After the IJC’s 1916 report was published, it was only a matter of time before every utility that provided drinking water, also chlorinated it. By 1916, witnesses testifying at the IJC’s public hearings in Detroit described the town councils of municipalities that lacked sewage treatment

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21 Durfee and Bagley, “Bacteriology and Diplomacy”, 5-6.
and chlorination as irresponsible and ignorant. A decade later, the Secretary to the Canadian section of the IJC happily told Kiwanis magazine that, “as the direct result of this investigation and of the Commission’s recommendations, many towns on both sides of the boundary have voluntarily improved both their water and their sewage systems, and the death rate from typhoid has steadily decreased in the region of the Great Lakes.” The Commission’s investigation certainly contributed valuable data to an ongoing process of improvement in water supplies around the lower Great Lakes, though its report was not the sole catalyst for this trend, or even the most important or earliest. The IJC’s investigation took place at a time when municipal, state and provincial governments were also working to improve sanitation, and so its study likely gave strong reinforcement to the existing trend towards more effective sewage and waters supply infrastructure in the basin. Chlorination of drinking water began in European cities in the late 1880s and became widespread in the Great Lakes region by 1925. This reduction of waterborne disease contributed enormously to the progress of the ‘demographic transition’ in the lower Great Lakes region.

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27 See appendix for reduction in typhoid rates around the Great Lakes and some examples of chlorination.
While not unique in its findings, the IJC Report was valuable for several reasons. It was comprehensive, providing a great deal of reliable new data, and the transnational nature of the data proved that the boundary waters' pollution problems were shared, rather than caused by one country or the other. Furthermore, in the process of fulfilling the reference, the IJC established itself in its first years of operation as an institution that could design and execute a technically complex study, consult local stakeholders amicably, and present results and recommendations in a way that was acceptable to governments on both sides of boundary.

The Commission’s effect on transboundary pollution control policy did not end with its reference. In their final report, submitted in 1918, the Commissioners recommended that the United States and Canada give them the authority to monitor and regulate pollution in the boundary waters, and to enforce its orders through its own staff. In March 1919, the governments invited the IJC to report on how that could be done, through a convention or legislation. The understanding of pollution that underlay the Commission’s recommendations after their investigation is particularly clearly expressed by the American Chairman, Justice James Tawney, in a draft agreement in May 1919. Noting that it would be impossible to achieve zero raw sewage discharge, he proposed a very rigorous standard for a certain b. coli count per volume of water that could be applied universally. Tawney described the need for severe measures to limit sewage pollution as a way to prevent future diplomatic problems, arguing that

30 Memo and Draft Treaty from Commissioner Tawney, p 3. May 19, 1919. File 1921-721, Vol 1949, RG 13, LAC. B. Coli is shorthand for balantidium coli, a protozoan parasite that was used as an indicator for the presence of human feces in the water samples. Counting the number of parasites in a small sample and estimating their volume per unit of water was a way for the scientists to estimate the amount of sewage in a water source.
without them, urban expansion along the boundary would worsen transboundary pollution.\textsuperscript{31}

Perhaps the most expansive part of his draft agreement was the larger role he imagined for the International Joint Commission: Tawney and his fellow commissioners proposed that the Commission should have the power to define and enforce pollution regulations in the boundary waters and, Tawney wrote: “The power to prohibit includes the power to prevent that which is prohibited.”\textsuperscript{32} His memo also discussed how to conduct the necessary research, testing and enforcement, and argued the IJC should have its own budget and staff, separate from the federal agencies.\textsuperscript{33}

In order to make this enforcing IJC a reality, Commissioners and different Canadian and American civil servants argued that no new legislation would be needed, because giving the IJC responsibility for transboundary pollution would simply be an administrative change to its already-mandated powers under the Boundary Waters Treaty.\textsuperscript{34} In October 1920, the Commissioners formally recommended that the governments sign a ‘convention,’ rather than a formal treaty to improve water quality along the boundary. In their submission to the federal governments, they argued that the terms of the pollution reference had been too conservative, too limited, and that the problems were much more complex and serious than the existing methods and laws could address.\textsuperscript{35}

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\textsuperscript{31} Memo and Draft Treaty from Commissioner Tawney, 5. May 19, 1919. File 1921-721, Vol 1949, RG 13, LAC.
\textsuperscript{32} Memo and Draft Treaty from Commissioner Tawney, 6. May 19, 1919. File 1921-721, Vol 1949, RG 13, LAC.
\textsuperscript{34} All in File 1921-721, Vol 1949, RG 13, LAC: Memo and Draft Treaty from Commissioner Tawney, May 19, 1919. Memo from Col. Bigger (of the Air Board) to Minister Doherty, February 5, 1920. Office of President of Privy Council (Rowell’s secretary, Robertson) sent memos to Min. of Justice (Doherty), March 1920. December 1919 letter from Commissioner Charles Magrath, to Sir Newton Powell, President of the Privy Council.
\textsuperscript{35} IJC report to federal governments, October 6, 1920. Quoted in confidential briefing book, Chronological Review of Negotiations Re Proposed Convention Between Canada and the United States with respect to the Pollution of Boundary Waters and Waters Flowing Across the Boundary, from August 1, 1912 to
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The IJC’s proposed remedy - a binational convention setting and enforcing water quality standards - is an interesting document with a remarkably restrictive attitude towards industrial, biological and transportation pollution. For example, it would have given the IJC the responsibility to investigate and report on allegations of pollution on its own initiative, as well as in response to requests from the U.S. or Canada. Furthermore, the 1920 draft convention stipulated that wherever the IJC established that waters on one side of the boundary had been polluted ‘to the injury of health and property on that side,’ “such pollution shall be deemed to be injurious to health and property on the other side until the contrary is proved.” (Emphasis added.)

Finally, it specified that for court cases in jurisdictions around the boundary waters, “In any such proceedings the findings of fact of the International Joint Commission shall be final and conclusive.” Overall, the attitude to pollution expressed in the IJC’s drafts and correspondence was very different from the laissez-faire that was prevalent throughout the first half of the twentieth century; it is disappointing but not surprising that the draft convention was never signed or ratified.

Although the IJC’s 1920 draft never passed into law, it is a novel and important instance of Canada-US cooperation. By going through the process of assessing the IJC’s findings, requesting further recommendations, and discussing convention drafts, the governments of Canada and the United States were working seriously together on water pollution abatement for the first time. These actions required a significant investment of staff time and resources. Ultimately, the two governments either did not regard the pollution problem as sufficiently important, or perhaps did not choose to commit to such a drastic solution as the IJC’s draft

convention, though they also did not propose any alternatives of their own.\textsuperscript{37} Federalism and division of responsibilities may also have been a barrier to coordinated action; the levels of government responsible for water quality (municipal in practice, legally provincial in Canada, and shared in the USA between local governments and state) were emphatically \textit{not} the levels of government that were permitted to engage in cross-border relationships.

The IJC’s pollution reference also supported the growth of informal capacity for transboundary cooperation: the engineers, doctors, chemists and biologists who conducted the IJC’s study belonged, to a greater or a lesser extent, to the Anglophone scientific community in North America. The scientific and technical publications and professional organizations of the time were quite transnational: citizens of both countries attended conferences, served on committees, corresponded, researched and published together. Groups within the scientific community were aware of germ theory, and sanitation experts on both sides of the border were aware of the links between water-borne disease and chlorination before the IJC got the reference that raised the local stature of these ideas. Participation in the IJC study certainly strengthened some of those professional networks. However, the researchers’ shared concerns and knowledge did not coalesce into any other specific research projects, activism or education effort within the watershed.\textsuperscript{38}

\textit{Industrial pollution}

As we have seen, urban sanitation improved tremendously between 1915 and the end of World War II, but industrial pollution in the Great Lakes continued to worsen. The damage was

\textsuperscript{37} Read points out that the widespread adoption of chlorination reduced the need for comprehensive sewage treatment. Instead, public health could be assured through local waterworks, and provincial and state governments frequently developed ways to help poorer municipalities finance the needed infrastructure for chlorination. Jennifer Read, "A sort of destiny": The Multi-Jurisdictional Response to Sewage Pollution in the Great Lakes, 1900-1930" \textit{Scientia Canadensis} 22, (No. 51, 1998): 103-129.

\textsuperscript{38} At least, none that I have found in my archival research or readings of secondary literature.
most apparent in the shallow, heavily travelled channels connecting the lakes. The following pair of charts is based on a sample of complaints about pollution that were recorded by civil servants in Ontario, New York, and by the United States and Canada, show these trends. For the most part, they came from heavily populated, heavily polluted urban areas. The sample of seventy-five complaints represents all of the complaints about pollution that appear in the records surveyed for this dissertation, not including the IJC’s reference research, and so it is neither random nor comprehensive. Nevertheless, examining these data adds further weight the narrative that emerges from the primary sources and existing historiography: complaints about industrial pollution (31) were more numerous than complaints about biological pollution (16), and the complaints about industrial pollution became more frequent and more numerous over time. A large majority of the complaints of all three kinds, (51 of 75 or 68%) occurred after 1926. To create these charts, the seventy-five complaints were sorted by type of pollution: clearly biological, clearly industrial, and mixed, and the data from former two categories are represented as points on the timeline charts.

![Figure 9: Reports of Industrial Pollution in Lake Erie, Lake Ontario and Connecting Channels, 1917-1941](image-url)
Figure 10. Reports of Biological Pollution in Lake Erie, Lake Ontario and Connecting Channels, 1917-1941

Archives around the Great Lakes watershed hold many examples of local protests against the deteriorating quality of water from the first half of the twentieth century. Citizens, public servants and elected officials commented on industrial pollution and called for action to reverse the trend, and, in some locations, there were isolated attempts to address it. The preceding charts illustrate the increase in expressions of concern over time. Unfortunately, the interrelation that characterizes all water systems rendered these isolated efforts meaningless; unless the jurisdictions around the lower Great Lakes and the connecting channels acted in concert, no meaningful improvement would occur. Transboundary cooperation was, therefore, the only kind of pollution abatement with the potential for change.

Although rare, there were several attempts to coordinate a response to industrial pollution across the Canada-US boundary during this period, and they are of interest for two reasons. First, studying the reasons for these attempts and their failures provides clues to the historical factors that prevented an effective response to the intense, growing problem of industrial pollution. Second, despite their failure, these initial attempts were models for later pollution control policies and also functioned as points of connection between policymakers, part of a growing set of relationships and institutions that were crucial to later attempts at pollution control. In that sense, these early, failed attempts at transboundary pollution control were valuable for many of the same reasons as the contemporary cross-border work on sewage.
Cooperation does not have to be successful to be important for institutional change in the long term. Between 1900 and 1941, there are four notable examples of transboundary action on industrial pollution, instances when Americans and Canadians made an effort to work together to address industrial pollution problems.

**Fighting Island, 1919-1935**

Between 1919 and 1935, citizens of the U.S. and Canada made a series of complaints about industrial pollution from an American company called the Solvay Process Company (also called the Michigan Alkali Corporation), which dumped its wastes on Fighting Island, in the Detroit River. The complaints began in 1919 and gradually took on a transboundary dimension. The island itself is in the United States, but the boundary line runs past it through the Detroit River, and until the mid-1920s, the island’s eastern side was bounded by Canadian marshes that were highly valued as bird and fish habitat by recreational sportsmen, professional seasonal hunters and fishermen, and conservationists.

Interestingly, the initial Fighting Island complaint came through back channels, before pollution had even begun: in mid-December 1919, a Mr. E.B. Kerr of Walkerville, Ontario wrote to his friend Dr. C. Gordon Hewitt, a consulting zoologist for the Canadian federal Department of Agriculture. Kerr explained that “private and confidential” sources told him that the Solvay Process Company had laid piping across Fighting Island “through which they intend to pump the refuse, and thus fill in the marshlands of the island. . . . As out [sic; (our?)] mutual friends are anxious that you be advised of this I take the opportunity to acquaint you with the proposed plan.

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39 December 18, 1919, letter from E. B. Kerr to Dr. C. Gordon Hewitt, Consulting zoologist to Canadian Federal Department of Agriculture File 702-4-9 (1), Box 436, RG 23, LAC.
of the corporation." He expected that the company’s waste would pollute the Detroit River as a result of this plan and affect the ‘fish and game life’ there.

The Canadian federal government discussed possible responses to this potential pollution over the course of January 1920. On January 8, a Parks Commissioner, J. B. Harkin, wrote to the Deputy Minister of Marine and Fisheries, Mr. G. J. Desbarats, calling his attention to the rumor of impending dumping in the marshes. Desbarats passed this distressing news along to his counterpart at the provincial ministry of Game and Fisheries, describing the dumping as a ‘proposal’ that fell under the province’s responsibility for fisheries. (The Canadian federal government had given Ontario responsibility for managing its fisheries in 1911.) The Ontario Deputy Minister of Game and Fisheries sent a District Warden, a Mr. V. Chauvin, to look into the matter, and who found no dumping, pumping or pipes but promised to “keep a close watch” on the company. There does not appear to have been any policy or practice for prevention of transboundary pollution, such as the International Joint Commission suggested in the same year.

The Solvay Company’s pipe was laid in either the spring of 1920 or in 1921, and complaints arose almost immediately. The Canadian National Parks Commissioner who had alerted the federal government to the problems on Fighting Island wrote again to Mr. Desbarats to say that National Parks staff had noticed the company’s “the waste chemical products” being

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40 December 18, 1919, letter from E. B. Kerr to Dr. C. Gordon Hewitt, Consulting zoologist to Canadian Federal Department of Agriculture File 702-4-9 (1), Box 436, RG 23, LAC.
41 On January 8, a Parks Commissioner, J. B. Harkin, wrote to the DM of Marine and Fisheries, Mr. G. J. Desbarats, noting the ‘rumour’ of impending dumping in the marshes and explaining mildly that the company’s plans “… should possibly be given some consideration in view of the possibility of pollution to the Detroit river and the detrimental effects to fish and game life in the district.” Jan 8., Parks Commissioner to Desbarats. File 702-4-9 (1), Box 436, RG 23, LAC
42 Jan 15, 1920, G. J. Desbarats wrote to DM of Game and Fisheries, D. McDonald. File 702-4-9 (1), Box 436, RG 23, LAC.
43 Letters: Jan 20, DM of Game and Fisheries Mr. D. McDonald to Desbarats; Jan. 27, 1920, DM of Game and Fisheries, D. McDonald to G.J. Desbarats, DM of Marine and Fisheries; Jan 24, 1920. V. Chauvin to D. McDonald. File 702-4-9 (1), Box 436, RG 23, LAC.
pumped from the island into the marshland. The federal Marine and Fisheries department did not investigate, having decided that it was a fisheries issue and, therefore, a provincial responsibility. Desbarats’ deputy wrote to the Provincial Fisheries Ministry in early January 1922, and his letter represents the federal government’s first official recognition of the industrial pollution around Fighting Island. McDonald responded a week later that the issue would “have the further attention of the Department,” but it is not apparent that his office actually did anything.

In 1926, the pollution on Fighting Island was framed as an international problem for the first time. Local Canadian activists mobilized their Member of Parliament and also contacted the Minister for the Interior, Mr. Stewart. The activists were Sandwich Board of Trade, a businessmen’s group from the Ontario side, complaining that pollution from the Michigan Alkali Company was driving valuable fish and game away from the Detroit River around Fighting Island. They asked their minister and MP. Although they mention private ownership as a possible obstacle to pollution abatement, they do not seem to have regarded the international boundary as an obstacle. It is also interesting to note that all reference to the marshes around Fighting Island disappears from the file between 1922 and 1926, and it seems likely (given the earlier references to marsh filling and the widespread practice of dredging and filling around the lower Great Lakes at this time), that the extent of the wetlands diminished considerably during those years.

Interior Minister Stewart wrote to the federal Minister for Marine and Fisheries, the Québécois Arthur Cardin, asking him to arrange for an inspection of Fighting Island. Stewart’s

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44 Wm. Found to J.B. Harkin, 16 January 1922. File 702-4-9 (1), Box 436, RG 23, LAC.
45 Wm Found to D. McDonald, 16 January 1922, File 702-4-9 (1), Box 436, RG 23, LAC.
46 McDonald to Found, 25 January 1922. File 702-4-9 (1), Box 436, RG 23, LAC.
47 L. G. Hyams, Secretary of Sandwich Board of Trade, to Hon. Chas Stewart, Minister of the Interior, May 15, 1926. File 702-4-9 (1), Box 436, RG 23, LAC.
letter contains the first description of the Fighting Island issue as an international problem. American officials had been raising similar concerns about other points along the boundary, and so the transnational nature of the pollution prompted him to act, rather than simply pass along the problem to the provincial authorities. He wrote,

There is a very direct similarity between the conditions complained of [in the Detroit River] in this communication and those complained of in the two communications dated March 25th last, received from the Honourable F. B. Kellogg, United States Secretary of State, dealing with the alleged pollution of water . . . in British Columbia by certain mine wastes, and complaining of the effect thereof upon fish life on the United States side of the international boundary, as to which I communicated with you recently and which are now under investigation.

It would appear, therefore, that . . . there are important international considerations which should not be overlooked.48

Cardin’s ministry wrote to their counterparts in Ontario, asking for an inspection and reminding them that there had been complaints in 1922. The provincial Department of Game and Fisheries again agreed to make an inspection. The 1926 correspondence does not show any further reference to concerns over transboundary pollution. However, this is one of the first indications that the possibility of a transboundary incident made the Canadians more responsive to industrial pollution complaints. It is also clear that industrial pollution in the Detroit River was having an increasingly significant effect on local water quality. Whereas the first complaints, in had come through the personal network of a zoologist (1919) and a Parks Commissioner (1922) who might be expected to be concerned with aquatic animals and ‘nature’ more generally, the 1926 complaints came from a well-organized group - the Sandwich Board of Trade - that was not explicitly connected to water quality. Furthermore, this local organization had taken the trouble to enlist their Member of Parliament’s support. These changes indicate that a larger and more diverse group of people were concerned by the problems at Fighting Island in 1926 than in 1922, and that they were more motivated and better organized.

48 Charles Stewart to Pierre-Joseph-Arthur Cardin, May 20, 1926. File 702-4-9 (1), Box 436, RG 23, LAC.
Unfortunately, it is apparent that the procedures that existed to assess environmental impact were totally inadequate to detect the environmental changes that people in the watershed were noticing, even when the machinery of the state was engaged to investigate. An extremely simple and unscientific personal visit seems to have been the best inspection that any level of government was willing or able to execute. The 1926 inspection was carried out by the Game Warden for the Essex area, a Mr. B. Emmerton, who reported directly to Mr. McDonald, the Deputy Minister for Game and Fisheries for Ontario. His report, a single page of typescript, written in the first person, was accepted and referenced as the sole official Canadian account of the pollution problem at Fighting Island until the 1950s. Emmerton described how he landed his patrol boat to the island and “looked the situation over very carefully,” and asserted that “In my opinion there is no ground for complaint.” How did he arrive at that reassuring conclusion? Emmerton described the company’s waste dump as a dredged area “possibly fifty acres in extent” surrounded by triple embankments, and noted that, “The outside embankment being approximately six feet in width on the top, twelve feet at the bottom and eight to ten feet high. It is quite impossible for waste that is pumped from Alkaline Company to Fishing Island [sic] to find its way back into the river as the pipes into which the waste matter is dumped go over the top of the embankment and there is a drop of six feet.” He described the liquid waste pouring out of the pipes, onto the dumping ground, where it hardened (it is not clear from his account whether this was former marshland or on Fighting Island). He went on to note that the workmen were all Canadian and that ‘Mr. Edward Nellis, the superintendent of this Company’ was a conservationist, presumably as further evidence that the company’s activities would not harm Canada.

49 Report from Mr. B. Emmerton, the Ontario game Warden for Essex area, to D. MacDonald, DM for Game and Fisheries, Ontario, June 17, 1926. File 702-4-9 (1), Box 436, RG 23, LAC.
50 Report from Mr. B. Emmerton, the Ontario game Warden for Essex area, to D. MacDonald, DM for Game and Fisheries, Ontario, June 17, 1926. File 702-4-9 (1), Box 436, RG 23, LAC.
Warden Emmerton’s report ends with his opinion about why the complaints had appeared, which gives the reader several clues about of how he thought about the complainants and the chemical company:

It would appear to me that citizens such as Muskrat LeFramboise and a few others are possibly the real complainants as this point used to be the natural outlet for smuggling muskrats into the United States and also the shooting of thousands of ducks in the spring of the year, for Americans and since the company have put a stop to this practice in not allowing any hunting or trapping certain people are trying to start trouble for the Company.  

Warden Emmerton warden was clearly suspicious of the people complaining, and related the Board of Trade’s complaints to the smuggling problems that were presumably a familiar part of his job. It seems unlikely that a business organization and a Member of Parliament would have complained on behalf of a smuggler, but the assertion that the company had ended duck-hunting raises the question of whether the deprived locals were recreational sportsmen or whether the ban had an impact on a seasonal subsistence pattern. Emmerton’s slighting reference to ‘Muskrat LeFramboise’ is particularly intriguing: as a given name or nickname, it could suggest a person whose living was closely tied to trapping. When combined with a French surname, it prompts the question of whether Mr. LeFramboise might have been a member of a Métis community or First Nations group, or a French Canadian whose ethnicity was held against him by the game warden.  

In any case, Emmerton’s report clearly shows that Fighting Island was a place where citizens of both countries worked and used the water in different ways. His report, based on a single visit and his own unsupported opinion, was accepted by provincial

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51 Report from Mr. B. Emmerton, the Ontario game Warden for Essex area, to D. MacDonald, DM for Game and Fisheries, Ontario, June 17, 1926. File 702-4-9 (1), Box 436, RG 23, LAC.
52 An economic geographer writing in the 1940s described ‘muskrat farmer’ as a pejorative term applied to French settlers by Americans who arrived in the late 18th century. He himself wrote condescendingly, “The physical conditions of the inland offered several advantages over the shore settlements occupied earlier by the French. . . . Likewise, “muskrat farmer” as an appellation applied to the French by American settlers came as a response to the environment that the French met, rather than any inherent lack of desire to be a good farmer.” Bert Hudgins, “Evolution of Metropolitan Detroit” Economic Geography 21 (No. 3, July 1945): p 215.
government as fact, and Ontario cheerfully reported to the federal ministers and the Sandwich Board of Trade that there was ‘no cause for complaint.’ It is not clear what qualifications Emmerton may have had, but even if he was an engineer or scientist, his knowledge clearly did not include any awareness of groundwater or leaching.

In 1935, a Mr. Harold Martin of Detroit, an American attorney, wrote to the Canadian government about the decline in the fishery around Fighting Island over the previous twenty-five or thirty years as a result of the industrial pollution. This instance of an American complaining directly across the boundary further demonstrates the transnational character of the problems at Fighting Island. The Canadian Government told Martin that other people had complained, but that the waste dump on island had been inspected and found unobjectionable, and that the complaints of the mid-1920s had not been well-founded. The internal correspondence that accompanied the drafting of the response to Martin’s complaint shows that this reassurance was based solely on the 1925 warden’s report. In this case, the local people on both sides of the boundary noticed the changing environment and asked for government action, and the Canadian government did eventually respond in good faith, partly because of concern for the potential of pollution problems to disrupt Canada-US relations. However, the science, technology, and oversight procedures of the time were totally unable to acknowledge the truth that local observers perceived: that the introduction of a new source of industrial pollution was taking an unacceptable toll on the local biota and interfering with residents’ use of the space.

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Letters: DM D. McDonald to Wm Found, Director of Fisheries (federal), June 24, 1926; Minister Cardin to Minister Stewart, June 24, 1926; Minister Cardin to Col. S.C. Robinson (MP for W. Essex), June 26, 1926. File 702-4-9 (1), Box 436, RG 23, LAC.
Thurlow Hatchery, 1920-1922

Even in cases where there was strong proof of pollution and laws to require its reduction, effective active to reduce pollution remained difficult. Between 1900 and 1941, Americans and Canadians occasionally tried to reach across the international boundary and work together to address industrial pollution problems, but the variety of jurisdictions in the watershed posed a significant barrier to improvement. In the case of the Thurlow Hatchery, a group of federal hatchery managers who worked regularly with Americans at the federal and state level tried to remedy a water quality problem.

The Canadian federal government operated the Thurlow Hatchery near Belleville, Ontario, on the Bay of Quinte for nearly twenty years, beginning in 1906. (See Chapter 4 for a discussion of the Thurlow hatchery’s role in transboundary fish propagation and biological research.) The Bay of Quinte was a particularly good site for a hatchery because it was a large, calm, shallow space that acted as a fish nursery for many commercially valuable fish species Lake Ontario. During the early decades of the twentieth century, Thurlow Hatchery was the hub of a cooperative, seasonal spawn-collection effort by staff from government hatcheries around Ontario and New York. Spawn collecting brought hatchery managers, local fishermen and government scientists from around the watershed to work together. Their ongoing joint effort was one of the more tangible and longstanding indications of the informal professional network that government ‘fish culturalists’ created around the lower Great Lakes during this period. When water quality problems arose in 1919, the transnational character of the hatchery’s work was one reason that its problems commanded attention and resources.

The Thurlow hatchery staff, their supervisors in Ottawa, and local officials and newspapers first called attention to the worsening water pollution in 1919, coming in large part from a distillery on the Moira River, which flows into the Bay of Quinte. Called the ‘Corbyville Distillery’ in some documents and ‘Corbyville Alcohol Works’ in others, it produced corn and
grain alcohol for human consumption. The Thurlow hatchery drew its water supply from the bay near the mouth of the river, and so the pollution affected its operations dramatically. Over the course of four years, this group tried to document the water quality problem and prompt local and provincial authorities to require the distillery to reduce its pollution. Thurlow staff were highly motivated, methodical collectors and interpreters of data, operating at the forefront of their profession, but their work did not bring about any positive change: the hatchery closed in 1923 because clean water was no longer locally available. The complete lack of meaningful enforcement of the Ontario 1914 Fisheries Act appears to have been related to the difficulty of proving a link between the distillery’s waste and the water quality problems. The exchanges between proponents of pollution reduction, the responsible authorities and local actors indicates that even the best-informed, best-placed complainants were quite unable to compel pollution regulation. A socially disadvantaged, under-resourced group would presumably have had even less success.

The first person to describe the pollution and local attempts to reduce it was the Superintendent of Fish Culture at Thurlow, Mr. J. A. Rodd, writing to his superiors in Ottawa in October 1920.\(^5^4\) His reports covered a variety of topics that demonstrate the transnational character of the fish culture field during this period, including conferences between hatchery staffers from Ontario, Canada and the United States; the task of dividing spawn collection grounds between representatives of each jurisdiction, and shared concern over the ‘extremely serious’ seasonal pollution on the Moira River, which provided water for the hatchery. Rodd described the previous summer’s pollution and its effect on local people,

\(^{54}\) Long report memo, from Superintendent of Fish Culture (J. A. Rodd) for Canadian federal government. October 1920 (conjecture based on location in file, no date) RG 23, Box 142, file 731-17-2, pt 2, LAC.
We were informed by Superintendent Oakes and others that during last summer the stench from the pollution and decaying fish was so bad that residents along the banks of the river were obliged to keep all windows and doors closed. . . . after trying various methods [the town of Belleville] was obliged to flush out the river bed with the town fire hose. They also paid as much as $26.00 to one man for gathering up dead fish from the banks of the river in the town, and disposing of them.\textsuperscript{55}

After their conference on October 21, 1920, Rodd and some other representatives of the fisheries departments of the Canadian and Ontario governments inspected the Moira River between the Thurlow Hatchery and the Corbyville Distillery, and upstream of the distillery. He listed the flora and fauna, described the condition of the fish, and stressed that nothing seemed to be polluted above the distillery.\textsuperscript{56} In order to ensure a clean water supply for the hatchery, Rodd explained, the staff were disinfecting their intake pipes from end to end with ‘chloride of lime in solution,’ i.e., bleach.

Despite Rodd’s report, the question of pollution abatement on the Moira River appears to have lain dormant through the winter of 1920-21. As spring arrived and the question of a recurrence of the previous summer’s conditions loomed larger, the local press commented on the hardships and embarrassment that pollution control would place on Belleville’s businessmen.\textsuperscript{57} The Manager of the Belleville Chamber of Commerce suggested to Ottawa that the hatchery should install sand filters on its water intake, but the Deputy Minister for Marine and Fisheries, Mr. A. Johnston, responded coldly that his Department was not interested in spending money on the hatchery until the province or municipality acted to control the pollution.\textsuperscript{58} Ontario had taken over responsibility for its fisheries from Ottawa in 1911; the

\textsuperscript{55} Report memo, from Superintendent of Fish Culture J. A. Rodd for Canadian government. October 1920 (conjecture based on content and location in file, no date) File 731-17-2, pt 2, Box 142, RG 23, LAC.
\textsuperscript{56} Report memo, from Superintendent of Fish Culture J. A. Rodd for Canadian government. October 1920 (conjecture based on content and location in file, no date) File 731-17-2, pt 2, Box 142, RG 23, LAC.
\textsuperscript{57} Clipping, \textit{Ontario Intelligencer}, Belleville, March 7, 1921 and Letter, J. O. Herity (Manager, Chamber of Commerce) to DM Johnston, March 21, 1921. File 702-4-13 (1) “Pollution of Rivers and Harbours - Province of Ontario - Bay of Quinte and Moira River,” Box 436, RG 23, LAC.
\textsuperscript{58} DM Johnston to Manager, Chamber of Commerce, a J. O. Herity, at Belleville, March 31, 1921. File 702-4-13 (1) “Pollution of Rivers and Harbours - Province of Ontario - Bay of Quinte and Moira River,” Box 436, RG 23, LAC.
Thurlow Hatchery was a remnant of the federal government’s earlier work there and it was also
the rendezvous point for the annual Canadian-American spawn collection for regional
hatcheries.

The division of labor between the two levels of government contributed to the lack of
official response to the problem. In late April 1921, Johnston complained to his provincial
counterpart that the Ontario government already knew which part of its Public Health Act of
1914 and the 1911 Fisheries Act were relevant to the Moira River, and already had the power to
fix the problem.59 Later in the year, when federal officials asked Ontario for an update, Deputy
Minister McDonald answered that his Department of Game and Fisheries had instructed the
local Board of Health to fix the problem, which he named a nuisance “under Section 81 of the
Public Health Act, R. S. O. 1914, Chapter 218, and relating Sections.”60 A Deputy Minister is the
highest civil service rank in Canada, generally filled by appointees who act as advisors to the
elected Ministers. It is clear that the provincial government knew that the Moira River had a
serious problem and knew precisely which statutes to employ to compel local action. Clearly,
the lack of official response to the problems was not related to a lack of relevant legislation or
any ambiguity about jurisdiction, but rather a lack of will.

Meanwhile, the hatchery stand continued to monitor their local conditions. During the
summer of 1921, the Thurlow Hatchery staff reported to Ottawa that the distillery had installed
two holding tanks for refuse, but had no clear plans for emptying them. After consulting the
Mayor, the City Clark and the Chairman of the Board of Health, the Thurlow hatchery inspector

59 DM Johnston of federal Marine and Fisheries, to DM of Ontario Game and Fisheries, April 27, 1921.
File 702-4-13 (1), Box 436, RG 23, LAC.
60 June 17, 1921, Letter from Ontario Game and Fisheries DM McDonald to A. Johnston, federal DM for
Marine and Fisheries. File 702-4-13 (1), Box 436, RG 23, LAC.
could only report that nobody thought the provincial Board of Health would act. 61 A local daily newspaper noted in late May that the algae and other problems would soon come back, and reported vaguely on possible actions: that the plant had been asked to close, that the mayor of Belleville was inspecting sewage treatment plants in neighboring towns.62

Despite the lack of enthusiasm from the local business community, the distillery’s management appear to have behaved differently during the summer of 1921 as a result of attention and warnings from the provincial health authorities. In late July, Dr. Horace Yeomans, the Medical Officer for Belleville, wrote to Ontario’s Deputy Minister for Game and Fisheries, Mr. McDonald. He explained that the Corbyville Distillery had not run at all that summer, and that its owners had no intention of operating during the six months of warm weather in the future. He noted that his observations supported the Thurlow hatchery staff’s opinion of the source of the pollution, and that the Provincial Board of Health was discussing sewage disposal projects with the City of Belleville.63 The hatchery staff and their Ottawa supervisors remained dubious about whether or not the summer’s discussions would produce lasting change.64

In late October 1921, the distillery began to operate again, dumping molasses and corn residues into the Moira River. Thurlow staff reported this, along with suggestions for adapting their binational egg harvest to work around the pollution.65 Rather than exchange letters and wait for action, William Found, the federal Director of Fisheries, began to press the province to

61 Letter from Jos. Oakes to his superintendent, J. A. Rodd, Thurlow Hatchery. [early June 1921]. File 702-4-13 (1), Box 436, RG 23, LAC.
63 Letter from Dr. Horace A. Yeomans, Medical Officer of health for Belleville. Replying to DM McDonald at Ont. Game and Fisheries, July 21, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.
64 Letter from Jos. Oakes, Thurlow inspector, to J. A. Rodd, Superintendent of Fish Culture, Ottawa. August 20, 1921. Letter from Wm Found (Ottawa) to DM McDonald (Toronto), August 31, 1921. Both in File 702-4-13 (1), Box 436, RG 23, LAC.
65 Letter from Mos. Oakes to J.A. Rodd, Nov. 1, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.
stop the dumping via a series of telegrams to Deputy Minister McDonald.66 Found also began to monitor the situation, instructing the hatchery staff and a nearby group of scientists from the federal Department of Agriculture to send samples of the polluted water to a chemist at the Experimental Farm in Ottawa. The chemist’s report on water taken just below Corby distillery came back before the province acted on the telegrams: the chemist, Mr. Shutt stated that “The assemblage clearly indicates distillery waste,” that it would certainly be fatal to fish, and that “In our wide experience with Canadian waters we have seldom had submitted to us such utterly bad and offensive samples.”67 A second set of samples was analyzed and reported to be even worse than the first batch, and staff from the Thurlow Hatchery wrote reports about their observations of the river’s water quality during the rest of the autumn and early winter.68 They observed that a paper mill upstream of the distillery was also contributing to the problems, along with the Belleville gas plant, which was “making gas from crude oil and emptying all the refuse in the bay east of the harbour,” and that raw sewage from the local hospital and ‘House of Refuge (an orphanage or institutional care facility?) were also discharging into the Bay of Quinte near the hatchery.69 Although the distillery wastes were the focus of their attention, these other sources of pollution were almost certainly contributing to the hatchery’s problems, too. The federal government’s use of regular monitoring and laboratory test to confirm the presence of

66 Telegrams from Found to DM McDonald, Nov. 1 and Nov. 2, 1921. Found reiterated that hatchery losses and damage to fisheries for ‘two years’ have been “very largely, if not altogether, due to the pollution of the water by the molasses residue from the distillery.” Telegram, Found to McDonald. Nov. 5, 1921. Mr. Found expected the province to fix the problem, cabling: “This Department satisfied that the present untreated drainage from the Corby Distilleries constitutes a serious menace to the fish life of the Moira River and nearby spawning grounds of the Bay of Quinte. The responsibility for this condition being allowed to continue rests entirely with your Department.” All in File 702-4-13 (1), Box 436, RG 23, LAC.

67 Report from Shutt, to federal Department of Marine and Fisheries, Nov. 18, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.

68 Report from Shutt to ADM Wm. Found. December 2, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.

69 Letter from Jos. Oakes to J. A. Rodd, Superintendent of Fish Culture for federal Department of Marine and Fisheries, Dec. 16, 1921. heading on the stationery is “Naval Service Canada - Fish Breeding Service” File 702-4-13 (1), Box 436, RG 23, LAC.
pollution and create basis for collaborative action between the various jurisdictions presaged later eras of pollution control.

The Director of Fisheries’ insistent telegrams did produce some activity: the Ontario Game and Fisheries Department told the manager of the distillery, the Corbyville Alcohol Works that: “Representations have been made to this Department in regard to the refuse from your plant which is polluting the waters of the Moira River and the Bay of Quinte, and in view of the conditions created, the Department is obliged to ask you if you are prepared to have these conditions remedied before action is taken under the provisions of . . . the Fisheries Act, 1914.”70 Judging by the timing of McDonald’s letter to the distillery Manager, it seems likely that he was responding to the November telegrams, rather than the complaints and reports from the previous spring or the Medical Officer’s reports from the previous August.

Despite the undeniably acute pollution, the distillery’s managers appealed to their Member of Parliament, Mr. E. Guss Porter to stay the proceedings. Like the game warden in the Fighting Island example, the MP Porter portrayed the complainants as local malcontents. He cabled the federal department of Marine and Fisheries, contending that “Fisheries Department through manager of Thurlow fish hatchery here giving Corby Industrial Alcohol Company here trouble by charging pollution of water.”71 The federal department told him that he was protesting to the wrong jurisdiction, because any legal proceedings were provincial, and adding that “Department advised Provincial authorities some time ago that if hatchery were to continue to successfully operate, pollution of waters would have to cease.”72 There seems to have been some local confusion about how the different levels of government were involved.

70 DM McDonald, Nov. 15, 1921, to Department of Marine and Fisheries, enclosure. File 702-4-13 (1), Box 436, RG 23, LAC.
71 Telegram, Mr. E. Guss Porter to Minister of Marine and Fisheries. Nov. 25, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.
72 Telegram for Mr. A. Johnston, rep for Minister, to MP Porter. Nov. 25, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.
Unfortunately, the Ontario provincial government’s effort to take legal action to improve conditions on the Moira River slowly bogged down during the winter of 1921-1922: the province had the authority to initiate court proceedings, but either could not or would not allocate the resources to construct a case. The federal government had the staff and research capacity to furnish the necessary evidence of pollution and had been monitoring the water in question for months, but the federal Department of Marine and Fisheries refused to get involved in fisheries policy, the province’s area of jurisdiction. In late December 1921, McDonald at Ontario Game and Fisheries asked Found whether he would advise court proceedings, explaining that if Ontario started a court case, it would have to rely ‘to a large extent’ on evidence provided by Found’s department.73 Found offered to provide copies of his department’s monitoring data to McDonald, but also pointed out that provincial bureaucrats had also inspected the river and the bay in 1920 and 1921 and asserted that there was already ample evidence for a case.74 In effect, the Canadian government agreed to share their data, but refused to take responsibility for the outcome of Ontario’s lawsuit.75

Over the winter of 1922, Found began to monitor the Thurlow hatchery’s water supply at regular intervals.76 He explained to the chemist that “The matter is of so much importance that it may involve the closing down of the hatchery, and this Department would be greatly strengthened in its position should action be necessary, if it had analyses of the water in the

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73 Ont. DM of Game and Fisheries, McDonald, to Wm. Found at federal Marine and Fisheries, December 20, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.
74 Found to D. MacDonald, DM of Ontario Game and fisheries, Jan 16, 1922. File 702-4-13 (1), Box 436, RG 23, LAC.
75 Letter, DM of Ontario Game and Fisheries (McDonald?) to DM Found, Jan 23, 1922. Handwritten notations, initialed by Found, dated 26/1/22. On letter, DM of Ontario Game and Fisheries (McDonald?) to DM Found, Jan 23, 1922. File 702-4-13 (1), Box 436, RG 23, LAC.
76 Wm Found to DM of federal Department Agriculture, Dec. 27, 1921. File 702-4-13 (1), Box 436, RG 23, LAC.
hatchery made at intervals of two weeks during the present winter." Shutt’s monitoring and reports from Mr. Joseph Oakes, a fisheries inspector from the Thurlow Hatchery, documented the weather and water conditions around Thurlow, as well as the distilleries’ actions. Thurlow staff also kept track of hydrogen ion concentration of the water in and around the hatchery, as well as the effect of the pollution on the fish eggs and fry. The hatchery’s water had almost no dissolved oxygen in it in December and January, and was full of decomposing organic matter, but in February, the hatchery’s water intake contained enough dissolved oxygen for the growing fish. The federal government was clearly sufficiently invested in solving the pollution problem and maintaining their hatchery to devote resources to data collection and analysis. Found sent all of the reports and lab results to the provincial government but continued to refuse to take responsibility for a possible lawsuit by Ontario.

During the spring and summer of 1922, the hatchery staff and federal civil servants monitored the condition of the Moira River and the Bay of Quinte as the quality of the water supply degraded. The Belleville health board argued that the untreated sewage was an even bigger problem than the chemical wastes and Belleville needed a treatment plant. Some of the letters commented on how essential the Bay of Quinte was as a fish nursery, not only for the local fishery but for the whole lake. The Corbyville Distillery did not voluntarily reduce its pollution in response to repeated provincial requests. Bureaucrats at the provincial and federal

77 Found to Shutt at Hatchery, Jan 21, 1922. File 702-4-13 (1), Box 436, RG 23, LAC.
78 ADM Wm Found of Marin and Fisheries, to Mr. Frank Shutt, Dominion Chemist, Central Experimental Farm, Ottawa. March 28, 1922. File 702-4-13 (1), Box 436, RG 23, LAC.
80 Found to Ont. DM of Game and Fisheries, March 17, 1922. File 702-4-13 (1), Box 436, RG 23, LAC.
81 Clipping, “Declare Moira River Has Usual Complaint” May 31, 1921. Unnamed local newspaper from Belleville, Ont. File 702-4-13 (1), Box 436, RG 23, LAC. Clipping, "Pollution of River Water: Several Sources Alleged to be the Cause of the Trouble" The Intelligencer (Belleville, Ont.), November 13, 1922. File 702-4-13 (2), Box 436, RG 23, LAC.
levels corresponded about a possible lawsuit, but did not take any action. By October 1922, the distillery molasses was creating extreme problems for the hatchery’s water supply. In 1923, the Department decided to close the Thurlow Hatchery because of gases in the water from fermentation of distillery wastes.

The official response to the pollution complaints around the Bay of Quinte started from below: hatchery staff and their visiting colleagues reported their observations about the changing smell and appearance of the river water. Eventually, official sampling and laboratory monitoring began and confirmed their reports. The case of Thurlow Hatchery and the Moira River shows that despite having relevant laws 'on the books,' a well-documented case, and sustained advocacy from reputable figures, pollution reduction was useless because not all of the relevant agents were actively committed to enforcement. The case of Thurlow is certainly an attempt at transboundary management, but in this case the boundary lies between levels of governments, rather than between countries. Around the Great Lakes, water management was never simply a Canadian-American question.

The Buffalo Wave, 1933

By the mid-1930s, industrial pollution was becoming an acute problem, affecting quality of life for people along the lakes and connecting channels. During this period, when they recorded these problems systematically, Americans and Canadians kept track of pollution’s impact on people on both sides of the boundary.

In mid-March 1933, a remarkably large and unpleasant slug of polluted water was released into the Niagara River from Buffalo, flowing downstream into Lake Ontario and into

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82 Correspondence between Wm Found, DM for Fisheries and J. A. Rodd, Superintendent; Jos. Oakes, Hatchery officer. October 5-20, 1922. File 702-4-13 (2), Box 436, RG 23, LAC.
public memory, where it remained for several years as the ‘Buffalo Wave.’83 A detailed report written by the state government after the incident concluded that a combination of shifting ice, wind and water at Buffalo created a frozen dam, early in March 1933, holding polluted water in channels around outskirts of the city, restricting the flow of the Niagara River, and preventing the normal mixing and flow patterns below the city.84 Then, it suddenly shifted and released the pent-up water and wastes. The first and worst wave occurred on March 14, followed by smaller waves over the next seven days. For two weeks, towns along the Niagara River and the shores of Lake Ontario as far as Kingston, Ontario and Massena, New York were affected by discolored, foul-smelling water that tasted ‘phenolic’ and contained much more sewage than usual. Local water treatment plants were unable to add enough chlorine quickly enough to maintain safe drinking water quality, causing complaints and dire warnings but only one notable diarrhea episode in the town of Niagara Falls, NY.85

The state’s report itself is an interesting document because it represents the best available information about water quality in this Connecting Channel after half a century of heavy industrialization and urbanization. The engineers who wrote it compared the 1933 ‘wave’ to earlier reports from 1907, 1913 and 1931, and also took care to investigate the possible impact of this pollution on Canadians downstream. The report is written in the form of a letter from the senior sanitary engineer of the New York Division of Sanitation to the Commissioner of Health. It includes an extremely detailed and precise account of the Buffalo Wave, noting each municipality along its path, when people in each place noticed the wave (precise to the hour),

83 For example, an irate resident cited the ‘Buffalo Wave’ as evidence that the state and local government response to pollution was inadequate. Letter from Miss Grace Schneider of Rochester, NY, Jan 19, 1939 to Mr. Holmquist, Director of Division of Sanitation. File 1922-38, Box 10, Series A1120-80, NYSA.
85 1933 Report on Buffalo Wave, p 3. File 11, Box 30, Series A1120-80, NYSA.
what conditions were and how water plant managers responded. The report describes how the authors concluded that the sudden slug of pollution was due to particular ice and weather condition, rather than a massive industrial spill. In one gruesomely exact passage, they explained how observers recognized the problematic water as coming from Buffalo by its color: it was bright red from dye wastes that flowed into the Niagara River from the Buffalo River just below the city of Buffalo.

The report compared the 1933 Buffalo Wave to earlier ‘waves’ of particularly acute pollution that had come down from Buffalo in 1907, 1913 and 1931, noting how much worse conditions had become over the decades. The report’s authors noted carefully that in each of the previous cases examined, the flow of the Niagara River prevented the plumes of additional pollution from creating international problems. However, their analysis of the 1933 pollution plume indicated that the Canadian side of the Niagara River and the Canadian territory at the outflow of the St. Lawrence River were affected. They argued that Buffalo’s untreated sewage constituted a ‘distinct and continuous menace’ to the health of people living downstream, and that it would continue until the city arranged for ‘interception and treatment’ of its waste.

The New York Health Department followed up in April 1933, sending two engineers from the Sanitation Division to sample water quality and analyze the currents from the Niagara River mouth along the southern shore of Lake Ontario. Their report, written by a Dr. Hervey, compared the speed and direction of the Buffalo Wave to a survey of the currents of the Great

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86 1933 Report on Buffalo Wave, p 12. File 11, Box 30, Series A1120-80, NYSA.
87 1933 Report on Buffalo Wave, p 10. File 11, Box 30, Series A1120-80, NYSA.
88 1933 Report on Buffalo Wave, pp 4-5. File 11, Box 30, Series A1120-80, NYSA.
89 1933 Report on Buffalo Wave, pp 5-6. File 11, Box 30, Series A1120-80, NYSA.
90 1933 Report on Buffalo Wave, p 4. File 11, Box 30, Series A1120-80, NYSA.
91 Dr. Hervey to Holmquist and Diefendorf [sic, Devendorf?] on April 15, 1933, File 11, Box 30, Series A1120-80, NYSA.
Lakes that the U.S. federal government had made in 1892-93, and commented on the congruence of the official data with the local knowledge of the region’s sailors and yachtsmen.

Although the Buffalo Wave did not prompt immediate investment in sewage treatment, it was significant because it occasioned detailed analysis of previous problems as well as new data collection, which when combined showed the acceleration of the industrial pollution problems on the Niagara River. At the same time, the New York government was clearly aware of the pollution as a transboundary issue and possessed the connections to get data from Canada and include it in the records.

_Detroit River, Wayne County, 1934_

The case of Wayne County’s effort to get transboundary support for investment in pollution abatement on the Detroit River in the mid-1930s is particularly poignant because it represents the most persistent and serious attempt at cross-border information sharing before World War II. It had such potential! The Wayne County Supervisors, whose area of responsibility included Detroit and the Detroit River, sought funding from the American federal government for a new sewage treatment plant under the New Deal infrastructure programs. To strengthen their case, they asked the International Joint Commission, the Canadian government and the Ontario government for data supporting their argument that the Detroit River was affecting both sides of the border, particularly at Amherstburg, Ontario. After several years of persistent effort met with tepid and unhelpful responses, the county officials abandoned the attempt. A widespread lack of data about pollution at many levels of government, combined with a lack of interest in finding or collecting new data, prevented meaningful cooperation.

The interaction began when the Health Officer of Wayne County, Dr. J. Hugh Lewis, wrote to Ontario’s Minister of Health in late July 1934. Attaching a report that his county’s Board of Supervisors had recently received from the Michigan Stream Control Commission (est. 1929),
Lewis explained that reducing the Detroit River’s pollution would benefit industries and health outcomes on both sides of the border, and described the county’s proposals for sewage treatment, which they hoped to execute with Public Works Administration financing from the American federal government. The Stream Commission described the Detroit River’s pollution stream as a mix of industrial waste and domestic sewage, noted where and how it crossed the boundary, and precisely how much money Wayne County could plan to spend upon sewage treatment. Dr. Lewis explained that if the county could demonstrate that there were any complaints at all, however mild, from Canadians about pollution of international waterways, Washington would be much more likely to approve their funding application.

The Michigan Stream Commission’s report cited the International Joint Commission’s 1918 pollution reference report in detail, an excellent example of how data collected earlier by other groups supported later joint policy-making. The report compared the quality of water before and after it passed through Detroit River, noting that it picked up a “thousand-fold increase in pollution” between Lake Huron and Lake Erie, though less than ten percent of the problem originated on the Canadian side. While Canadian industries did pollute the river, according to the Stream Commission’s research, the river’s currents prevented that waste from crossing the boundary.

The report also described the many kinds of damage that pollution caused: bathing beaches closed frequently; Detroit’s water supply was periodically ‘menaced’ when river’s current reversed; the “entire American shore” from East Grand Blvd to Lake Erie was unfit for domestic or recreation use; fish had disappeared; the remaining water was unfit for

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92 Letter from Dr. J. Hugh Lewis, Wayne County Health Officer, Grosse Ile, MI to Minister of Health of Ontario. July 26, 1934. See also enclosure, Report from Michigan Stream Control Commission to Board of Supervisors of Wayne County, July 6, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
93 Report from Michigan Stream Control Commission to Board of Supervisors of Wayne County, July 6, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
consumption and therefore in violation of Michigan’s health and conservation laws; industries on the lower river faced extra expenses related to purifying their water supplies; there were offensive oil and tar slick on shoreline and boats; bird habitat was ruined; downstream municipalities faced an excessive burden of ‘ever-threatening peril’; there was ‘definite public nuisance of an extremely serious nature’ at Grosse Isle; shoreline property values were destroyed; and, of course, the whole mess contravened the Boundary Waters Treaty. Altogether, the report argued that the increase in pollution in the decades since the IJC’s report constituted “unmistakable proof of the immediate need of corrective action.” The report’s characterization of the transboundary relationship is noteworthy: the authors (a trio of bureaucrats) identified the Boundary Waters Treaty as a reason to act, refrained from nationalist rhetoric and did not criticize Canada as a polluting nation.

When Dr. Lewis’ letter arrived in Toronto, the Ontario Health Minister passed it immediately to the Canadian Secretary of the International Joint Commission, Mr. Burpee, explaining that, “I feel that there are Canadian interests here which are jeopardized . . . and would appreciate any such action as may be taken by the Commission to urge that the proposed work be proceeded with.” Over the next few months, Burpee led a search by correspondence, a loosely related exchange of letters between officers of the International Joint Commission, the Canadian federal ministry of Public Health, the Ontario Ministry of Health, municipal officials in Amherstburg, Ontario, company executives from the Amherstburg waterworks, the U.S. Public Health Service, and the Detroit Commission of Public Works, as the

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95 Letter from Ontario Minister of Health, J. A. Faulkner, to Mr. Burpee, July 26, 1934. See also, Minister Faulkner to Dr. Lewis, July 28, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
Canadians tried to find evidence that the pollution of the Detroit River was causing problems on their side of the boundary.\textsuperscript{96}

At several points, Canadian civil servants affirmed their belief that the Wayne County officials had identified a real problem.\textsuperscript{97} The federal and provincial governments, as well as the IJC secretary, accepted Lewis’ reports and stated that they wanted the United States to support Wayne County’s abatement plans. However, their correspondence indicates that neither the province nor the Canadian government had made any attempt to keep systematic records of water quality along the Detroit River in the years after the IJC’s 1912 pollution reference. When asked, the company that operated the municipal waterworks on the Detroit River at Amherstburg, Ontario, the point that Wayne County and the Michigan Stream Control Commission had identified as the crossing point for pollution, had no files or personnel with positive evidence that the pollution in the Detroit River came primarily from the American side.\textsuperscript{98} The waterworks operators did not deny that pollution existed, but could not provide any records about its sources, character or extent.

As Secretary Burpee explained in an early August letter to his superior, Commissioner Sir William Hearst, that the IJC had collected no new data since 1913, when the investigations for its pollution reference were completed.\textsuperscript{99} The IJC had neither authorization nor resources to conduct monitoring outside of the references and applications forward to it from the

\textsuperscript{96} Letters between Canadian federal and provincial government, waterworks of Amherstburg, Ont. and to IJC, various dates, 1934-1935. Letter from AE Berry of Ontario Department of Health to GA Ferguson. Sept. 11, 1934. All in File 370-J-4 pt1, Vol 272, RG 29, LAC.
\textsuperscript{98} Letter from officer of Brunner Mond, operator of Amherstburg Waterworks, Ont. to Canadian federal Department of Pensions and National Health, Aug 25, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
\textsuperscript{99} Lawrence Burpee to Commissioner Hearst, Aug. 2, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
governments of the United States and Canada; instead, Burpee and Hearst encouraged the Dominion government and Ontario to act, and sent letters asking their colleagues for data. The lack of resources was not limited to the IJC: many organs of government whose work might have been relevant were affected by funding cuts during the Great Depression, such as the Canadian federal Fisheries Research Board, which lost 50% of its budget between 1930 and 1933.  

Given that the Canadians expressed interest in supporting Wayne County, and given that they had no supporting data to hand, several questions remain. They could presumably have found proof of pollution if they had investigated. Why couldn’t Ontario, Canada or the IJC have presented their support for Lewis in a systematic, ‘expert’ sort of way? Why was there not more urgency or clarity in their response? By late August, the Wayne County officials had not received any response to their request and wrote again. A member of the Michigan Stream Control Commission, which had created the initial pollution report, began to correspond directly with the Canadian Ministry of Pensions and National Health.

In response to further prodding from Ottawa, the provincial health authorities complained that they had no staff available for monitoring work, and “no investigations or information which would enable us to say whether this pollution is increasing and whether it is crossing the border to the Canadian side.” They asked for a copy of Lewis’ report and explained that they had

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102 Letter, AE Berry (Director, Sanitary Engineering Division, Ontario Department of Health) to Ferguson (chief sanitary engineer of Canada’s Department of Pensions and National Health), Sept 11, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
been in regular contact with Colonel Rich, the chief sanitary engineer of Michigan’s Department of Health. Rich shared data and maps with them and invited them for meetings about the state of the Detroit River. The Ontario health officer’s letters show that transboundary professional networks existed, but the people in those networks had few resources for monitoring. The Great Depression presumably contributed to this problem on both sides of the border. Wayne County’s requests apparently did not motivate Ontario’s civil servants to begin allocating resources for pollution monitoring.

The Canadian federal government did have some pollution data, but seems indicative of the low priority of the topic that none of the information in their files had been produced by the federal or provincial governments. Mr. Ferguson, the chief sanitary engineer of Canada’s Department of Pensions and National Health, listed Ottawa’s database it in a letter to the IJC in 1934: Canada had the IJC’s 1913 data and 1916 hearings transcripts, the Michigan Stream Control Commission’s report, a series of coastline survey from the Michigan commission, charts of the Detroit River, and a file of letters and reports created after the US Surgeon General notified Canada of some unusual turbidity in the Detroit River in 1931.\textsuperscript{103} Overall, he noted,

From an examination of the above data it appears that since . . .1913 there has been a tremendous increase in population in Wayne County, Michigan, including Detroit and other municipalities bordering on the Detroit river. That co-incident with this increase of population there has been a very serious increase in the amount of raw sewage discharged into the Detroit river from these several municipalities. That the transboundary effect of the resultant pollution has increased to a corresponding degree in the area near Amherstburg, Ontario is specifically indicated on plates E-2 and E-2A of the June 1933 report of the Michigan Stream Control Commission re. Coastline Pollution Surveys of Michigan.\textsuperscript{104}

Clearly, Canadian bureaucrats knew how to evaluate pollution statistics, but were not in the business of collecting new information on a regular basis, or perhaps could not afford to spend

\textsuperscript{103} Letter, Ferguson to Burpee, Sept 11, 1934. Memorandum, “Memo re Pollution of Detroit River,” Anonymous and undated, but reproduces the contents of Ferguson’s Sept 11 letter to Burpee, and is placed in the file next to that letter, so presumably it was created by Ferguson or his staff around that time. Both in File 370-J-4 pt1, Vol 272, RG 29, LAC.

\textsuperscript{104} Ferguson to Burpee, Sept 11, 1934. File 370-J-4 pt1, Vol 272, RG 29, LAC.
money on research during the Depression years. They do not appear to have considered a preventive approach to the pollution problem. In any case, the IJC’s binational research continued to form an important resource for civil servants even twenty years after its collection.

One other part of Ottawa’s response is more difficult to excuse: a few months after Wayne County’s second request, the Chief Sanitary Engineer, Mr. Ferguson, wrote to his Deputy Minister that, “It is difficult to see how action can be taken by this office in regard to the matter as, up to the present time, we have not received any complaint of injury from any Canadian body.” This seems disingenuous. The Canadian national archives hold numerous complaints from Canadian and American citizens, addressed to Canadian and Ontario bureaucracies, a significant proportion of which related directly to the Detroit River and which were received and answered between 1913 and 1934. In addition, given that, as demonstrated on Fighting Island during the 1920s, the eyewitness account of a single game warden was considered sufficient to confirm or deny the presence of industrial pollution, a health officer from Ottawa or Toronto could presumably have been dispatched to give his opinion of Amherstburg’s water quality.

Neither Canada, Ontario nor the International Joint Commission responded to the Wayne County officials. Six months after sending his initial letter, Dr. Lewis wrote to the man whose job was the nearest analogue to his own, the Deputy Minister of Health for Ontario, Dr. Bell. He explained that the Public Works Administration had approved the Wayne County project in principle, but had no available funds for it unless the transboundary aspect of the problem was more forcefully presented:

Mr. Geo. Waldbridge, representative of the Governor of Michigan in Washington . . . assures us that if we can possibly get some official complaint, no matter how feeble, from the provincial

105 Letter, Chief Sanitary Engineer, Mr. Ferguson to federal DM of Department of Health, Jan 23, 1935. File 370-J-4 pt1, Vol 272, RG 29, LAC.
106 See Figure 9 and Figure 10.
board of health direct or through Ottawa to Washington we will get immediate action on this
crying need . . . May we confidently hope for some action from your Department in the near
future?\textsuperscript{107}

It appears from Lewis' letter that the Canadians' search for hard data might not even have been
necessary - an accusing letter might have been enough to push the administrative gears into
motion in the United States. The pollution prohibitions in the Boundary Waters Treaty were
frequently invoked, but only by people who already wanted to use them. The Public Works
Administration did eventually build sewage treatment plants in Detroit, Buffalo and Cleveland,
among other Great Lakes ports, and Canadian officials reported on them in the late 1930s as
laudable examples to follow.\textsuperscript{108} However, theirs remained a disappointing missed opportunity for
transboundary cooperation.

\textit{Conclusions}

When the Boundary Waters Treaty came into existence in 1909, there was already
significant industrial pollution in the connecting channels and along the shores of the lower
Great Lakes, especially around cities and towns. The pollution increased in volume and
complexity over the next four decades, and it was easy for people around the watershed to
perceive the change. The people living around the lakes noticed the increase industrial pollution
and some people protested about it and attempted to remedy the problems.

Urban residents complained about the increasingly unpleasant local conditions: the state
of their rivers and harbors, the smells, and the visible pollution. In addition to the strong
sanitation movement that pushed for chlorination, urban populations also complained about the
smell and taste of their drinking water, with 'phenols' being the most widely reported problem.

Conservationists, the small academic biology community, and recreational anglers from rural

\textsuperscript{107} Jan 12, 1935, letter from Dr. Lewis to Dr. Bell. File 370-J-4 pt1, Vol 272, RG 29, LAC.
\textsuperscript{108} Correspondence, Fall 1938, Ferguson to Burpee. File 370-J-4 pt1, Vol 272, RG 29, LAC.
and urban areas called attention to the deterioration of wetlands, streams and shallow bays that had once been excellent fishing and hunting spots. Commercial fishermen and employees of the region’s hatcheries pointed out the same problems, using language of economic decline and threat to livelihoods rather than appeals to nature appreciation. The same public health officials who transformed the cities of the lower Great Lakes from typhoid hotspots into relatively sanitary cities also commented on the worsening pollution. However, the individuals and groups who noticed and complained about declining water quality and their increasing frustration with the industrial pollution did not form effective coalitions or exert collective pressure. Their protests, though frequently crossing the international boundary, remained essentially isolated.

The response of the various federal, state, provincial and municipal governments to these pollution complaints took a variety of forms. At no point in the 1900-1941 period did Canada and the United States work together in any sustained way to address this shared problem. Both the calls for remediation and the official responses were diffuse, piecemeal, and hesitant. Response to the industrial pollution problem took the form of studies, some crisis response in Buffalo in the 1930s, some investment in wastewater treatment infrastructure in Buffalo, Cleveland and Detroit through the Works Progress Administration, and of some new legislation drafted, though not passed, in New York State.

Compared to the scale of the problem, these responses counted for very little. These early efforts did help in tiny ways and did become grist for later mills in some cases, but they did nothing to substantially reduce pollution loads or change behavior.

Why was the response to this evident damage not more constructive? While it is impossible to identify a single reason for the lack of action, several explanations seem probable. The people objecting were not united, nor did they represent particularly powerful constituencies. In economic terms, fishing, hunting and angling tourism were small potatoes compared to the benefits of growing companies like DuPont, Kodak, Corby Industrial Alcohol,
Ford Motors, General Electric, Michigan Alkali/Solvay and all the others. The politics of the time were not conducive to restrictions on industry. Industry was progress, modernity, civilization. Sub-national laws about nuisances or threats to fisheries prompted some legal actions and official responses, but not enough to produce a coordinated response to industrial pollution. The application of such laws depended on local politics that were generally pro-industry rather than concerned with preserving local environmental quality. Complainants, even reputable government scientists, were labelled troublemakers by local officials. Once sanitation was assured through chlorination, drinking water no longer contained anything obviously, provably lethal. As a result, there was much less typhoid but also much less political will to restrict industry around the lower Great Lakes.

It is also important to realize that the laws of the time, at every level, were unsuited to the problem. Public health laws in New York, Ontario, Michigan, and Ohio only allowed prosecution or management of those kinds of pollution that were shown to be dangerous to human health. During the first half of the twentieth century, there were no laboratory tests that could identify industrial pollutants when diluted in rivers or lakes, and no tests for toxicity at small doses over long periods of time. Even chemicals that were known to be acutely toxic, were diluted to near-imperceptibility in rivers and lakes, and without morbidity or mortality statistics, there was little evidence to support a case to limit pollution under existing health laws. These early controversies were attempts to clarify the existence of industrial pollution and create mutually acceptable proofs of its existence, in a time when new materials were constantly being created and released into the environment.

Although there was no serious cross-border response to the immense growth of industrial pollution during this period, it is worth asking: what impact did all of this have on the region’s institutional arrangements for water management? Did institutional change occur?
The IJC’s biological pollution reference was a very big success for proponents of transboundary cooperation, and their report gave a substantial boost to sewage control throughout the region. There was a massive improvement in public health after 1910, through clear, decisive policy action supported by verifiable data, and transboundary research was part of that. It is worth considering whether or not the commitment to chlorination water treatment diverted resources away from reduction of pollution overall. However, the data-based policies for reducing disease through chlorination were very important, and it is doubtful whether the science of the time could have supported an ecosystemic approach to pollutants with as much success. In the course of industrial investigations, some other data were collected, which were very important for comparison in later years.

The fully drafted pollution control treaty of 1920, which grew out of the governments’ request to the International Joint Commission for remedies, was a valuable attempt at coordination that provided a focal point for Canadian-American discussions until the end of the Second World War. In the same way, the need for pollution abatement was rising to a higher level of public and political attention.

The unsuccessful pollution control efforts of the 1900-1941 period did produce a few results that were valuable later on, such as failed legislation in New York state and draft legislation in other jurisdictions109 that created a basis for successful new laws later on, quantities of data and reports that supported later research, growing public consciousness of

109 Letter, C. A. Holmquist, Director of Division of Sanitation, to Miss Grace Schneider, Jan. 17, 1939. “As you probably know, we have for several years, without success, attempted to have legislation passed which would give us more definite authority to handle cases of this kind.” File 1922-38, Box 10, A1120-80, NYSA. “Public Health Laws relating to pollution and experience of State Department of Health in connection with their enforcement, etc.” Presented by Mr. E. Devendorf at meeting of Joint Legislative Committee on Interstate Cooperation, July 30, 1946. File 26, Box 6, Series A1118-80, NYSA.
the problems, and unsuccessful lawsuits\textsuperscript{110} that demonstrated the gaps in existing laws and legal strategies.

Historians have rarely probed the meaning of early attempts to manage or address other kinds of water pollution. These were unsuccessful and, compared to the scale of the growing problems, laughably small. However, they are meaningful because, when compared to the earlier absence of all attention, they indicate growing awareness and official attention. They are also part of the beginning of our current system of water management. While the first generation of American-Canadian water management institutions - the IJC, hatchery programs, and collaborative infrastructure projects - developed and grew stronger, the seeds of the succeeding generation are visible in these early fits and starts.

Examining joint attempts to control pollution during the first decades of the twentieth century reveals the developing division of labor between national, state, provincial and local governments, as well as the different groups of experts that studied complaints, from fish and game wardens to public health practitioners. Arguably, the multiplying complaints about industrial pollution and the attempts to remedy them in a space with many jurisdictions are both part of a set of slow changes that were beginning to be felt in the first half of the twentieth century, which later shaped new goals for water management in the Great Lakes. States and provinces became more involved in pollution monitoring, analysis and abatement. People living around the Great Lakes developed a greater appreciation for the negative consequences of human activity. More money and expertise became available to regulate municipal water supplies. Water supply professionals in many fields gained a better understanding - scientific, medical and legal - of how the lakes functioned as a biological system, as well as a physical and

\textsuperscript{110} Report of hearing held 13 June 1938 in Buffalo, NY by NY Department of Health. The hearings were a state-level response to local lawsuits that had begun in 1935 against the City of Buffalo. Folder 5, "Hearings, 1913-1938," Box 6, Lake Erie-Niagara River, Drainage Basin Subject Files, Series A1120-80, NYSA.
chemical system. These trends all contributed to transboundary awareness of the many links between human health and environmental quality and to the slow growth of a new goal for joint water management: ecosystem health.
Chapter 4 — Ignorance, Optimism and Invasive Species: Cooperation in Fisheries Management, 1900-1972

Between 1906 and 1954, the valuable fisheries of Lake Erie and Lake Ontario declined precipitously. Populations of the most sought-after species shrank dramatically, ecosystems became increasingly stressed, biodiversity declined, and fishermen were unable to make ends meet even as they intensified their efforts. People around the lakes tried to work together across the international boundary to reverse these trends using both formal and informal methods. This chapter recounts the causes and consequences of their failure, the numerous attempts to make formal international agreements, and the unexpected benefits of their informal modes of cooperation.

Despite the extensive historical literature analyzing the national policies of Canada and the United States, and the bilateral relationship between the two governments, the classic tenets of international relations are nearly irrelevant when it comes to transboundary water management in the Great Lakes. Instead, to understand how commercial fisheries policy evolved on Lake Erie and Lake Ontario, it is essential to study the changing aquatic environment of the Great Lakes and the interactions between people who actually lived along their shores. These were the decisive factors in shaping transnational efforts to support the fish populations and regulate the commercial fisheries between 1906 and 1954.

In 1954, a treaty between Canada and the United States created the Great Lakes Fisheries Commission (GLFC), a permanent, bilateral institution tasked with researching the lakes' ecology and controlling an invasive species, the sea lamprey. The GLFC does not regulate the fisheries, but its data and recommendations carry weight with the state, provincial and federal governments that do. This new institution grew out of informal teams of state, provincial, professional and municipal actors who worked together on the lamprey problem,
rather than any formal initiative. This admittedly inadequate institution of the 1950s created binational management structures were a starting point for better policies in the late twentieth century.

By the same token, the broad, deep networks from which the lamprey control teams grew were based on earlier, equally informal cooperation in fish culture that tried to 'plant' fish for harvest and on the negotiation of four failed fisheries regulation treaties. These otherwise pointless efforts from the early 1900s through the 1940s made the successful institution-building of the 1950s easier.

Some legacies of the numerous failed treaties and attempts at cooperation are quite tangible. The reams of statistics and reports, produced by commissions whose recommendations were ignored, provided data and models for later efforts. Others were less tangible but perhaps more important: the process of negotiating agreements and joint projects created patterns of communication among civil servants that outlasted elections cycles, and linked researchers, fishermen, bureaucrats and local residents.

Canada and the United States never made a treaty agreeing to collaborate in fish propagation or on invasive lamprey control, the two topics which prompted the formation of cross-border networks that were crucial to the creation of the GLFC. In both cases, networks grew up between government units located within the affected ecosystems, among the experts and technicians employed there. The gradual creation of institutional capacity and networks of knowledgeable people was the best 'fertilizer' for joint action. The lamprey, an equally local component of the ecosystem, was also critical to the creation of the Great Lakes Fisheries Commission because it provided a common enemy.

Even as the Great Lakes basin's water quality and biodiversity suffered from intensive exploitation, the states, provinces and municipalities were developing the institutional capacity to address anthropogenic environmental problems more effectively. By 1954, national and sub-
national governments on both sides of the border were able to work together more easily because they had built up their research staffs, their negotiating capability, and clarified their areas of responsibility.

This chapter will lay out the relevant events as follows: it will begin with a description of the state of the fisheries in 1906, as negotiations for the first joint fisheries policy began. Then it will juxtapose an account of the creation and failure of the 1908 Inland Fisheries treaty with the growth of informally cooperative fish propagation programs from 1906 to 1954. The realization that fish hatcheries were not working, combined with growing awareness of the depletion of the fish populations in Lake Erie and Lake Ontario, prompted several abortive attempts at joint regulation of the commercial fishery, in 1928, 1933 and 1946. Then, during the late 1940s, informal networks of collaboration, galvanized to respond to a new invasive species, finally succeeded in creating a permanent, joint fisheries management institution in 1954.

*The Fisheries in 1906, Their Development through 1954*

Before launching into analysis of fisheries regulation on Lake Erie and Lake Ontario, it is useful to have a sense of what the fisheries were like during the period in question.

The largest lakes do not necessarily yield the most fish. Before European settlement, all of the Great Lakes of North America were oligotrophic, meaning cold, clear, oxygen-rich, and relatively poor in nutrients. As settlement increased erosion and nutrient loading, the shallowest lakes, Erie and Ontario, became oligomesotrophic, which means they became warmer, muddier, and had more nutrients available as algae and plankton at the bottom of the food chain.¹ The shallowest and warmest, Lake Erie, supported the most productive fishery during

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the twentieth century, yielding the largest number of fish both in absolute numbers and relative to its size. Lake Erie has the smallest volume and the second-smallest area of all the Great Lakes. After Lake Erie, the most productive lakes in the basin, in descending order, were Lake St Clair, Lake Ontario, Lake Michigan, Lake Huron, and Lake Superior.

Commercial fishermen were responsible for the overwhelming majority of fish caught around the lakes during the first half of the twentieth century. Recreational angling and First Nations/Native American subsistence fishing also occurred, but those practices had a much smaller impact. In commercial fishing, small groups of men fished in deep waters from boats and fished the shallows from shore using ‘pound nets,’ generally returning to port each night. In 1906, some fishermen processed and shipped their catch to market independently, but larger fish merchants consolidated their operations during the first decades of the twentieth century and by 1930 most fishing occurred either as part of a fish merchant's 'fleet' or as part of a contract arrangement between fish packing houses and individuals. Canadian fishermen supplied cities and towns throughout Southern Ontario, but the majority of their catch went by rail to New York City and to the populous American cities on the Great Lakes, including Buffalo, Rochester, Cleveland, Detroit, and Chicago. American fishermen sent their catch to American cities on the Great Lakes and on the Atlantic seaboard. Given the lack of centralized fish consumption statistics in the archival documents, and in the absence of time and resources to reconstruct the consumption data for each lake’s fishing industry, the growth of populations in

2 Lake St Clair, a small body of water linked to Lakes Erie and Huron by short rivers, is counted as a separate lake in almost all Great Lakes fisheries statistics.
3 Individual members of southern Ontario First Nations and Native Americans from the northern Great Lakes states frequently participated in the commercial fishery. Because these fishermen and their catches are not identified in the commercial fisheries statistics, I have not been able to estimate the frequency with which they participated in the commercial fishery, or how this participation might have interacted with traditional or recreational fishing they may have done.
the places where Great Lakes fish were eaten can serve as an extremely rough approximation of the growing market for fish. The graph below shows the relative populations of the largest cities whose populations consumed fish from the Great Lakes; the United States was a much larger market for almost every good and service, so it is not surprising that the commercial fisheries sold most of their produce there.

**Figure 11. Population of Markets for Great Lakes Fish**

Fishing was a seasonal and often part-time occupation, so it is difficult to count the fishermen working on the Great Lakes at any given time. However, about ten thousand ‘shoresmen’ in both countries caught fish and brought them to port in the Great Lakes annually between 1900 and the mid-1930s, in addition to a growing number of dockside workers who

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5 See Appendix C for source data and citations.

In the first decades of the twentieth century, Great Lakes fishermen targeted the most popular 'food fishes' such as freshwater salmon, whitefish, sturgeon, trout and herring. Large, long-lived, and piscivorous, these firm-fleshed species were at the top of the food chain. The enormous lake sturgeon were fished to the brink of extinction by the 1920s. As the most popular species declined, people began to go after less highly valued species such as perch, smelt and carp. This pattern of 'fishing down' the food chain over time has been documented in other intensively exploited places, for example MacEvoy's classic study of the California coast, \textit{The Fisherman's Problem} (1986).

Intensive commercial fishing reshaped the species composition of the Great Lakes, while pollution and shipping also contributed to the decline of fish populations. While it is
impossible to determine the precise extent to which each factor was responsible, it is certain that between 1900 and 1954, Canada, the United States, and their relevant provinces and states encouraged the fishing industry in the Great Lakes, to the detriment of the fish stocks there. Commercial fishing intensified between 1906 and 1954, and it bears a large part of the responsibility for the sharp decline of the fish populations of the Great Lakes in that period.

The loss of these fish populations mattered because it was an economic loss to commercial fishermen, to First Nations people who fished as part of their seasonal subsistence pattern, and to the angling tourism business. At the same time, it represented a distinct loss of biodiversity and a decrease in the Lakes’ ecosystemic resilience to invasive species, climate shocks, and pollution. The suddenness of the changes in species composition, combined with the relative youth and simplicity of the Lake Erie and Lake Ontario ecosystems, magnified their impact.9 (The lower Great Lakes acquired their current shape between 10 000 and 14 000 years ago, which is relatively young. Younger ecosystems are simpler than older ones, which means that they have less biodiversity and fewer niches filled with species evolved to suit the locale. This comparative simplicity makes them especially responsive to changes such as invasive species.)

There are no precise records of the fish populations of the Great Lakes during this period. However, there are detailed catch statistics for each lake. Catch statistics are imperfect representations of species in a lake because they are affected by things such as fishermen’s effort, changes in technology, and markets. However, in the absence of better data, they are at

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least able to show the switch from focused fishing one species to another, and show when a
given species became too scarce to be worth pursuing. The following graphs are based on the
catch statistics for Lake Erie and Lake Ontario. Note the difference in y-axis scale between the
lakes. The first graph shows the overall decline of the Lake Ontario fisheries production.

Figure 12. Lake Ontario Commercial Catch – All Species$^{10}$

The second graph shows the four species that made up 75-95% of the total catch from
Lake Erie, and how fishermen substituted various species of perch and pike perch, which were
lower value ‘rough fish,’ to compensate for the loss of the more highly valued herring.

$^{10}$ “Notes on Statistics.” Commercial Fish Production in the Great Lakes, 1867-2006. Great Lakes
Fisheries Commission website: http://www.glfc.org/databases/commercial/tr3notes.htm Accessed: April
24, 2012.
The first attempts to manage the Great Lakes’ fisheries jointly highlight the complexity of the region’s political geography: throughout the twentieth century, it was a patchwork in three dimensions. This made uniform, formal regulation of anything very difficult, let alone such a slippery commodity as live fish. The first noteworthy attempt to create consistent fisheries regulations in the watershed was the Inland Fisheries Treaty of 1908. The laborious process of writing it and the circumstances of its failure demonstrate the lack of reliable information about freshwater fish, the lack of institutional capacity for environmental policy, and the important role that local opinions played in water management during this period. Contrasting the fate of this

treaty with the contemporary Boundary Waters Treaty of 1909 further strengthens the argument that local people’s expertise and interest were the driving force in water management.

The Inland Fisheries Treaty of 1908 was part of a larger effort by the British Ambassador to Washington, Lord Bryce, the Governor General of Canada, Earl Grey, and the US Secretary of State, Elihu Root to ‘clean the slate’ of Canadian-American disputes. In this way, the British officials hoped to clear the way for more amicable Anglo-American relations and an alliance against Wilhelmine Germany. Before 1931, the Dominion of Canada did not have control of its external affairs and any friction between the United States and Canada had to be resolved via the British Foreign Office. This was slow and problematic, but Grey, Bryce, and Root formed a remarkably efficient team and made several practical treaties between 1906 and 1910, reducing a list of sixteen disputes by more than half. Like every Canadian Prime Minister until the 1920s, Prime Minister Wilfrid Laurier (1896-1911) acted as his own Minister for External Affairs. Laurier supported the slate-cleaning initiative, although he was extremely skeptical of British interests and regularly asked Canadian experts to review proposed agreements before accepting them.12 President Roosevelt, an ardent conservationist who spoke fervently about the need to protect the beauty of Niagara Falls, was not directly involved with the negotiations, which initiated and managed by his Secretary of State, Elihu Root.13 In any case, by the time the Inland Fisheries


Treaty arrived before Congress for ratification in 1910, Roosevelt and Root were no longer in office, and the newly elected Taft administration was not interested in pushing for the treaty’s passage.

At the turn of the twentieth century, the large fisheries off the Pacific and Atlantic coasts and in the Great Lakes basin were all subject to international disputes. Grey, Bryce and Root came up with the 1908 Inland Fisheries Treaty to cover a group of lakes, rivers and bays that spanned the continent, including the Great Lakes.\(^\text{14}\) Under its terms, the United States and Canada agreed to set up an International Fisheries Commission with one representative from each country, which would draft a set of “uniform and common regulations for the protection and preservation of the food fishes of the boundary waters,” that would also be incorporated into domestic laws.\(^\text{15}\) The commissioners, Dr. David Starr Jordan (US) and Dr. Edward Prince (Canada) were given six months to complete their assignment, a time limit that was intended to produce a finished set of regulations before President Theodore Roosevelt left office in early 1909. (It seemed likely that Roosevelt’s administration could convince the Senate to pass enabling legislation, and that the conservationist President would happily sign them.)

Prince and Jordan had very little information about the fish or the places involved. For example, because fish life cycles were not well understood, it was impossible to estimate a reasonable pace of harvesting. The gulf between their assignment and their information was enormous and the slow pace of communications and information-gathering compounded the problem. It is important to realize how little they had to work with because it shows how much the later treaties and policies benefited from the creation of knowledge and administrative


capacity within the Great Lakes watershed between 1900 and 1954. It also demonstrates the usefulness of an institution such as the Great Lakes Fisheries Commission, which maintains and updates a mutually acceptable stock of data on which to construct policy.

Unfortunately for the fish stocks, politics on both sides of the border combined to obstruct the treaty. One impediment was the six-month timetable, which was too short for detailed research. The commissioners needed a year for information gathering alone, and more time for analysis and recommendations after that.\textsuperscript{16}

Canada’s tiny institutional capacity for foreign relations also slowed the process considerably. In 1906, it took seven months for the U.S. Secretary of State to receive an answer to a letter to the Canadian Prime Minister, due to a combination of unwieldy protocol and lack of Canadian personnel. The letter followed the normal official channels of the day: it went from the State Department to the British Embassy in Washington, then to the Foreign Office in London, the Colonial Office in London, to Governor General Grey in Ottawa, and finally to Prime Minister Laurier. Laurier’s reply followed the same route in reverse, once the overworked Prime Minister was reminded by the Governor General to write it. In that capacity they devoted their scarce time and attention to British pressure to contribute to imperial defense, questions of national autonomy, and the creation of a Department of External Affairs. Canada’s embryonic foreign policy apparatus seems not to have devoted resources to 1908 fisheries treaty, which was an unpopular and complicated problem.

By the time draft regulations were ready for congressional approval in April 1909, the Roosevelt administration was over, William Taft had been elected President, and the new administration did not choose to devote much political capital to enacting the joint regulations.\textsuperscript{17}

\begin{flushright}
\textsuperscript{16} Bogue, \textit{Fishing the Great Lakes}, 312-320. The time-table was eventually extended to one year, which was still inadequate.
\textsuperscript{17} Dorsey, \textit{The Dawn of Conservation Diplomacy}, 73-75.
\end{flushright}
Fishermen and fish dealers from border states urged their Congressional representatives to oppose the regulations, asserting that they would hurt their business and disputing the science on which they were based. Reconciling the many interested states required far more time and effort than the new Congress or the Taft administration (1909-13) wished to spend on the issue, particularly in the face of interested constituents’ lobbying against it. In the end, the enabling legislation for the treaty’s regulations passed the Senate but was not approved by the full Congress.¹⁸

Taking a close look at exactly how those constituents proved their point shows both salience of local opinion and feebleness of available science. According to government correspondence and the newspaper accounts of the day, a few fishermen from Saginaw, Michigan decisively killed the treaty in the following way. The signed agreement failed to exit the Foreign Relations Committee. The senators were decisively influenced by a widely reported visit from a group of fishermen from Saginaw on Lake Huron, who marched into their conference room with three buckets of live whitefish, denied that any regulations were necessary, and asserted that the 1908 treaty would ruin their livelihood.¹⁹ Newspapers from every Great Lakes state recounted the demonstration enthusiastically, including the New York Morning Sun:

Messrs. Orr and Gillingham of Bayport, Mich., and McCormick of Bay City were the fishermen. After they were recognized by Senator Cullom of Illinois, chairman of the Committee of Foreign Relations, McCormick, the spokesman of the party, pulled out a piece of fishnet of the mesh required by the agreement and some live lake herring that had reached maturity. He lifted the fish by their tails after a good deal of splashing and dropped them into the net. They promptly slid out through the meshes into a pan that had been placed on the table around which sat the dignified committeemen. This demonstrated to the satisfaction of the committee that in some respect at least the agreement won’t do.²⁰

²⁰ New York Morning Sun, Thursday, Feb. 17, 1910. Clipping, no page number. File, “Clippings,” Box 3 (Alexander Notes, etc), 150-1-17-3, RG 22, NARA.
The Cleveland, Ohio *Bulletin of Fishery*, an industry newspaper, reported happily, “The carefully drawn Jordan-Prince code was shaken down like a house of cards. . . . The truth appears to be that Dr. Jordan tried to settle the fisheries question without consulting those who know most about fisheries - the fishermen.”21 The fisheries of the Great Lakes were not a high priority for the majority of the committee’s members, and the local perceptions, histrionically expressed by constituents, were decisive despite being in contention with the best data-based policy of the day. Incidentally, this activism may have contributed to Secretary Root’s steadfast refusal to allow Lake Michigan to be covered by the Boundary Waters Treaty of 1909.

Congressional opposition was decisive, but Canadian election cycles and federal structure also had a role to play in the failure of the agreement. Between 1899 and 1911, the federal government and the province of Ontario disagreed over which government could regulate the Great Lakes fisheries. While the disputes continued there was no guarantee that the provincial officials would enforce the regulations passed by the Parliament in Ottawa. The controversy was resolved in 1911, probably because the newly elected Conservative federal government was better able to compromise with its provincial ‘cousins’ in Toronto than the outgoing Liberals had been.22 Robert Borden’s Conservative Party ousted Laurier’s Liberals in October 1911, running on an anti-American platform. Although the federal-provincial fish dispute ended when Borden took office, the new Prime Minister did not make any effort to enforce the Inland Fisheries Treaty regulations. Canadian fishermen were not particularly supportive of the

21 *Bulletin of Fishery*. Feb. 22, 1910. Clipping, no page number. File, “Clippings,” Box 3 (Alexander Notes, etc), 150-1-17-3, RG 22, NARA.
22 “The deadlock between the two levels of government was broken about 1911-12. The reason for the change is not clear although a compromise may have been made possible by the existence of Conservative administrations in both Toronto and Ottawa after 1911. The federal government continued to enact fishery legislation and pass regulations for Ontario, but it consulted closely with the provincial government . . . Over a period of years provincial input increased to the point where the federal role was reduced to that of a rubber stamp . . .” McCullough, *Commercial fishery*, 96
measures and since the American Congress showed no signs of enacting the treaty’s provisions, it is also possible that whichever party had won the 1911 election would have abandoned it. Once the momentum imparted by Bryce, Root and Grey’s exceptionally smooth cooperation was lost, fisheries regulation was simply not a high enough priority for Borden or Taft to justify a serious effort to reconcile the many interests involved.

In 1914 the British government abrogated the 1908 Inland Fisheries Treaty on Canada’s behalf. That same year, Canada entered World War I and mobilized its domestic economy to produce for the war effort, encouraging the fishing industry to expand, giving it unprecedented support, and pushing the population to eat fish instead of meat. This wartime policy lasted until 1918, raising pressure on the fisheries. Canada’s entry into World War I marks the end of its first effort to regulate the Great Lakes fisheries with the United States.

In the first decades of the twentieth century, cooperative fisheries regulation was a hard sell and a low priority for federal and state/provincial governments. While fishermen and scientists frequently called on their political leaders to stop the decline of the fish populations, the long-term management policies needed to do that could not be reconciled with short-term entrepreneurial goals. When it competed with or conflicted with the more highly valued goal of supporting the commercial fisheries industry, regulation lost.

The failure of the 1908 treaty cannot be blamed on its complexity alone, because Ottawa and Washington did take care of other intricate questions during this period. The Boundary Waters Treaty, every bit as ticklish and as wide-ranging as the Inland Fisheries Treaty, was concluded in 1909 and ratified in 1910 by both countries. Why did one succeed and not the

other? Comparison of the two treaties’ fates shows the value of detailed preparation and proactive negotiators, as well as the importance of local expertise.

The successful Boundary Waters Treaty grew out of earlier proposals advanced by the International Waterways Commission (IWC) from 1905 to 1907.25 (See Chapter 1.) The IWC’s Canadian chairman, George Gibbons, a lawyer from London, Ontario, prodded his fellow commissioners into submitting unusually detailed, ambitious reports to their governments.26 Gibbons was a prominent Liberal who had Prime Minister Wilfrid Laurier’s confidence and strong nationalist views. He acted as the Canadian representative during negotiations for the Boundary Waters Treaty and its ratification in both countries, from 1906 to 1910, helping the British and American diplomats to ‘clean the slate.’27 The Canadian-US consensus on the Boundary Waters Treaty was built over four years of patient discussions.28 There was no comparable preliminary drafting or knowledgeable local lobbyist/activist to ease the passage of the Inland Fisheries Treaty.

The importance of local activities in shaping the transboundary water management regime is further proven when one examines informal cooperation: while the first fisheries treaty failed, local interest supported a cordial and steadily growing exchange of materials and ideas for aquaculture projects between local professionals, civil servants at the state, provincial, and national level officials, and academic researchers on both sides of the border. Aquaculture, or

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25 The International Waterways Commission was formed in 1903 and put to work in 1905. Its mandate was to examine the problems associated with diversions in the Great Lakes watershed and recommend solutions to them. The IWC could only report on Great Lakes issues, but it was the most direct venue for Canada-U.S. discussions up to that time. The IWC had three commissioners from Canada, three from the United States, and none from Britain.

26 Had the Liberals won the federal election in 1911, George Gibbons would almost certainly have been the first Canadian Chairman of the International Joint Commission. His legal training and nationalism might have given the IJC’s early work a different complexion than it got from the engineers who were appointed.


28 See Chapter 1 for a detailed description of the Boundary Waters Treaty negotiations.
fish propagation, is a form of aquatic agriculture, the practice of cultivating fish to be released into the wild to support themselves until harvested for human consumption. Its popularity in the Great Lakes basin and its enthusiastic promotion by the US and Canadian governments are examples of their shared optimism about fish culture as an alternative to restrictive regulations and their pro-business attitude to fisheries.

*Comparing Diplomatic Failure to Local Capacity Building in Hatcheries, 1906 – 1925*

This contrast between the extreme difficulty of creating a formal joint regulation system and the ease with which substantive informal cooperation developed is an important part of the foundation of today’s water management system in the region. The U.S. and Canadian civil servants, scientists, and fishermen who monitored the Great Lakes fisheries were aware that increasingly sophisticated technology, overfishing, and pollution threatened commercially valuable fish populations. In the first decades of the twentieth century, their preferred solution to this pressure was aquaculture. They were convinced that hatcheries could make up the difference by ‘planting’ fish eggs and fry (newly hatched fish) in sufficient quantity.29

As the 1908 treaty failed, cooperation between American and Canadian public service fish culturalists was increasing. Hatchery staff and scientists from New York, Ontario and the federal governments formed an informal transboundary professional network that grew more active and collaborative over time. In 1918, the U.S. Commissioner of Fisheries, H.M. Smith, reported to the Commerce Secretary, the Hon. William Redfield, that,

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The possibilities of increased fish-cultural work on the Great Lakes, particularly on Lakes Erie and Ontario, as a result of more intimate cooperation between the United States and Canada have recently become evident, and arrangements have been made by which all available sources of egg supply will be exploited. Especially valuable during recent seasons has been the courteous action of the fishery officials of Canada in opening to spawn takers from the Cape Vincent station the whitefish spawning grounds in the Bay of Quinte, Lake Ontario.30

Smith’s note is one of multiple references to cooperation with federal and provincial officials in Canada. The hatchery and research stations staffs in the Great Lakes basin collected specimens in each other’s waters, shared specialized transportation equipment, attended conferences, shared publications, and generally kept in touch as they pursued their respective fish culture programs. The U.S. Commissioner of Fisheries’ annual reports from 1901 to 1939 and 1947 to 1953 include references to work with Canadian counterparts under many headings, from simple references to locations north of the border to full-scale public conferences. This ongoing, practical collaboration stands in contrast to the parochial attitudes of the fishermen’s lobbying groups in both countries, which contributed to the failure of the 1908 Inland Fisheries treaty. A few examples of the activities at the federal hatchery at Thurlow, Ontario illustrate the point.

The Thurlow Dominion Hatchery was on the Bay of Quinte, a very large, warm, and shallow bay on the north shore of Lake Ontario. The bay was an excellent fish nursery in the early decades of the twentieth century, and still supports a significant angling tourism industry today. The area supported a mixed economy with several towns, the largest being Belleville, Ontario.31 Representatives of the American federal hatcheries near Oswego, New York formed a close working relationship with the hatchery staff at Thurlow because the fertile Bay of Quinte

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31 Thurlow Hatchery operated from 1911 until 1923, when it closed because local industrial pollution had increased so much that fish eggs could no longer hatch in the available local water. (See Chapter 3.) Belleville’s population was approximately 9,100 people in 1901, and grew to 12, 300 by 1919. John Moody, Moody’s Manual of Investments: American and Foreign, Vol. 4. (London: Mathieson and Sons, 1920) 1152.
had ample fish eggs for collection and cultivation, whereas the southern basin of the lake was comparatively cold and barren. Twice a year between 1918 and 1925, local fishermen on contract worked with hatchery staff for the Canadian, U.S. and Ontario government to harvest fish eggs from the bay. The staffs of the different governments corresponded throughout the year about mundane things like spawn containers and how much to pay the contract fishermen. There is no evidence of nationalist attitudes in their letters, even when the provincial staff wrote to their federal counterparts in 1922 to complain that the Americans were paying harvesters too much and that to match their rates would wreak havoc on the Ontario budget. Staff from all three jurisdictions (Ontario, US, and Canada) used first names and referred frequently to events attended together around the lower Great Lakes, including the Lake Erie Fishermen’s’ Association meetings. This group of people had more in common than their occupation: they were all men, English-speaking, and (judging by their surnames) of Western European and British descent, all of which probably contributed to a sense of shared culture and professional cohesion. Comments from hatchery staff indicate that contract fishermen (and their professional associations) supported the fish-planting programs enthusiastically. When international cooperation seemed likely to increase the catch, it was not a problem.

In March 1921, Canadian biologists employed by the federal government at Thurlow wrote to Ottawa that the whitefish catch had increased of the preceding twenty-five years due to hatchery operations on Lake Ontario. More rigorous analysis would later show this to be quite inaccurate, but the hatcheries did conduct other valuable research in support of the commercial

32 Correspondence, File 731-17-2, pt 2, Box 142, RG 23, LAC.
33 Ibid.
34 Federal civil servants from several departments worked there: the Dept of the Naval Service’s Fish Breeding Service, the Dept of Marine and Fisheries’ Office of the Superintendent of Fish Culture, and the Dominion Experimental Farm.
35 Correspondence, File 702-4-13, pt 1, Box 436, RG 23, LAC.
fisheries. For example, the government and university biologists at Thurlow spent considerable time between 1920 and 1922 trying to understand the link between the deteriorating water quality in their fish tanks and pollution from local sewage and a nearby distillery, the Corbyville Alcohol Works.\(^{36}\) The records of their experiments are fascinating: while the mechanisms of biological oxygen demand and the role of CO2 in aquatic ecosystems were not well understood at the time, researchers knew enough to try to devise tests for dissolved oxygen and carbon dioxide.\(^ {37}\) The hatchery researchers joined up with the Ontario Public Health Service and the Belleville Medical Officer to argue that the distillery should be prosecuted for violations of the federal Fisheries Act of 1914, as well as public health laws. They also devised a series of sand and gravel filters for their water supply to reduce mortality of their young fish. In the same way that harvesting fish eggs brought fish culture professionals from two federal governments and Ontario into regular contact, the question of water supply for the hatchery drew federal hatchery employees to work with health authorities from three levels of government (provincial, federal, municipal).

The records of Thurlow hatchery’s quest for clean water in which to raise fish also show that the hatchery was a site for communication between government officials and local people. When gathering information about pollution, hatchery staff did not rely solely on laboratory tests. They canvassed fishermen, property owners, and recreational swimmers from the Bay of Quinte and wrote down their comments about the small, taste, look and feel of the water. These observations were then formally confirmed by hatchery staff, either by collecting samples of the offending water or simply visiting the same sites and recording the evidence of their senses.\(^ {38}\) Taken together, it seems clear that the push for pollution control in the Bay of Quinte in the mid-

\(^{36}\) Correspondence, File 702-4-13, pt 2, Box 436, RG 23, LAC.
\(^{37}\) Correspondence, File 702-4-13, pt 2, Box 436, RG 23, LAC.
\(^{38}\) Correspondence, File 702-4-13, pt 2, Box 436, RG 23, LAC.
1920s was driven from below, as the civil servants at Thurlow combined local accounts with their own tests to argue that the governments in Ottawa and Toronto should prosecute the distillery and require sewage treatment. This collection of local environmental knowledge and detailed chemical data is a kind of institutional capacity. The hatchery did not succeed in solving the fishing industry’s problems, but the information and relationships produced in the attempt were extremely valuable to later policymakers.

First Recognition of Overfishing, First Regional Response after World War I

Although the hatcheries in Canada and the US had a good working relationship, their efforts did not halt or even reduce the effects of overfishing in the Great Lakes ecosystems. While the government men collected statistics and fish eggs together, the fishermen of the Great Lakes responded to the declining fish populations by changing their target species. The first commercial fish that was harvested to near-extinction was the sturgeon, which became very rare by 1900. As the sturgeon disappeared, trout and whitefish took its place in the nets. When those faded away, fishermen took herring instead. As herring disappeared, they turned to perch, walleye, pike and sauger, followed by smelt, and later by the much more marginal carp, pikeperch and catfish. There were occasional ‘bounces’ in the fish population trends, but the overall direction did not deviate.

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39 To the consternation of local conservationists like Edward Harris of Toronto, who wrote a detailed account of the sturgeon’s decline, Our Great Lake Fisheries, A Vanishing Heritage (Toronto: W. Briggs, 1905).
41 This classic pattern has been described by numerous environmental historians and resource managers. A particularly well-written example is Arthur MacEvoy’s The Fisherman’s Problem: Ecology and Law in the California Fisheries, 1850-1980 (Cambridge: Cambridge University Press, 1986) and a Great Lakes example is Margaret Bogue’s Fishing the Great Lakes.
The period from 1912 until 1925 was crucial for the fish populations of Lake Erie and Lake Ontario for several reasons. First, new technologies and access to new markets enabled the commercial fishery to grow and intensify its pressure on the populations of the preferred species of the day, especially whitefish, trout, and herring. Historians have approached these years with varying emphasis. Frank Prothero, a rather sentimental historian of the fishing industry, referred to these as “the great herring years” and ‘the Good Years,’ noting that investment in the industry more than doubled in less than a decade. That money went into new railroad sidings, steam-powered boats, processing plants and ice houses, as well as nets and salaries.\textsuperscript{42} The sole environmental historian of the Great Lakes fisheries, Margaret Bogue, describes this as a time of increasing fishing intensity in response to rising demand for fish in urban areas as well as, “the realities of a deteriorating resource, less rigorous regulation, spotty enforcement of fishing codes, and the availability of new technology.”\textsuperscript{43} By the end of the First World War in 1918, more than three quarters of the fisheries’ boats were powered by gasoline rather than steam or sail, and technology such as powered net lifters were increasing the amount of work each crew could do.

Second, the years between 1910 and 1925 saw a marked increase in industrial activity and urbanization around the lower Great Lakes, contributing to increasingly significant habitat loss and pollution in rivers, marshes and inshore areas, which are important places for fish reproduction. Local concern about the impact of pollution on the fisheries is apparent in both Canada and the United States as early as 1914: activist groups such as the Izaak Walton League and fish cultural associations lobbied the U.S. federal government to protect fisheries, citizens wrote to the Canadian government, and civil servants in New York and Ottawa

\textsuperscript{42} Prothero, \textit{The Good Years}, 17, 29-30.
\textsuperscript{43} Bogue, \textit{Fishing the Great Lakes}, 255.
undertook to study the problem.\textsuperscript{44} However, none of these complaints was particularly effective. The presence of pollution was not denied, nor was its nuisance effect, but neither government nor any significant proportion of civil society was convinced that addressing the problems was worthwhile. In the 1980s, fisheries biologists working for the Great Lakes Fisheries Commission debated the relative impact of pollution and more intense fishing, but even with the benefit of hindsight were unable to reaching a definitive conclusion.\textsuperscript{45} Both were extremely detrimental.

In addition to overfishing and pollution, fish populations were changing in response to new species. The common carp, native to Europe but cultivated in the Hudson River valley of New York state from the 1830, was installed deliberately from an unknown source and cultivated in millponds in southern Ontario beginning in 1880.\textsuperscript{46} These carp escaped into tributaries of Lake Ontario during a flood and adapted so successfully to the Great Lakes that they became a problem, competing with other, more commercially valuable fish such as trout and whitefish.\textsuperscript{47} The ‘carp mistake’ convinced fish culturalists to restrict their introductions to North American species. Rainbow smelt, introduced to Lake Michigan from the Atlantic coast in 1906 and present in all five Great Lakes by the early 1930s, were also a mixed blessing.\textsuperscript{48} When scientists in the 1920s sought to explain the decline of trout and whitefish population in the Great Lakes, they frequently blamed the smelt for eating the fry of valuable species.\textsuperscript{49}

\textsuperscript{44} File 702-1-1(1), File 702-1-1(2), and File 702-1-2(1), Vol. 433, RG 23, LAC. File 702-4-2(1), File 702-4-3 through 9, 11-13 (2), Vol 436, RG 23, LAC.
\textsuperscript{46} W.B. Scott and E. J. Crossman, \textit{Freshwater Fishes of Canada}. Bulletin 184 (Ottawa: Fisheries Research Board of Canada, 1973), 408.
\textsuperscript{48} Scott and Crossman, \textit{Freshwater Fishes of Canada}, 313.
However, in the 1940s, after the whitefish, trout and herring fisheries had declined, smelt became a valuable fish in its own right.

In broad terms, the order in which the fish were targeted reflects human preferences, the most desirable being the first to go. Human preference correlated strongly with position on the food chain: the big, long-lived predatory fish such as sturgeon, salmon and trout were pursued first, followed much later by small and/or softer-fleshed bottom feeders. As the big fish became scarcer, the smaller species, which had been their prey proliferated until they were targeted in their turn. In some cases, the transition from one fish to another was relatively seamless, as from whitefish and trout to herring. Because fish populations fluctuated from year to year and place to place, the fishermen in any given congressional district or parliamentary riding were seldom convinced that the overall decline of fish was a durable trend or that it was a result of overfishing, much less the result their own port’s efficiency. Nobody denied that pollution was affecting aquatic ecosystems in this period, but it took time for overfishing to be recognized and publicly acknowledged as a primary cause of declining fish populations. At other times, as in a herring collapse on Lake Erie in 1925, the change was sudden and devastating: the catch from the 1924 season was officially recorded in 1925 as 109,079 hundredweight (5,543 metric tons), and the following year, it was 28,396 cwt (1,419 metric tons) a mere quarter of that amount.

51 “A basic problem of fishery management is monitoring the size of a fish population of a lake in relation to the size of the annual catch of that species. This is relatively easy when the species is uniformly distributed and its numbers can be determined by statistical sampling, or where there is some other means of directly estimating the size of the population. In the Great Lakes in the 1920s neither of these situations existed.” Frank Egerton, “Missed Opportunities: U.S. Fishery Biologists and Productivity of Fish in Green Bay, Saginaw Bay and Western Lake Erie.” Environmental Review 13, (No. 2, Summer 1989), 43.
52 On the fishermen’s opinion of government scientists, see Prothero, The Good Years, 113.
Despite disagreements about the scope and relative importance of overfishing, by the time of the herring collapse of 1925 on Lake Erie, a consensus began to emerge among fisheries scientists and interested politicians that commercial fishing on the Great Lakes was too intensive to be sustained and should be limited by cooperative management. This was a local response to changing conditions, unlike the earlier British-American slate-cleaning. Discussion of the declining fisheries included frequent references to the sturgeon’s near-extinction before 1900. More than one author predicted that the same thing would happen to other species if measures were not taken to restrict fishing. The sudden loss of the herring fishery on Lake Erie in 1925 provided the necessary catalyst for new attempts to rein in the fishing industry, this time through coordinated legislation.

In 1928, the representatives of US federal government and Ohio, New York, Pennsylvania and Michigan met in Cleveland to discuss fishing problems on Lake Erie. They carefully noted what each jurisdiction’s administrative capacity was, and which states already had fisheries regulations. They drafted a set of eight regulations and agreed that each jurisdiction would enforce them. The records of the meeting and subsequent correspondence provides revealing commentary about responses to the herring crash and declining catch of preferred species. In particular, civil servants noted the relative weakness of conservation groups such as the Izaak Walton League compared to the fish dealers’ business associations and fishermen’s groups. This conference is also the first time that John Van Oosten (1891-1966) appears as a significant character. As the first director of the newly minted federal fisheries research lab at Ann Arbor, he figured prominently in international fisheries policy


55 File “Great Lakes Conference, 1928-1930,” Box 1, Entry #42, Bureau of Fisheries, Dept. of Commerce, RG 22, US Fish and Wildlife Service, NARA.
throughout the 1930s, 1940s and 1950s. During the 1928 conference, he argued convincingly that controlling overfishing, rather than pollution, was the highest priority on Lake Erie. Given the federal character of the United States and the wide differences between states’ fisheries regimes at this time, the 1928 regulations should be regarded as a form of cooperation across jurisdictions even though they did not involve Canada.

The internal American effort occurred simultaneously with efforts to work across the international boundary. In February 1933, on the initiative of New York State, representatives of the sub-national jurisdictions bordering Lake Erie - Ontario, New York, Ohio, Pennsylvania, and Michigan - met in Toronto as the Lake Erie Advisory Committee and signed a formal agreement to enact a set of five uniform regulations. Both federal governments were aware of the agreement and did not forbid it. Unfortunately, it was less than a year before the four jurisdictions abandoned any pretense of observing its strictures.

Why did the 1928 and 1933 regulations fail? In some ways, the failure of these agreements recalls the Inland Fisheries treaty, in that both efforts ran up against popular opinion and political indifference. Local concern about the herring crash and the growing effort to get the same amount of fish was strong enough to bring people together, but not unified enough to overcome opposition.

On the other hand, the opposition to fisheries regulation in the late 1920s and early 1930s was different from that in 1908. One noteworthy change was that in 1933 the fishermen and fish dealers argued that they needed protection, but did not dispute the need to restrict

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fishing. During the 1930s, the fishermen of the Great Lakes, and especially on Lake Erie, were better organized and more vocal than they had ever been.\(^\text{58}\) The Lake Erie Fishermen’s Association on the north shore lobbied its federal and provincial members of Parliament and criticized the 1933 agreement, arguing that American fishermen were not respecting the agreement and that they would not restrict their catch unless the south shore fishermen did, too. These parochial concerns were able to derail the 1933 agreement in the US and Canada because the fishing lobbies were strong and because the jobs from the fisheries were precious during the Great Depression. Local agitation for special consideration on protectionist or humanitarian grounds was very effective.\(^\text{59}\) A case from Ontario demonstrates the power of protectionism: in 1925, Queen’s Park legislated that bull nets, a particularly disruptive and controversial technology, were legal on the north shore of Lake Erie in the 1920s, “as long as they were allowed in any one of the states that borders on Lake Erie.”\(^\text{60}\) Politicians in every jurisdiction in the basin faced pressure to allow fishing to continue, as declining catches and the Depression made life harder for their constituents. Although states and provinces were increasing their administrative capabilities in the decades following World War I, sub-national fisheries regulation was no more successful than basin-wide regulations.

The inability of scientists or technical experts to establish a clear cause for the fisheries’ problems was also an impediment to regulation, though probably not the decisive one. Commercial fishermen were quick to blame the lumber, chemical, or construction industries for their smaller catches, and to push for regulation of those activities instead of their own. In

\(^{58}\) Prothero, *The Good Years*, 110.


NB: Bull nets were an adapted gill net, which used a three-inch mesh net to trap fish by their gills from the lake bottom up through twenty-five feet of water. A standard gill net only harvested within five feet of the bottom. Bogue, *Fishing the Great Lakes*, 259.
addition, not all fisheries scientists and hatchery managers were convinced that overfishing was
the most important threat to counter. The tone of researchers’ work on the impact overfishing
was especially vehement in part because it was countering such well-entrenched opposition.

Alan McCullough, writing for Environment Canada in 1985, also identified lax, badly
funded enforcement and parochial politics as reasons that official efforts to regulate the fisheries
failed in 1928 and 1933. Fishermen used twice their licensed netting, used illegal net
technologies, and disregarded closed seasons with impunity throughout the watershed. Other
aspects of fisheries management, such as labor relations, tariffs, and enforcing local laws took
precedence over the task of creating a joint management regime between the mid-1920s and
the late 1940s. So, although protectionism and the lack of a clear highest priority were
deterrents, official indifference was just as obstructive to basin-wide regulations.

Despite its short lifespan, the creation of the 1933 agreement shows that the need for
fisheries regulation was being taken more seriously in the Great Lakes basin. The negotiation
between states and province also shows that the range of these governments’ activities was
growing. In 1906, direct transnational discussion of fisheries problems was limited to hatcheries
activities between scientists and staff. By 1933, elected officials were working across the border
to find a consensus and create a unified formal response for Lake Erie, the most depleted lake.

Whereas the 1908 Inland Fisheries Treaty was part of a policy to nurture an Anglo-
American alliance, such classic international relations concerns were irrelevant to the 1928 and
1933 attempts at fisheries management on Lake Erie. The federal governments never engaged
each other directly, diplomats were never involved, and power relations between jurisdictions
were minimally significant. The catalyst for negotiations and joint action was a change in the
local environment: the herring crash of 1925, which served as to draw attention to the general

61 McCullough, Commercial fishery, 85-90.
depletion. Both proponents and opponents of joint regulation were people working on Lake Erie, as commercial fishermen, scientists, conservationists or civil servants.

*Fundamental Rethinking: White Elephant Hatcherries and the 1946 Treaty*

While these abortive attempts at regulation played out in the 1930s, both countries continued to operate hatcheries and fisheries development programs, and maintained their pattern of informal collaboration. To the extent that the governments in the Great Lakes basin tried to address the effects of overfishing, they gave most of their support to hatcheries and programs to develop markets for the traditionally unpopular ‘rough fish’ that now made up such a large proportion of the catch, not to regulations, habitat preservation, or pollution reduction. National and state/provincial governments also provided funding for research in ichthyology and biology in the hopes that better scientific knowledge would benefit the hatcheries, and a greater number of formally trained scientists began to work in them.62 The staffs and funding increased or stayed steady, and a greater number of formally trained scientists worked in them. In this context, university researchers and government scientists regularly exchanged samples, equipment and information about their projects and sometimes collaborated on projects. Aquaculture was one of the few things that the states and province could agree to do collaboratively over the long term. It was the most common avenue for transboundary exchange of information. These joint activities built professional networks that facilitated basin-wide lamprey control policies years later, as we shall see.

Despite their popularity, the Great Lakes hatchery programs for ‘food fishes’ such as trout, whitefish, pike and sturgeon were useless. In the mid-1930s, after several decades of focused funding and research, government scientists began to acknowledge that they could not

prove that large-scale planting of fish increased the commercial catch. That admission was the beginning of a deep change in fisheries policy on the Great Lakes. The reasons for this failure probably included inadequate knowledge of fish biology and lake ecology; a lack of ways to monitor or track fish after release, and above all, insufficient resources to hatch and disburse enough fish to compensate for the widespread loss of habitat, decline in near-shore water quality, and intense commercial fishing.

Understanding how the technical experts’ attitude to hatcheries changed is important. Between the onset of the Great Depression and the end of the Second World War, there were few new resources for fish managers in the US or in Canada. Dr. Ralph Hile, a biologist and administrator who worked for the US Dept. of the Interior’s Bureau of Commercial Fisheries for decades, defined the years between 1933 and 1947 as a period of “stringently reduced budgets” for freshwater fisheries research. As a result, projects in the field ended, no new ones began, and government scientists were reduced to finishing and publishing the results of earlier research. In 1936, Hile showed that the stocking of pike-perch in Lake Huron and Lake Michigan had had no demonstrable impact on the catch there. The ‘digestion’ of earlier data displaced the fish-planting hypothesis, not so much debunking it as demonstrating that it didn’t work in the face of overfishing and pollution. The appearance of frequent publications was positive in that it increased public awareness of the problems in the fisheries.

64 Ralph Hile. 25 Years of Federal Fishery Research, 6-7.
John Van Oosten, the outspoken proponent of regulation to reduce fishing intensity, was made director of the newly created U.S. Bureau of Fisheries laboratory at Ann Arbor in 1927, and under his direction the researchers focused on three areas: the commercial fishery, limnology and fish biology. Van Oosten’s lab did investigate pollution on Lake Erie, but the work went slowly and concluded in 1933 that only a few small areas were seriously polluted. (Writing for the Great Lakes Fisheries Commission in 1985, biologist Frank Egerton opined that the methods and tests used to reach those conclusions were very rudimentary, albeit the best in existence at the time.) Van Oosten’s contemporary and the director of the Ohio State laboratory on Put-In-Bay on Lake Erie, Thomas Langois, argued that pollution was a significant factor in the 1925 herring collapse, but his evidence was very slim. Faced with successive Depression-era budget cuts, Van Oosten opted to stop funding research into the relationship between water quality and fish populations until the 1950s and focused on supporting the case for reducing fishing pressure. In addition to proving the irrelevance of aquaculture to the commercial fisheries, American and Canadian researchers in the 1930s also determined in numerous studies that overfishing was a primary reason for decline of various fish populations. As the Great Depression curtailed funding for new research, scientists worked in greater depth with data collected during the 1920s, ‘digesting’ their limited information and arriving at a new conclusion.

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66 Egerton, Tech Report 41, 9
68 Egerton, “Overfishing or Pollution,” 10-11.
69 Egerton, “Overfishing or Pollution,” 16.
70 Egerton, “Overfishing or Pollution,” 13.
As scientists and government officials started to evaluate aquaculture more rigorously, they slowly started to wind down their hatchery programs. However, because they were popular with fishermen, hatcheries continued to function for some years in the U.S, while in Canada, “[p]lantings continued of the same scale for 30 years [from 1927-1957], but seemed to have no discernible relation to whitefish catches.”

In large part, these seemingly pointless commitments were maintained because old fish-planting ideas were tenacious. Scientists were beginning to show that a different set of policies would do a better job of managing the fisheries to people’s tastes, but neither politicians nor the public had changed their minds. Until mid-1950s, policy makers continued to believe that if sufficient planting could be done, there was no urgent reason to restrict the fish harvest.

The tension between the changing scientific consensus and decision makers’ understanding is evident in a case recounted by Hile in a 1950s retrospective to the U.S. federal government:

The 1931-32 survey of the deep-trap-net fishery in Lakes Huron and Michigan was conducted in cooperation with the State of Michigan (which carried the bulk of the cost of field operations) to obtain information on which to base regulation of a new and phenomenally efficient net that early threatened ruin to the whitefish fishery . . . Although detailed observations . . . permitted specific recommendations on regulations shortly after completion of the survey, legislative action was delayed until after the whitefish fishery have collapsed in all major production centers of Lake Huron.

This is an example of an opportunity for regulation that had ample scientific data to support it, and yet was allowed to fail because it was not supported by political consensus or public opinion. Despite the depressing regularity of occurrences such as these, the whitefish study is also an example of the increasing technical understanding of government officials at multiple levels.


Fish culture programs to stock streams with salmon eggs for the sports fisheries were successful and continuous. After a thirty-year hiatus due to pollution, salmon programs were restarted in Lake Erie in 1970. Hartman, Lake Erie, 36.

73 In 1954, federal fisheries scientists were still writing wearily of the need to support ‘white elephant’ hatcheries because of their popularity with the commercial fisheries. File 797-6-1, pt 1, Box 343, RG 23, LAC.

74 Hile, 25 Years of Federal Fishery Research, 5.
levels and their realization that regulation, rather than aquaculture, was necessary to protect the fish stocks. The constant, smooth cooperation between federal and state officials that Hile describes was an aspect of institutional relations in this period that was useful to later, more holistic fisheries management.

As scientific understanding of the interaction between fishing and fish populations slowly developed, the acceleration of two other trends increased overfishing still farther. First, technological change in the industry was accelerating. Net technology varied widely, but tended towards the use of more nets per boat and labor-saving devices to haul them out of the water.75 By 1950, durable nylon nets had replaced cotton ones. Second, as fishermen used more sophisticated technology to chase fewer fish, the Government of Ontario was devoting fewer and fewer resources to fisheries regulation in the interwar years. Because Ontario governed the largest and most productive transboundary fisheries, its policies were very important. In 1911, the Canadian federal government and the Province of Ontario had more or less agreed that the province would have jurisdiction over fisheries regulation there.76 The province of Ontario’s policies paid no attention to scientists’ calls for catch reductions. The province continued the federal government’s hatcheries programs, but it also steadily reduced its regulations to the point that a government historian characterized the Canadian Great Lakes fisheries as ‘relatively unregulated’ by 1950.77

On the American side, the federal government conducted some research and hatching programs, but responsibility for making and enforcing regulations for commercial fishing rested with the states. State governments cooperated with the federal Bureau of Fisheries and with

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75 McCullough, Commercial fishery, 30-32, 42.
76 McCullough, Commercial fishery, 96.
77 McCullough, Commercial fishery, 96-97. See also Bogue, Fishing the Great Lakes, 261: “Ontario followed a more relaxed licensing and enforcement policy than had the dominion.”
each other when conducting research, and individual administrators recognized the need for joint regulations to control the pollution and overfishing that they believed were harming the resource, but no state devoted much money or attention to enforcing what regulation were on their books.\textsuperscript{78} Arguably, the general lack of commitment to regulation within jurisdictions was an even more effective barrier to successful long-term management than the lack of a basin-wide agreement.

In 1940, increasingly well-researched and pointed criticisms of overfishing also prompted Canada and the United States to set up an International Board of Inquiry made up of two Canadians and two Americans, “to explore various means of establishing coordination” in fisheries regulations. John Van Oosten deserves much of the credit for this shift. He propounded his ideas more persuasively and to a larger audience than any of his contemporaries in Canada or the U.S throughout the 1930s. He published both popular and peer-reviewed articles in which he stressed how badly depleted the fisheries had become, explained the need for immediate and drastic restrictions on fishing pressure to save the industry from collapse, pointed out how little voluntary regulations had achieved, and called for a treaty with Canada for joint investigation and control of the Great Lakes fisheries.\textsuperscript{79} His peers credited him with raising the public profile of the Great Lakes’ fisheries problems and called his work, “a major factor in the request of the Council of State Governments for the appointment of the International Board of Inquiry for the Great Lakes fisheries . . . [and] the negotiation of a treaty between the United States and Canada for international investigation and control of the

\textsuperscript{78} Bogue, \textit{Fishing the Great Lakes}, 259, 276, 290 and 311.

Great Lakes fisheries.” Van Oosten also served on the board of inquiry himself and shaped its reports.

It is worth noting that neither Washington nor Ottawa would have begun a formal inquiry into the Great Lakes fisheries without the different ‘pushes’ coming from the Great Lakes region, including scientific agitators like Van Oosten and complaints about the falling catch of less desirable species from professional fishermen. These catalysts filtered up to the Council of State Governors and thence into the realm of formal bilateral investigation. The 1940 inquiry was a direct descendant of the 1928 and 1933 attempts at joint regulation; the problem still had not been solved, the commercial fishing industry still mattered to both countries, and new data were available to support the case for regulations.

The significance of events in the Great Lakes watershed is also apparent when one understands how the Board of Inquiry functioned. It gathered information about the state of the Great Lakes fisheries by canvassing technical experts, professional fishermen, and residents around the lakes. Detailed questionnaires were mailed to the membership lists of fishermen’s associations and to hatchery staff. The Board held public hearings in 1940 in towns and cities in Ontario, Michigan, New York, Ohio and Pennsylvania. At these hearings, which lasted anywhere from one to four days, a variety of people involved with the fishing industry aired their views and responded to questions from the commissioners. Topics ranged from the value of hatcheries, whether and how to make uniform regulations, the progress of the fisheries’ decline and the reasons for it, the value of closed seasons (i.e. no fishing while fish were spawning), and the significance of urban pollution. The hearings were transcribed word for word, a

80 Ralph Hile. 25 Years of Federal Fishery Research on the Great Lakes, 7. See also, Kuchenberg, Through a Tarnished Mirror, 45.
81 Files 1-282-3-1, 1-282-3-5 through 1-282-3-9, and 1-282-3-27, “International Board of Inquiry for the Great Lakes Fisheries,” Box 5 of Fish and Wildlife Branch, B397140, RG 1-282-3, AO. File 701 pt 1 and 2, Vol 2140, RG 25, LAC.
fascinating collection of empirical evidence, self-interested arguments, and contentious discussion of the science of the day.

Rather than the expected call for an inter-jurisdictional compact, the Board of Inquiry recommended a treaty between Canada and the United States to establish a common agency that would regulate the common stocks of fish, collect better statistics, and evaluate the usefulness of fish culture programs.\textsuperscript{82} These recommendations became the basis for the audacious Great Lakes Fishery Treaty signed in 1946, which provided for a permanent binational commission with the power to take direct action if local authorities did not enforce its regulations. After forty years of sporadic effort, Canada and the United States had at last agreed to change the practice of commercial fishing on the Great Lakes.

The treaty was technically practical but the idea of giving regulatory powers to an international commission turned out to be politically unworkable.\textsuperscript{83} Representatives of Ohio and Wisconsin led the opposition to the treaty in the US Congress, and the treaty, never ratified or implemented, was withdrawn nine years after its signature.

The failure of the 1946 treaty is disappointing, but the content of the agreement is a testament to the growing realization in the Great Lakes region that joint action was necessary to manage the resource, curb overfishing, and get better information. Unlike the Inland Fisheries Treaty of 1908, the scientific basis for fisheries regulation was sound enough that it could not be overturned with a few buckets of live fish.

The process by which the negotiations started and then coalesced into a treaty also demonstrated that, as in 1928 and 1933, the impetus for better water management policy was growing from the environmental awareness of people living and working on Lake Ontario and

\textsuperscript{82} McCullough, \textit{Commercial fishery}, 102.
Lake Erie in particular, in response to worsening conditions there. The commissioners who drafted the ambitious treaty were not trying to create an agreement that would fail. On the contrary, the unprecedented scope of their proposals was a direct response to the magnitude of the resource depletion, the failure of earlier, less forceful agreements, and the extreme difficulty of getting so many jurisdictions onboard. It was much more than anyone had tried before, but it was the least disruptive policy that might be expected to produce an improvement.

A Common Enemy Emerges

In the early 1940s, a durable reason finally emerged for fishermen and their representatives to support joint fisheries regulation. A fish parasite called the sea lamprey began to take an increasingly heavy toll on the remaining high-value fisheries (lake trout and whitefish). First identified in Lake Erie in 1921, Lake Michigan in 1936 and Lake Superior in 1946, sea lampreys had been endemic to Lake Ontario for over a century. Biologists theorize that they moved past Niagara Falls to Lake Erie via the Welland Canal locks, which were opened in 1829 and enlarged in 1932. During part of their life cycle, lampreys feed by attaching to the side of a trout or other fish. Studies conducted by American scientists between 1947 and 1951 indicated that while lampreys preferred trout, they would attack all species commercially fished. The wounds thus caused are frequently fatal to the fish and the lamprey devastated the remaining fisheries of Lake Huron, Lake Superior and Lake Michigan by the late 1940s. It is difficult to overstate the frustration and anger that the lamprey provoked; they are palpable in every description of the (admittedly ugly) creatures and every account of their arrival on the scene.85

85 File RG 1-282-3-6, Box 5, RG 1-282-3, B37140, AO.
Between 1946 and 1948, teams of scientists from the Great Lakes states and Ontario, led by Vernon Applegate from the Michigan Department of Fish and Wildlife and John Van Oosten from the US Fisheries Bureau at Ann Arbor, surveyed fishermen and the general public about where the lampreys were reproducing. The ad hoc teams were composed of staff from the state, national, and provincial fisheries departments, who had cooperated for so long in the hatchery programs. Like the Lake Erie agreements and the outcry that led to the 1946 treaty, the lamprey control program was essentially a local response to changes in the watershed, rather than a formal diplomatic policy.

Once they were located, the researchers studied the lampreys in the field and tried various control mechanisms on them. They decided that it was preferable to kill them with chemicals before they left their natal streams, either by electrocution or poison. Electrical barriers were problematic in several ways: they hurt other wildlife, posed a potential danger to humans, frequently ran out of batteries, and were regularly damaged by weather and high water. Deciding that a chemical solution was preferable, the lamprey control teams put together a binational laboratory at Hammond Bay near Sault Sainte-Marie, Ontario. The lab at Hammond Bay designed a specific lampricide called 3-trifluormethyl-4-nitrophenol or ‘TFM’ in 1958, which has been widely applied to streams around the Great Lakes every spring since that time. As far as GLFC researchers can determine, diluted TFM in streams is not toxic to humans, fish, birds or mammals, though it is poisonous to some kinds of insects and thus has temporary side-effects for stream ecosystems. Sea lamprey have not developed any resistance to the

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87 Kuchenberg, Through a Tarnished Mirror, 62-67.
88 “Exhaustive laboratory tests . . . show that at the dose needed to eliminate sea lampreys, TFM is nontoxic or has minimal effects on aquatic plants, other fish, and wildlife. . . . Studies have also shown TFM to be nontoxic to humans and other mammals. . . . TFM does not bioaccumulate in the aquatic
substance, but the impossibility of applying TFM to larger rivers and streams has ensured their survival.

The study and experimentation on sea lampreys proceeded relatively quickly and smoothly because it made use of personnel and knowledge that had been accumulated in the course of earlier cooperation on aquaculture and industry supporting research. It also benefited from advances in institutional capacity. By the 1940s, the basin’s state and provincial governments possessed designated departments, staff, funding and equipment to research fish and wildlife. Not only did these bodies exist, they were better organized and funded in 1949 than they had been in 1908 or 1933. The deeper understanding of the biology and limnology of the Great Lakes, funded by governments in the watershed during the first half of the 20th century to benefit the fishing industry, turned out to be crucial to the development of effective lamprey control. Unlike all the earlier attempts to stopping overfishing, the lamprey control efforts were enthusiastically supported by fishermen and subnational governments around the lakes. The sea lamprey gave fisheries officials, scientists and fishermen a compelling reason to work together to protect the resource, though it was too little, too late to make a difference for the commercial fishing industry of the lower Great Lakes. In a sense, the sea lamprey was an unusually powerful non-human actor in the history of joint management of the fisheries: its presence provided a common enemy for fisheries policy to engage. The lamprey also made more people aware of the loss of the fish populations in a shorter, more intelligible space of time than the long, ambiguous erosion of earlier decades. Despite its galvanizing arrival, however,
the local impetuses for change in Great Lakes fisheries policies - enthusiasm for hatcheries, response to crashing populations and then animus against the sea lamprey - were either misplaced or tragically inadequate. But they were the catalysts for creating institutional capacity in the form of trained personnel, funding for research, and a permanent joint institution that is still a forum of joint policymaking today.

Collaborative lamprey control was originally conceived as a temporary emergency measure, and so it began without complex treaty-making. However, as it continued to be both necessary and somewhat successful, in 1954 the U.S. and Canada agreed to continue the lamprey control on a permanent basis by creating the Great Lakes Fishery Commission.89 Scientists had been arguing for curbing overfishing for long-term economic and environmental reasons since the 1930s, but the sea lamprey provided the necessary catalyst for a united management effort. The Great Lakes Fisheries Commission is “charged with developing and coordinating fishery research programs, advising governments on measures to improve the fisheries, and developing and implementing measures to control the sea lamprey.”90 Without the practical prelude of aquaculture programs, the growing rejection of hatchery programs in favor of fishing regulations, and the pressing need for lamprey control in the 1940s, the 1954 agreement might never have become a reality.

The Great Lakes Fisheries Commission has continued to oversee lamprey control in the basin, in addition to conducting other useful research. The Commission’s technical reports are standard references for every topic related to the ichthyology of the Great Lakes. Because the

89 On September 10, 1954, representatives of the two governments signed a “Convention on Great Lakes Fisheries between the United States of America and Canada” at Washington, D.C. Instruments of ratification were exchanged at Ottawa, Ontario, Canada on October 11, 1955, on which date the Convention became effective. The Convention applied to the Great Lakes and their connecting channels. The Great Lakes Fisheries Commission is composed of four Canadians and four Americans. Crowe, Great Lakes Fishery Commission History, 1.
90 Crowe, Great Lakes Fishery Commission History, 2.
lamprey control measures grew into a permanent institution, Canada and the United States have a better knowledge base from which to make their fisheries policy. Unfortunately, the scientists at the new Commission were (and still are) obliged to devote much of their research to studying human damage to aquatic ecosystems. The fisheries of the Great Lakes, abundant though stressed in 1906, were severely depleted by 1954 and their species composition was much altered by human introduction of new species of fish and parasites. The partial success of lamprey control efforts and the creation of the Great Lakes Fishery Commission cannot compensate for the failure of the earlier fisheries regulation agreements. Overfishing and pollution were so prevalent and relentless that by mid-century the only possible way to control them would have been a basin-wide set of regulations coupled with enforcement by the various local governments and a change in attitude on the part of the fishermen themselves. Nothing of the sort occurred, and the changes in the species of fish harvested speak for themselves.

*The Great Lakes Fisheries Commission in Action, 1954-1972*

In the years between the creation of the Great Lakes Fisheries Commission in 1954 and the grand revision that came with the Great Lakes Water Quality Agreement in 1972, Canada and the United States did not make any substantial changes to their shared fish management infrastructure. They did not create any new treaties or institutions, though they did revise the Convention on Great Lakes Fisheries, which created the GLFC, in 1967. However, during this period Ontario and the Great Lakes states worked together more frequently and augmented their capacity for joint action in this as in other areas of water management. In 1965, the GLFC created five ‘Lake Committees’ composed of state, provincial, federal and GLFC staff, to facilitate information sharing between researchers and policy professionals.91

91 Beginning in 1981, the Lake Committees also include two U.S. intertribal authorities: the Chippewa-Ottawa Treaty Fishery Management Authority and the Great Lakes Indian Fish and Wildlife Commission.
The new data that were collected and the expanded administrative capacity for fisheries policy that was built up during this period made coordination easier. However, the new research and monitoring also conveyed the enormity of the problem: the environmental impacts of the human activities in the Great Lakes made of the commission’s long-term goals seem extremely remote.

The GLFC began its work in the mid-1950s, attempting to control the sea lamprey while researching and supporting fisheries policies. Over the next two decades, Commission staff studied and published public reports about: basic aquatic biology, impact of persistent pollutants such as DDT, and impacts of other varieties of pollution. They also began and maintained a set of lake-by-lake studies, extremely practical synthesis portraits of each lake that would have been difficult to create without transboundary cooperation. In addition, the Commission’s staff contributed substantially to debates in the region’s academic and policy communities about whether the fish populations of the Great Lakes were collapsing due to overfishing, habitat destruction, pollution, or invasive species.

The lamprey program continued under the aegis of the GLFC, and over time it expanded to cover all five Lakes and their connecting channels. The Commission tested several control methods, eventually choosing to release a lampricide into streams harboring larval lamprey, either 3-trifluoromethyl-4-nitrophenol (TFM) or 2', 5-dichloro-4'- nitrosalicylanilide (Bayer 731). Sea lamprey abundance was reduced by about 90% in Lake Superior by the early 1960s. The other lakes eventually saw slightly less impressive reductions in lamprey population, with corresponding decreases in fish scarring and mortality. It is indicative of the growing interest in the environmental impact of pollution that the Commission decided to study the toxicity of their lampricide, TFM, beginning in 1971.

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Beginning in the mid-1960s, the GLFC also supported the efforts of states and the province of Ontario to introduce varieties of salmon and trout to the Great Lakes to supplement the remaining fish.\(^94\) The states and province cooperated informally, by sharing information and maintain professional networks among practitioners, but the fish stocking programs were not executed in any coordinated way. Eventually, varieties of salmon and trout did manage to become self-sustaining, though ecologists debate the exact nature of the impact of these introductions.\(^95\) The introduction programs are an example of how the goals for fisheries management shifted after the lamprey invasion: even with the joint lamprey control program of the GLFC, by the mid-1960s, Americans and Canadians no longer tried to support their once-valuable commercial fishery. Instead, they focused on the much more limited goal of supporting a stocked tourist fishery and mitigating the impact of other anthropogenic problems such as invasive species and pollution, trying to salvage native species and maintain some biodiversity.

Part of the reason that the Great Lakes Water Quality Agreement became a reality in 1972 was the driving force of the mercury scandals, which began in 1969. The unfolding of the crisis illustrates the global connections within the scientific community. A Swedish research group discovered that metallic mercury could propagate up the food chain from river sediments to food fishes and game birds, a surprise for the global scientific community in 1964. Their findings interested researchers and civil servants in the United States, where the federal Food and Drug Administration considered and then postponed a study on the subject, in Canada, where the head of the federal Canadian Wildlife Service's toxic chemicals section translated and circulated Swedish articles and encouraged several professors to assign mercury research to their


\(^{95}\) Crawford, *Salmonine Introductions*, 19-78.
graduate students in 1967 and 1968. A Norwegian PhD student at the University of Western Ontario’s biology department, Norvald Fimreite, received a grant to study mercury in Canadian fish and wildlife in May 1968. As he later explained to an interested wire service, Fimreite expected his field work in the St. Clair River to confirm the Swedish findings, that mercury in game birds and fish came from mercurial pesticides and chemicals used to clean pulp mill sluices. Instead, the levels were higher than expected and seemed to be concentrated near the sewer outfalls of chloralkali chemical plants.

A graduate student’s confirmation that the flesh of fish and birds in the Detroit River area contained dangerous levels of mercury shocked the Great Lakes region shortly thereafter. Norvald Fimreite conducted his doctoral fieldwork in the marshes of Lake St. Clair during the summer of 1968, collecting plant and soil samples, as well as tissue samples, scales and feathers from game birds and different fish. In February 1969, he presented a paper about possible mercury pollution at an Ontario conference, which was attended by scientists working for the Ontario Water Resources Commission (OWRC). The OWRC researchers were

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98 Fimreite quoted by a Cleveland journalist, Betty Alaric. Wire report, April 8, 1970. File, "Interrogatory Answers - ODA - Interrog. 2, Item 1-11," Box 5794, Series 2253, OHS. ‘Chloralkali’ is a technical term for an industrial process, the electrolysis of sodium chloride. This process creates chlorine, hydrogen and sodium hydroxide (also called lye or caustic soda). In the late 1960s, both products were used by a wide variety of customers. Chlorine was used in plastics manufacturing, to make bleaching agents, and as a disinfectant. Sodium hydroxide was used in pulp and paper manufacturing, textile manufacturing, aluminum processing and to make industrial and household chemicals such as detergents, paint thinner, drain cleaner. Hydrogen was used to produce hydrogen peroxide, used in bleaching, antiseptics, and cosmetics and ammonia, used in pharmaceuticals, cleaning products, and fertilizers.

99 B140259, B140265, and B140244, AO. Files on industrial pollution, 1970-71, B280060, RG 3-26, AO. Files, “6025.7, Mercury” 1970-1975, Box 2, B397137 and Box 3, B397138, RG 1-282-1, AO.

concerned enough to test some mud samples that they had taken the previous summer for mercury, and in the summer of 1969, they instructed Dow Chemical to stop dumping mercury into the Detroit River/St Clair River system. In September 1969, both Fimreite and the OWRC independently sent fish samples from the St Clair River to a laboratory in California to measure the mercury content of the tissues. The tests came back in January 1970, and the government of Ontario sent the OWRC’s to be checked again at a Canadian federal laboratory in Winnipeg, which confirmed dangerously high mercury levels in March 1970.101

Intense pressure to define the scope of the mercury problem, assess the risk to humans, and decide what the presence of mercury meant for commercial fishing drove policymakers to close the fisheries on the entire Detroit River/St Clair River system from Lake Huron to Lake Erie, including Lake St. Clair and the western basin of Lake Erie itself in 1970. The bans were enacted by different jurisdictions, beginning on March 24, 1970 when the Canadian federal government banned the export of fish caught in Lake Erie and then banned commercial fishing banned on western Lake Erie, in the south end of Lake Huron, and the Ontario section of St. Lawrence River.102 This was followed by the province of Ontario’s ban on commercial and sport fishing throughout the Detroit River/St. Clair River system and Lake Erie during the first week of April.103 On April 10, 1970 a formidable group met in Toronto to discuss responses to the mercury pollution. The meeting was chaired by Ontario’s minister for Energy and Resources Management, George Kerr, and attended by a host of high level officials from Michigan, Ohio,

and the federal governments of the United States and Canada.\textsuperscript{104} After discussing the timeline of events leading to Fimbreite’s discovery, they discussed the Canadian federal and provincial closures and compared opinions about safe limits for mercury consumption. It was at this meeting that the governor of Michigan announced his intention to close his side of the Lake St. Clair and St. Clair River fisheries. The attending jurisdictions also agreed to share information about the problem as it developed, which was logical but redundant.\textsuperscript{105} Americans and Canadians had already been using efficient transboundary professional networks to cope with the problem for several years when the April 10 meeting occurred. On the American side, the bans were made by state governments after the meeting with Canadian officials: Michigan closed the commercial and sport fisheries in the Detroit River/St Clair River system on April 11, then Ohio closed the commercial fishery in the western basin of Lake Erie on April 13, and finally Michigan closed the fishing on its portion of Lake Erie on April 30, 1970.\textsuperscript{106}

At the same time, the federal, Ontario and Great Lakes state governments began mercury research and monitoring programs and required two companies, Dow Chemical and Wyandotte,

\textsuperscript{104} Chaired by George Kerr, Minister of Energy and Resources Management. Also attending from Ontario: ministers of Health and Municipal Affairs, the Cabinet Secretary, many Deputy Ministers, and the Chair of the Ontario Water Resources Commission. From Michigan: the state Governor, a state Senator and a state Representative, the directors of the Departments of Public Health and Agriculture, and the Secretary of the Michigan Water Resources Commission. From Ohio: the Director of the Department of Health, the head of the state’s Food and Drug Administration, and the head of the Division of Wildlife for the Ohio Department of Natural Resources. From the US federal government: representatives from the Department of Interior, the FDA, and the Federal Water Pollution Control Administration. From the Canadian federal government: the head of the Canada Centre for Inland Waters, representatives from the departments of Fisheries and Forestry, Energy, and Mines and Resources. “Minutes, International Meeting on Mercury in the Environment” April 10, 1970. Ontario Parliament Building, Toronto, Ontario. File, “Interrogatory Answers - Doc. ODA - Interrog. 2, Items 11-17, 1970,” Box 5794, Series 2253, OHS.
\textsuperscript{106}Montague and Montague, “Mercury: How Much Are We Eating?” 54.
to stop discharging pounds of mercury per day into the Detroit River/St. Clair river system.\textsuperscript{107} Ohio and Ontario began a pair of coordinated lawsuits against the two companies at the same time as the closures. The Great Lakes Fisheries Commission was one fact-finding group among several that were involved in the transnational mercury investigations of the early 1970s, including the province of Ontario working with First Nations groups, the US Army Corps of Engineers, the state of Ohio, academics, fishermen, the US federal EPA, and Environment Canada.\textsuperscript{108} Widespread concern about well-publicized mercury poisoning disasters such as the citizens of Minamata, Japan had suffered – the case most often mentioned by people around the Great Lakes – provided an extra political boost to the negotiations for the Great Lakes Water Quality Agreement.

\textit{Conclusions}

Given the power of their shared culture of science and technology to facilitate cooperation, the failure of the United States and Canada to create uniform fishing regulations is an interesting puzzle. Fisheries managers and scientists on both sides of the border tried to apply technical solutions to their hatcheries and to draft regulations. However, professional fishermen, who also claimed technical expertise, disagreed with their conclusions, and conflicting ideas prevented any joint action to support the fish populations. The conflicting opinions and longstanding failure to collaborate was likely due to a combination of factors. Scientific understanding of the lakes and the fish was rudimentary. There was no quick, technological solution to the problem, such as chlorination for waterborne disease, and neither


governments, academic or private actors chose to fund the research needed to understand the problem more fully. At the same time, the commercial fisheries were a fairly small part of the regional economy and, as the economy of the lower Great Lakes grew more industrial and diverse over the course of the twentieth century, fishermen became a smaller proportion of the labor force and their concerns became less important to politicians. Finally, the fisheries were a smaller and smaller part of most residents’ daily lives, whereas problems such as the taste of phenols and the toxicity of mercury in fish grew more and more important in the popular imagination and regional politics.

Introduction

The rehabilitation of the North American lower Great Lakes is a rare, precious example of successful transboundary environmental management. Nonetheless it is very poorly understood. Even now, the people who live around Lake Erie and Lake Ontario are firmly convinced that the lake water is dangerous. Locals make wry jokes about their water quality (“Sure, it’s a great for fishing, if you like fish with five eyes”), tell vivid stories about the extent of the pollution (“I remember when the river caught fire and burned for a week”), and warn each other away (“Don’t go swimming if you plan to have kids”). At the same time, most residents will admit that the pollution has been significantly reduced since the 1960s. Swimming in urban areas has been safe for nearly twenty years, and municipal websites maintain water quality indexes for water sports like kayaking and rowing.

The popular account of this massive, fairly rapid improvement is that in 1965, a report on Great Lakes pollution from the International Joint Commission (IJC)¹ prompted a wave of environmental activism as people around the lakes to pressed their governments to improve water quality. In response, the story goes, Canada and the United States used those IJC reports to create the Great Lakes Water Quality Agreement (GLWQA) in 1972 and worked together on banning phosphate detergents and other pollutants. It is certainly true that the GLWQA was a landmark achievement. It is the bedrock of Great Lakes water management, a binational structure that brings together eight states, two provinces, two federal governments, numerous municipalities, industrial companies, First Nations, Native American groups and shoreline

¹ A binational treaty organization created in 1909 to manage the US-Canadian boundary waters, the IJC answers questions referred to it by the two federal governments and oversees projects that affect the levels and flows of shared waterways.
property owners. By setting up common water quality standards, identifying problem sites and laying out a road map to reach them, the Agreement has been very successful.

However, there are major flaws in this happy story. First, the International Joint Commission never does any research without explicit instructions from Canada and the US, which are laid out in a formal reference. The Commission’s devastating reports of the mid-1960s beg the question: what prompted the governments to ask for them? Second, the Great Lakes Water Quality Agreement is too large and complex to have been created a mere three or four years after public protests began in the late 1960s.² The work of creating brand-new technical standards that were acceptable to twelve governments took more than a couple of years. So, what is the real origin of the Great Lakes Water Quality Agreement?

The origin of the current binational pollution management regime has very little to do with classic international relations, conservationism or counterculture environmentalism. Archival research demonstrates that the Great Lakes Water Quality Agreement grew out of a series of improvised responses to acute pollution problems in the waterways that link Lake Huron to Lake Erie and Lake Erie to Lake Ontario, which are known as the connecting channels. The roots of the agreement are closely entwined with the environmental history of the region’s industrial development and with official responses to the evidence of pollution provided by residents’ noses, eyes and tongues during the last years of World War II.

During the first half of the twentieth century, the lower Great Lakes experienced an enormous expansion of industrial capacity, urbanization and population growth. This put pressure on water supplies near cities and towns, and when these stresses occurred along the US-Canada border, there were often calls for cooperative transboundary remediation and even

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some attempts by civil servants to organize a response. However, none were even marginally successful.

During World War II, Canada and the United States transformed their bilateral relationship through two unprecedented agreements. The first, made at Ogdensburg in 1940, created a Permanent Joint Board for Defense (PJBD) with equal numbers of Canadians and Americans. During the war years, the PJBD became an efficient forum for Canadians and Americans to discuss such topics as hemispheric defense, the use of bases and resources, and the clarification of their command structures in the event of joint military operations. The second agreement, more directly relevant to the Great Lakes, was the Hyde Park Declaration of 1941. It was a unique defense production deal under which Canadian products could be sold to the United States for the war effort, and British buyers could use their U.S. Lend-Lease dollars to buy Canadian products.

The Hyde Park Agreement led to the creation of ten industry-specific sub-committees, composed of US and Canadian businessmen and procurement officers who formed professional and personal networks that long outlasted the war. As a result, Canadian and American war production industries became so closely integrated that Canadian diplomats complained about the possible dangers of too-close association with the United States.

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In four short years, joint war production shaped the Great Lakes region quite decisively.\(^5\) As a result of the Hyde Park Declaration and its related cooperative production, the industrial development of the region intensified during the war years and continued at a high level afterwards. By bringing Canadian and American industrialists in the Great Lakes basin into closer contact, joint defense production fuelled joint ventures after the war. American investment on the Canadian side of the Lakes increased both during and after the war.\(^6\) The corresponding pollution also intensified and continued. In 1944, ad hoc investigations in the connecting channels by teams of Americans and Canadians found so many pressing problems that in 1946 the two federal governments gave the International Joint Commission a reference to investigate.

The several factors that distinguished the successful efforts of the late 1940s from earlier attempts at cross-border pollution abatement were as follows. First, the industrial pollution in the connecting channels during World War II was worse than in preceding decades and it was very easy to identify by taste, smell and sight — its offensiveness was universally acknowledged. Second, the Canadians and Americans responsible for supplying water to the Detroit-Windsor area had a close working relationship and pressed their respective governments to act with greater urgency and better coordination than any previous group. Third, there were several important changes in institutional capacity during the 1940s: the Canadian federal government created a Department of National Welfare and Health for the first time in 1944, which began to act as counterpart to the United States Public Health Service. Also, federal bureaucrats from both countries agreed upon a procedure for investigating water pollution between 1939 and


\(^6\) "Links were especially close among the captains of industry recruited for the war effort. Their friendships and associations outlasted the war, creating connections that lasted as long as the wartime generation and that matched, in a different sphere, the linkages that already existed among Canadian and American civil servants and diplomats." Bothwell, Politics of Partnership, p 21.
1941. Finally, Canada and the United States became military allies for the first time in 1941, and began to collaborate at the national level in many new ways.

The IJC’s research for their 1946 pollution reference discovered new and immediate threats to human and ecosystem health, and it expanded during the 1950s and early 1960s. State, provincial and national pollution regulations also developed during these decades, and the parameters of the pollution problems became clearer. Finally, the IJC’s 1965 and 1967 reports were published, recommending an overarching water quality treaty and suggesting possible benchmarks for measuring progress. These reports found a wide audience at a time when environmentalism was increasingly popular on both sides of the border. The Great Lakes Water Quality Agreement of 1972 grew out of three decades of local protest, binational investigation, growing awareness of industrial pollution, and capacity-building in sub-national governments around the Great Lakes. (See Chapter 6.)

_Perception and Pollution_

Between 1939 and 1945, industrial production in Canada and the United States increased dramatically to support the Allied war effort. Even before the United States formally entered the war, Canada and Britain placed orders for vehicles, weapons and materiel with American companies under the Lend-Lease agreements. Enormous amounts of new munitions and war materiel were produced. The war also drove demand for mundane products to replace things normally produced in Europe and East Asia. Phenol loading in the connecting channels increased so much, so quickly because of the new demand for bombs, aircraft and Jeeps, but also because of increasing orders for things like soap and aspirin that could equip troops going overseas or be shipped to places where fighting had brought manufacturing to a standstill, like the Netherlands.
A large proportion of that increased activity took place in the Great Lakes region, which was already a heavily industrialized and populous region. The American Federal Security Administration (FSA) later calculated that between 1940 and 1944, the War Production Board authorized new manufacturing facilities worth $929,253,000 in the four Michigan counties that bordered the connecting channels, in addition to the existing industrial infrastructure there. The FSA’s Administrator explained that the war industries included, “pulp and paper mills, a magnesium plant, petroleum products processing plants, and TNT and chemical plants, all of which are known to contribute pollution that detrimentally affects the operation of water treatment plants and the quality of the water from these plants,” in addition to synthetic rubber plants and refineries on the Canadian side. With this expansion of industry, and in particular the expansion of heavy industry reliant on petroleum derivatives, came a concomitant increase in chemical pollution. The urgency of wartime industrial production trumped other concerns, including pollution control. Any initiatives that might threaten the volume and pace of war production seemed unpatriotic and even treasonous to the Allied cause. As a Canadian official explained in 1945, the waterworks staff of Windsor and Detroit tried to minimize press coverage of the pollution problems between 1939 and 1944, “as this was not a time for any international difficulties.” In these circumstances, the threshold for local pollution tolerance was especially high while the war’s outcome still seemed uncertain, and only a bit lower in its final months.

The unusually acute wartime pollution was first apparent in the connecting channels that link Lake Huron to Lake Erie and Lake Erie to Lake Ontario, watercourses which include the Detroit River, St. Clair River, Lake St. Clair, and the Niagara River. The densest concentration of industrial activity was located along these waterways because they were (and still are) the

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8 Letter, Mr. Keith to F. M. Brickenden, May 14, 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC
sites with the best access to waterborne and rail transportation, and were close to hydroelectric power and urban working populations. Urban areas mirrored each other across the international boundary: along the Detroit River were Port Huron, Michigan and Sarnia, Ontario as well as Detroit, Michigan and Windsor, Ontario.

Figure 14. The Connecting Channels between Lake Huron and Lake Erie

The Niagara River wound through a packed municipal landscape that included Buffalo, New York; Fort Erie, Ontario; and Niagara Falls, Ontario.

Figure 15. The Connecting Channels Between Lake Erie and Lake Ontario\(^{10}\)

In addition to the sheer volume of additional pollution, the early years of wartime production also saw a dramatic increase in plastics that had been invented just before the war (polyester, nylon, and acrylic) and totally new chemical pollutants invented in the United States for the war, including synthetic rubber, modified cordite, napalm, and cyanamid resin (a precursor to fiberglass). These novel substances and the wastes from their production entered the connecting channels without treatment, where they also interacted with each other. Given this increasingly complex waste stream entering the connecting channels, it is hardly surprising that the quality of the local drinking water began to suffer. In the early 1940s, local waterworks and municipal governments received larger and larger numbers of complaints from rate-payers about the taste and smell of their water, and the unhappy residents singled out a class of chemicals, phenols, as a particular problem.

Phenol, named for the French word for benzene, is an aromatic organic compound. Any organic molecule containing a hydroxy group (HO-) bound to a benzene-like ("aromatic") ring is a phenol. In the 1940s, the term ‘phenol’ was used in popular parlance to refer to all chemicals in the benzene family. Phenol and its derivatives were initially produced from coal tar, but are now synthesized from petroleum. Some humans describe benzene and other phenolic chemicals as having a ‘sweet, tar-like’ odor, somewhat like gasoline. These chemicals are acutely poisonous when breathed or ingested directly, and long-term, low-dose contact with phenols is both toxic and carcinogenic. Long-term effects of exposure to phenols include damage to bone marrow and red blood cell production, leukemia, and hormonal problems.\

The many, many chemicals and consumer products that contained benzene derivatives from the 1940s until the 1970s have now been almost entirely reformulated without them because of the compound’s toxicity. During the middle decades of the twentieth century, these chemicals

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were key ingredients in a vast array of many common products, including disinfectants, plastics, explosives, epoxies, rubber, Bakelite, nylon, detergents, paint stripper, spot remover, herbicides, photographic developers, lubricants, dyes, fertilizers, preservatives, paper, soap, and pharmaceuticals.

Phenols were hardly the only chemicals going into the rivers, but the archival record shows that people easily perceived and recognized them. Because a high proportion of the complaints about water quality referred to phenolic smells and tastes, they were the first target of cooperative efforts to define and address the channels’ pollution problems, an effort which became the focus of the significant transboundary research and control effort that underlies so much Great Lakes water policy today. The Chief of Canada’s Public Health Engineering Division summarized the situation for his Minister in 1948,

> With the outbreak of World War II, additional industries were constructed and changes in population occurred which again increased the amount of pollution in boundary waters. This eventually led to the occurrence of offensive tastes in the water supplies of Windsor and Detroit which were believed to be due to the presence of excessive amounts of phenols in the river water. As a result, there was a good deal of official consideration given to the problem in 1945 by officials of Ontario, Canada and the United States.

The memo goes on to describe the precise sequence of letters and meetings which brought the problems to the attention of federal bureaucrats in the U.S. Public Health Service and the Canadian Department of National Welfare and Health, beginning in April 1945.

Phenols, then, were a common and growing part of the connecting channels pollution stream by the middle of the 1940s. They were easily identifiable and very unpleasant, although

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12 It is likely that the chemicals responsible were not (or not only) the aromatic organic compounds, but rather the chloro-phenols that are formed when chlorination is used to disinfect drinking water. Prof. Peter Campbell, Professor of ecotoxicology and geochemistry, Institut national de la recherche scientifique, Quebec, Quebec. Personal communication. September 3, 2016.

their toxic properties at low dosages were unknown. People living in the affected areas complained that they could not cook with ‘phenolic’ tap water, that pets and farm animals would not drink it, and, of course, that it was undrinkable for people.\textsuperscript{14} Robert Hansen, who worked as the Superintendent of Filtration and Pumping for a small city on the western shore of Lake St. Clair, described the conditions of the 1930s to IJC staff: “Phenol . . . produced a horrible taste in tea and coffee and was even noticed in cooked vegetables. The psychological effect of the phenol taste in the water was considerable. Many people would connect whatever was wrong with the taste in the water. If their stomach was upset, if the baby was sick, if the dog ran away or the potted plant or goldfish died, water was always to blame.”\textsuperscript{15}

As people who worked for municipal waterworks fielded these local complaints, they connected them to changes they observed in the water supply at their plants. For example, Mr. A. G. Price, the manager of the Water Commission in Wallaceburg, Ontario, which is on the Syndenham River just north of Detroit, noted that taste and smell complaints began in 1943 and usually coincided with “heavy dosages of phenol” in the water supply.\textsuperscript{16} Price also described the difference between untreated and treated water. He wrote that since 1944 there had been “almost a constant oily surface to the water coming into the filters,” an oily smell unless the phenol smell was particularly heavy, and that a phenol taste was present “practically all of the


\textsuperscript{15} Description of water pollution problems in in the mid- to late 1940s, from Robert Hansen, Superintendent of Filtration and Pumping, City of Mt Clemens Water Department. “Appendix A – Extracts from paper, Public Relations Work in Mt. Clemens.” Minutes of Meeting, Advisory Board to the International Joint Commission on Control of Pollution in Boundary Waters (Lakes Superior-Huron-Erie Section. March 11, 1953. Detroit, Michigan. Folder 28, Box 7, Series A1118-80, New York State Archives, Albany, NY.

\textsuperscript{16} Mr. A. G. Price to Miss E. M. Sutherland on Feb. 28, 1949. File 370-J-4, Vol. 275, pt 12, RG 29, LAC.
time’ but could be eliminated by adding chlorine dioxide to the water.\textsuperscript{17} In many cases, towns sent similar complaints, equally tightly focused on the phenol taste and smell, to their state and provincial governments, and state officials then began to raise the matter at the national level.\textsuperscript{18} From 1944 onward, as the war news began to improve, people living and working around the connecting channels began to raise concerns about their drinking water more frequently, farther afield and with greater urgency.

It is striking that even the people in the factories contributing to the problem wanted it to be investigated. In a letter to the Department of National Welfare and Health, the town council of Moore, Ontario noted that the St. Clair River was “unfit for cooking purposes,” because of the phenol smell and blamed the problem explicitly on the Polymer Corporation, synthetic rubber factory owned by the Canadian government.\textsuperscript{19} Less than a month later, the Polymer Corporation wrote to the Canadian Minister of Health to ask when an investigation would begin to clarify the source of the phenol problems and, while not denying its role in the problem, argued that, “Since we are satisfied that we are not the sole or even the principle source of the trouble, it is only natural we would like to avoid this unwarranted publicity.”\textsuperscript{20} One example of the publicity was a

\textsuperscript{17} Mr. A. G. Price to Ms E. M. Sutherland on Feb. 28, 1949. File 370-J-4, Vol. 275, pt 12, RG 29, LAC. Price’s account describes multiple problems with taste, smell and oils in the water he supervised, and not all of them match the descriptions of phenol pollution as set forth in later peer-reviewed research. The waste streams between Lake Huron and Lake Erie were complex during this period, and the problems that Price describes were likely due to a combination of wastes. However, because waterworks managers and other experts named phenols as the problem in the late 1940s, that group of chemicals became the focus of government attention along the border.

\textsuperscript{18} “[T]he volume of wastes . . . had increased tremendously, and as every effort was made during the War period to develop munitions that would be useful in winning the War, the pollution of the boundary waters has become so great, particularly in certain areas, so that nuisance condition have prevailed, and appeals have been made by the State of Michigan to the appropriate Departments of the Government of the United states and similarly, the province of Ontario to the Department of External Affairs, for an investigation. . .” p 3. Memorandum, “Re Supplementary Estimates International Joint Commission.” August 7, 1946. File 370-J-4 pt 2, Vol 272, RG 29, LAC.

\textsuperscript{19} Town council of Moore, Ontario to Canadian Department of National Welfare and Health, November 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC.

\textsuperscript{20} Polymer Corp to Minister Claxton, December 7, 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC.
headline in the Toronto newspaper *The Globe and Mail* on December 6, 1945 asserting, “‘Ugh! Detroit’s Water Drinkers Don’t Like Phenolic Cocktails.’” The article quoted the head of the Detroit Water Board stating that phenols tasted unpleasant but were not harmful.\(^2^1\) Polymer Corporation may have been correct about their innocence: Sarnia was also the site of petroleum refineries, whose untreated wastewater streams are a known source of phenols.\(^2^2\) Regardless of the source, it is disturbing to contemplate how many carcinogens people living along the Detroit River ingested with unfounded confidence.

**Local Urgency and Capability**

The remarkable investigation that eventually led to the Great Lakes Water Quality Agreement began in the spring of 1944, as preparations for the D-Day landings gathered steam across the Atlantic. Motivated by the public outcry and sense of professional responsibility (and possibly by disgust with the flow from their own taps), the managers of the Windsor and Detroit waterworks began to collect evidence of the problem, clarify its sources and push for government-mandated remediation. Their work began with a compellingly tangible survey: from May 17 to May 20, 1944, Mr. Roberts Hulbert, the Assistant Superintendent of Filtration for Detroit, and Mr. G. H. Strickland, Superintendent of Filtration for Windsor, piloted a small boat from the mouth of the Detroit River where it flows into Lake Erie, all the way north through Lake St. Clair and up the St. Clair River to its beginning on Lake Huron. They brought a map of the waterways, with a precise grid of points marked on it, and when they arrived at each point on their map, they took a sample of the river water, smelled and tasted it, and recorded their


impressions.23 They repeated their trip and their tests from June 8-9, 1944. This remarkably selfless testing was the only method available for assessing water quality. Until laboratory tests were developed in the mid-1960s, human smell and taste were the only ways to determine the presence of benzene chemicals at low concentration. It is also an interesting demonstration of how human sensory perception and awareness of changes in the environment shaped water management policy in the Great Lakes in critically important ways.

Through initiative and teamwork, local water supply managers in Windsor and Detroit translated urgent local concerns to national-level pressure for action between 1944 and 1946. Their successful advocacy is the second reason that, after numerous failures, transboundary cooperation to address pollution in the Great Lakes started. As the pressure to winning Second World War eased into the euphoria of victory and the shared tasks of rebuilding, citizens, political leaders, business and bureaucrats found more time and attention for the pollution problems that they had ignored during the height of the war.

At first, the local waterworks supervisors brought their carefully gathered evidence to the attention of Ontario’s public health officials. Mr. J. Clark Keith, General Manager of Windsor Utilities Commission and Manager of the Windsor Water Commission, and Mr. L.G. Lenhardt, General Manager of Detroit’s Department of Water Supply, initially contacted the province of Ontario in 1944, but after six months without a meaningful response, they shifted their attention

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to the federal level. They maintained a constant pressure on their respective federal public health authorities during 1945. Keith wrote to the Department of National Welfare and Health in Ottawa nine times in five months and regularly forwarded letters from his American counterparts.24

Mr. J. C. Keith described the reason for the expedition in a letter to F. M. Brickenden, the Senior Sanitary Engineer at the Canadian Department of National Welfare and Health: “. . . there was intermittent trouble and it was more frequently encountered on the Detroit side of the river than on our own, although our intakes are probably not more than one mile apart. The tastes encountered were those which arise through phenolic contamination, and a survey was made [in May 1944].”25 The excursions became the basis for a formal letter from the Canadian Minister of Health, Brooke Claxton, to the Canadian Secretary of State for External Affairs (foreign minister) in August 1945, calling for a reference to the International Joint Commission for a transboundary investigation. Approximately half of Claxton’s letter uses precisely the same wording as Keith’s report to assert the veracity of the evidence of pollution and noting that it was “visual” and “from actual tests carried out at the site” over several months.26

The Windsor and Detroit water supply managers worked as a team to encourage their respective governments to act on pollution in the connecting channels. The Windsor manager, Keith, noted that he had been in close contact with his Detroit counterparts since his filtration plant opened in 1926, “endeavouring to ascertain the cause of unusual conditions which might be present which might be giving rise to unusual tastes, odors or general unacceptability of the

24 Correspondence: Keith to Ferguson and Brickenden, April 9, April 10, May 14, July 26, August 1, Aug 14, Aug 21 (2), all 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC. Also see, Timeline titled, “Memo: Re Boundary Waters Pollution Investigation.” N.D., judging from placement in file, 1948 or 1949. File 370-J-4, pt 1, Vol. 275, RG 29, LAC.
water which was being furnished to citizens on either side of the river at that particular moment.” Local capacity to notice transnational problems and confer or collaborate had been part of the political landscape around the lower Great Lakes for decades, a function of shared geography and professional responsibilities. (See Chapter 3). In 1944, pushed by worsening pollution and perhaps facilitated by the new wartime alliance, local collaboration moved from trouble-shooting to advocacy for a joint response at the international level.

Federal officials in both countries began to try to address the problem late in 1945, and phenols were singled out for high priority attention at a time when many kinds of pollution, both new and familiar, were all increasing simultaneously. In letters from the Canadian Minister of Health to the Secretary of State for External Affairs, in the minutes of the inter-departmental meetings that decided the terms of reference for the joint Canada-US submission to the IJC, and in engineers’ memos in the Department of National Welfare and Health, ‘phenolic wastes’ were the only kind of pollution mentioned in connection with the IJC’s new reference. The phenols were the tangible problem that was upsetting residents of the lower Great Lakes region, and although they were believed to be non-toxic, the perceptible pollution was the problem that policymakers sought to fix.

There was a consensus in the Detroit-Windsor sanitation engineering community about the primary sources of the phenol pollutants. That consensus, and the data that the Windsor Utilities Commission and the Detroit Water Commission collected in 1944-45, were important in shaping the early binational investigation. The manager of the Windsor Utilities Commission identified two factories to the Canadian government as the most likely culprits for the 1944

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28 File 370-J-4, pt 1, Vol. 275, RG 29, LAC.
29 Correspondence: Keith to Ferguson, July 26, 1945; Ferguson to Keith, August 2, 1945; Claxton to Martin, August 3, 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC.
waves of phenols, but also noted that the plants’ staffs were very cooperative about sharing data.\textsuperscript{30} Based on the data collected in 1944 and observations during the war years, professionals on both sides of the border identified the privately-owned Imperial Oil refinery at Sarnia and Polymer Corporation, a Canadian government-owned synthetic rubber factory, as the source of the problems. As one manager diplomatically phrased it, “At no time have we made a positive statement as to the source of this trouble, but it is rather obvious to all parties who have investigated the problem that it can be confined to one or two sources on the Canadian side of the River.”\textsuperscript{31} (This is not to say that no American companies were contributing to the problem, but the people on the ground at the time ascribed the problem to that refinery and that rubber factory.) By the late 1940s, this information was widely distributed among local water supply experts and among federal, state and provincial civil servants.\textsuperscript{32}

When not writing for the public, officials do not seem to have been in much doubt about the sources of phenol and they routinely shared their data on phenol pollution. From their point of view, the value of an investigation by the federal, state or provincial governments, or by the International Joint Commission, would be to confirm what they already knew in a way that could be used to insist on a change in behavior. Waterworks staff and local officials became valuable sources of information for the foreign policy professionals in Washington and Ottawa and for IJC researchers, because their internal records, memories and opinions were often the only record of the conditions that had prompted the public outcry.

\textsuperscript{30} File 370-J-4, pt 1, Vol. 275, RG 29, LAC.
\textsuperscript{31} Keith to Brickenden, May 14, 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC.
\textsuperscript{32} Faust to Ferguson, April 10, 1945. File 370-J-4, pt 1, Vol. 275, RG 29, LAC.

Dr. Faust from Michigan’s Division of Water Supply wrote to Ferguson a few weeks later to enquire whether Ferguson’s office might be able to share data with him. Faust wrote nonchalantly about the “government owned synthetic rubber plant at Sarnia . . . water supplies of the Cities of Detroit and Wyandotte have been affected by these trade wastes . . . [hopes to get] some type of informal statement as to your findings and the possibilities of solution.”
There was remarkably little nationalism or blame-casting among the water supply professionals in the correspondence of this period, though journalists occasionally blamed ‘the other side’ reflexively. Keith pointed out to Canadian officials that the Americans in Detroit could have gone to the press with a damming account of Canadian industries, yet had restrained themselves for the sake of the war effort.33 Both Keith and Lenhardt empathized with the ratepayers whose water was undrinkable, and Keith empathized with his Detroit counterpart, noting that Lenhardt’s utility was criticized for the water quality and did not blame it on Ontario as they could have. Wartime exigencies certainly exacerbated the region’s longstanding pollution problems, but arguably the new US-Canadian alliance and shared wartime experience at the federal level also facilitated the 1946 reference to the International Joint Commission, mirroring the well-established local professional network that had grown up along the connecting channels.

The Impact of Alliance

A cluster of developments in policy-making at the federal level made it easier for Canada and the United States to work together on pollution abatement in the connecting channels in 1944. The Lend-Lease arrangement and wartime alliance created powerful new links between Ottawa and Washington in many policy areas. The evolution of the broader Canada-US relationship, and especially the integration of the two countries’ defense procurement processes during World War II, had as great an impact on the ecology of the Great Lakes as any of their joint fisheries, canal building, or sanitation policies.

Before World War II, Canada and the United States were not military allies and never had been. Canada’s fear of American aggression and her commitment to close strategic ties

with the British Empire were strong throughout the 1930s. Until the outbreak of World War II, Canada-US economic cooperation was limited, especially by comparison to the dense network of connections that existed by the time the war was over.

During World War II, Canada and the United States transformed their bilateral relationship through two unprecedented agreements. The first, made at Ogdensburg in 1940, created a Permanent Joint Board for Defense (PJBD) with equal numbers of Canadians and Americans. During the war years, the PJBD became an efficient forum for Canadians and Americans to discuss such topics as hemispheric defense, the use of bases and resources, and the clarification of their command structures in the event of joint military operations.

The second agreement, perhaps more relevant to the Great Lakes, was the Hyde Park Declaration of 1941. It was a unique defense production deal under which Canadian products could be sold to the United States for the war effort, and British buyers could use their U.S. Lend-Lease dollars to buy Canadian products. The Hyde Park Agreement led to the creation of ten industry-specific sub-committees, rather than a single institution like the joint defense board. Each subcommittee was composed of US and Canadian businessmen and procurement officers who formed professional and personal networks that long outlasted the war. As a result, Canadian and American war production industries became so closely integrated that Canadian diplomats complained about the possible dangers of too-close association with the United

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States. Wartime integration continued after the conflict and shaped Canada-US economic relations.

As a result of the Hyde Park Declaration and its related cooperative production, the industrial development of the region intensified during the war years and continued at a high level afterwards. By bringing Canadian and American industrialists in the Great Lakes basin into closer contact, joint defense production fuelled joint ventures after the war. American investment on the Canadian side of the Lakes increased both during and after the war. Joint defense production fostered joint institutions and transformed the larger bilateral relationship, but the effect of the military and diplomatic alliance on environmental policy cooperation is less clear. The direct effect of Canada-US joint defense production around the lakes was to increase pollution with little regard for long-term damage, but the experience of alliance facilitated communication about the water problems at Detroit, Windsor, Buffalo and Niagara Falls.

New Congruence at the Federal Level: Capacity and Processes

At the same time as the American-Canadian alliance was being formed, the two countries were increasing their capacity to cooperate on pollution issues. Between 1941, when the previous pollution control attempt failed, and 1944, when the first successful one began, two new structures were put in place: a mutually satisfactory process for carrying out research into transboundary water pollution and a national-level ministry for public health on the Canadian side, functionally equivalent to the United States Public Health Service.

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38 “Links were especially close among the captains of industry recruited for the war effort. Their friendships and associations outlasted the war, creating connections that lasted as long as the wartime generation and that matched, in a different sphere, the linkages that already existed among Canadian and American civil servants and diplomats.” Bothwell, Politics of Partnership, p 21.
The concentration of population centers and industrial economy along the connecting channels was the product of more than half a century of intense development, and there had been calls for cooperative Canada-US pollution abatement in 1918, in 1926 and over a period of several years in the late 1930s. Federal civil servants, local officials and professional organizations exchanged letters and formulated careful plans for permanent, joint management of industrial pollution in the Great Lakes Region. These schemes usually assumed that the International Joint Commission would play a significant role. One effort, in particular, came close to succeeding. Between 1939 and 1941, federal civil servants from both countries and the Secretaries of the IJC worked to determine whether or not public health officials in Michigan and Ontario could begin a joint investigation into the pollution of the Detroit River.\textsuperscript{39} Public health officers in the area had asked for permission and support for a pollution investigation, and Secretary of State Cordell Hull asked the United States and Canada to examine the question. Throughout these discussions, the IJC insisted that any research that touched on the boundary waters must happen under its leadership. In particular, the Secretary to the International Joint Commission’s Canadian section, Leonard Burpee, argued that the Commission was the only institution with jurisdiction over boundary waters and that it was better-suited to execute the work than any other group, citing the IJC’s influential bacteriological survey of 1914-1918.\textsuperscript{40} Eventually, the two countries and the commission agreed on a format: any state or provincial desire for pollution research would be communicated to the federal

\textsuperscript{39} File 370-J-4, pt 1, Vol. 275, RG 29, LAC. File 370-J-4, pt 1, Vol 272, RG 29, LAC. File 1920-372, Vol 1944, RG 13, LAC. File 702-1-1(2), Vol 433, RG 23, LAC. File 702-4-1, pt 1, File 702-4-2(1) and Files 702-4-3 through 9, all Vol 436, RG 23, LAC.

\textsuperscript{40} Burpee was extremely confident in the IJC, writing to a Canadian negotiator that, “the States and Provinces as such have no jurisdiction in the matter . . . I should imagine that as soon as the States and Provinces know that the Commission had been given definite jurisdiction over this matter they will be content to leave it in its hands. “In my opinion, this underestimates the sub-national governments’ interest in their citizens’ health and the political difficulties of regulating a diverse industrial economy. L. Burpee to Dr. Wodehouse, December 4, 1941. File 370-J-4, pt 1. Vol 272, RG 29, LAC.
governments, which would give the IJC a reference. However, in 1941, the Canadian federal government ended the discussion, claiming that because no federal official had received any complaints about pollution on their side of the border, they could not justify a transboundary research effort. It is also possible that the Canadians were reluctant to begin regulating the chemical, manufacturing and refining industries that were so central to the war effort. This legalistic excuse to address the problem must have disappointed the public health officials who initiated the request.

Thus, none of the well-intentioned proposals developed any momentum. Not until the tide of the Second World War had begun to turn, and not until local residents complained for several years in a sustained, urgent way about the ‘phenolic’ tastes and smells did their governments begin to address the problems. However, the last unsuccessful push for transboundary pollution management was not entirely pointless because it clarified the legal and diplomatic procedures necessary to conduct a joint investigation. That clearly defined process was essential between 1944 and 1946, when the very well-documented complaints arrived from Detroit and Windsor.41

The other development in institutional capacity-building was a purely Canadian one: creating a federal public health service. To understand how important this was to water management in the mid-1940s, one must know a few things about the development of the Canadian federal government at this time. The Canadian federal government had far fewer resources than its American counterpart and its power was limited by relationships with its provinces and with the British imperial government. Canada became a self-governing Dominion of the British Empire in 1867, which is generally considered the beginning of the country’s

41 Indeed, after a close reading of the archival record, it seems possible that Keith and Lenhardt, the water utility managers of Windsor and Detroit, may have been particularly thorough in documenting the pollution problems because the lack of documented complaints was the pretext for not starting an investigation in 1941. Unfortunately, there are no documents that explicitly confirm this.
independence. However, the British Empire controlled its foreign policy before 1926. From 1926 until 1931, there was a Canadian Legation in Washington to keep in touch with the State Department, but its mandate was confined to binational topics. Canada only gained full control of its foreign policy and military affairs in 1931, when the British Parliament passed the Statute of Westminster. Similarly, in Canadian federalism, the federal and provincial governments had strictly assigned responsibilities, known as ‘enumerated powers,’ which assigned responsibility for health and education to the provinces. During the Great Depression and continuing through the Second World War, the Canadian federal government gradually extended into a number of new policy social areas, including public health. It first created a Department of Pensions and National Health in 1928, and replaced that with the Department of National Welfare and Health in 1944.

The gulf between the two federal public health services is apparent from the kinds of data they were able to provide to foreign policy specialists when the phenol problem arose. In August 1945, W. E. Miller, the Administrator of the United States’ Federal Security Agency, wrote to the US Secretary of State, explaining the need for pollution abatement in the connecting channels of the Great Lakes and supporting his points with detailed data. Drawing on statistics compiled by the United States Public Health Service, he described the increased population since the beginning of the war, estimated the watershed’s sewage treatment capacity, noted how many millions of dollars in war manufacturing had been added since July 1940, and even sketched the Canadian side of the equation. Conversely, there was little capacity for maintaining this kind of detailed information about Canada in the 1940s. The closest analogue to the US Public Health Service was the Department of National Welfare and Health, created in October 1944. When

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Brooke Claxton, the department's first minister, wrote to the foreign affairs minister, Paul Martin, about the problems in Detroit and Windsor, his only sources of information were the letters penned by Keith, the manager of the Windsor Utilities Commission.44

When the Canadian federal government decided to ask the United States to join them in sending the International Joint Commission a reference to study pollution in the Detroit River, St. Clair River, and Lake St. Clair, at a meeting on September 11, 1945, Canada’s new capacity to combine health, economics and foreign policy was on display.45 Present for the decision were: a legal advisor from the Department of External Affairs, the secretary of the Canadian section of the International Joint Commission, an engineer from the Department of National Welfare and Health, two engineers from Dominion Water and Power Bureau, and one representative each from the Department of Mines and Resources, the Department of Transport, and the Department of Reconstruction. Two crucial departments, Health and Welfare and Reconstruction, had only existed for a year.

In April 1946, the United State and Canada gave the International Joint Commission a reference to determine whether the connecting channels between Lake Huron and Lake Erie were polluted ‘to the detriment of health and property’ on either side of the boundary, phrasing which explicitly invoked the Boundary Waters Treaty of 1909, which designated the IJC for that task. Informally, the two countries agreed that the reference could be expanded to cover more locations later, if necessary.46 The reference also specified that if the IJC found that there was damaging pollution, it should find out how to remedy the situation. Given that the phenol issue and other pollution problems had been common knowledge for years, this may seem like a

redundant assignment, but it was in keeping with the formal protocols of the IJC’s mandate, which had been carefully designed to avoid compromising national sovereignty.

In terms of science and engineering, this was a very broad mandate, because there were no tests for many of the known or suspected pollutants. The IJC is composed of six appointed commissioners, who are traditionally engineers or lawyers with public careers and experience in water issues, as well as a few administrative staff members. In the 1940s its ranks did not include water chemists or aquatic biologists. The commissioners needed help to carry out the actual research and analysis assigned to them, and so a Board of Technical Advisors was created in May 1946. It had two representatives from each of the federal governments, two from Ontario, and two from Michigan, all professional civil servants drawn from branches of government focused on water quality. One of the Canadian federal representatives was G.H. Ferguson, the sanitary engineer to whom Keith had been writing from Windsor, and one of the Ontario representatives had been involved in the IJC’s earlier biological pollution survey. The Technical Advisors were responsible for hiring lab space, staff and equipment, and for designing and executing the research agenda for the reference.

Once the reference began, its momentum built quickly: there were many sites in the Great Lakes region that needed attention. In October 1946, the United States and Canada expanded the IJC’s reference to include the St. Mary’s River, which connects Lake Superior to Lake Huron. A year later it was broadened again to include the Niagara River, which links Lake Erie and Lake Ontario. The IJC and federal governments reorganized the original Board of Technical Advisors into two new boards. One handled all research for the waterways connecting Lakes Superior, Huron and Erie, while the other handled the Erie-Ontario set. (Lake Erie was covered twice, and the boards communicated regularly to avoid duplicating effort.)

The International Joint Commission’s 1946 reference turned out to be the beginning of several decades of sustained detailed research and constantly increasing responsibility. The
commission’s first interim report on the connecting channels in 1948 began to describe the scope of the large, extremely complex streams of waste entering the waterways and proposed water quality standards for phenols and cyanides, both high-priority contaminants. The 1946 investigations continued through the 1950s, grappling with the variety of wastes, the need to develop new tests to detect many chemicals, and the absence of established safety standards for most of the chemicals in the drinking water. Binational teams of technical advisors consulted with industry representatives, did extensive sampling and mapping in the connecting channels, and held numerous public consultations. These efforts continued as post-war demand for consumer goods kept industries humming, intensifying the pollution of the Great Lakes and their connecting waterways.

Industrial pollution was not an issue that the governments in the Great Lakes sought to collaborate upon, in the way that they eagerly worked together for the sake of cost effectiveness and efficiency when building canals and hydroelectric dams. During the twentieth century, the Lower Great Lakes were the site of numerous joint infrastructure projects that were often located on only one side of the border but were used equally by both countries after negotiation. This shared infrastructure was cause for mutual congratulations about progress and modernity. Industrial pollution was a very different topic: independent action could not solve the problems, and it did not fit into the narrative of shared prosperity and development. (See Chapter 2.) It is intriguing to see that this whole exercise in transboundary water management began, not with a policy directive in a national capital, but with an improvised response to a change in the aquatic environment and a boat ride in 1944.

Conclusions

The landmark achievement of the Great Lakes Water Quality Agreement of 1972 was the culmination of a long stream of events. To follow that stream backwards in time: the GLWQA
derived from the IJC’s comprehensive reports of the mid-1960s, and those reports were the distillation of two decades’ work, which began in 1944 with local responses to local concerns over unprecedented levels of industrial pollution and resulting bad taste and smell of drinking water.

The creation of a permanent binational management structure to address water quality problems was pivotal to the success in reducing Great Lakes water pollution, the culmination of the transition from the first generation of development-minded water management to a second generation that included greater awareness of the Lakes’ ecosystem functions. So, in a sense, the popular memory is correct: the people of the Great Lakes did force their governments to address the water pollution problems. The story is older than most people realize, and it is less concerned with environmentalism than with the deterioration of many people’s living space, human disgust and fear of poisons, and a long period of gathering ammunition to support policy change. It is also an example of the value of publicly available, publicly financed monitoring and research.
Chapter 6 — Building a New Consensus, 1944-1972

Between 1946 and 1972, water quality management on the lower Great Lakes underwent a profound transition. A new group of policies and institutions emerged, with the Great Lakes Water Quality Agreement of 1972 at its center. This new, second generation water quality management regime was distinguished by its new goal of coping with anthropogenic environmental change.

The first signs of this shift in perception and focus emerged in the mid-1940s, when the wartime increase in manufacturing around the Lower Great Lakes cities produced massive streams of pollution that provoked widespread and strident calls for water quality management. As people working in water management began to recognize the scope of human impact on the Great Lakes and take account of the lakes’ finite ability to bounce back from damage, they gradually began to treat the Great Lakes as a biological entity, in addition to a set of physical channels for transit and a source of water. Over the course of the next three decades, three entwined trends combined to put this more ecosystemic awareness into practice across the watershed: administrative capacity increased; a vast array of new data about the Great Lakes water system was produced and analyzed; and regional political culture shifted towards criticism of industrial pollution and of regional governments’ failure to regulate it.

As these three trends took hold, Americans and Canadians trying to manage the lower Great Lakes created several new transboundary institutions; repurposed some existing ones, made new informal arrangements and complementary local laws, filed joint lawsuits, installed new infrastructure, and undertook new forms of political engagement and professional practice. As this ecosystemic understanding of the lakes became deeper and more widespread, policymakers and residents adopted new goals for water management policy, which are reflected in the Great Lakes Water Quality Agreement of 1972.
It is important to remember that water policy practitioners were not starting from scratch in 1946. They kept or expanded upon many of the old transboundary arrangements for transport, dredging, lamprey control, and water border policing. They persisted in many of their older, shared ideas. However, after 1946, people around the Great Lakes became increasingly aware of the relationship between human activity and the aquatic environment. Their awareness of ecological connections grew through the constant discovery and discussion of the connections between people and their surroundings, which entered the canon of general knowledge earlier in the heavily populated, heavily industrialized Great Lakes than in most parts of North America. For example, residents became familiar with the links between people, industrial agriculture, nutrients, algae, fish kills, and people (eutrophication); between people, canals, lamprey, edible fish, and people (invasive species and loss of fisheries); between fishermen and sturgeon (loss of commercially valuable species); and between people, toxins and heavy metals, water plants, fish, and people (methyl mercury and DDT poisoning).

Residents, scientists, policy professionals, and elected officials on both sides of the border began to act upon this new understanding, slowly changing their shared management techniques and tools to reflect their new interest in water quality and ecosystem health.

This chapter is arranged to show the interactions between these three key trends and how they shaped new approaches to joint water management in two successive waves. The first half of the chapter covers the period from 1946 to 1960, shows how administrative capacity around the basin increased to collect and analyze new data, which had an impact on the culture of water management. The second half of the chapter, covering the years from 1961 to 1972, traces the connections between new knowledge and new administrative capacity, and the cultural shifts that produced the Great Lakes Water Quality Agreement. While these three trends are closely interwoven, separating and presenting them in this manner enables the reader to understand how different levels of government and different kinds of public, professional and
political actors behaved as they learned about the impact that industrial pollution was having on Lake Erie and Lake Ontario.

_The Growth of Administrative Capacity across the Boundary, 1946-1960_

Between 1946 and 1960, the jurisdictions around the lower Great Lakes expanded their administrative capacity to formulate, coordinate and execute joint policies aimed at water quality management. One of the most significant changes was that states and provinces around Lake Erie and Lake Ontario became much more involved in both domestic and international water quality management in the years following the end of the Second World War and the IJC’s 1946 reference.\(^1\) Ontario’s government, for example, dated its first serious engagement with pollution control to 1946.\(^2\) By 1950, the Ontario Conservation Authorities (approximately one per watershed) were using their new personnel and budgets to improve water quality in the Bay of Quinte, working with the Canadian federal government.\(^3\) At the same time, Ontario was discussing whether water quality monitoring should be handled by provincial or municipal bureaucracies, and what rehabilitation techniques would be most effective.\(^4\) In 1953, Ontario sent copies of its water quality objectives to New York, sharing the fruits of its policymaking in this new area without the mediation of the Canadian government.\(^5\)

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\(^1\) The Commission’s first post-war reference, assigned in 1946, instructed the organization to study whether or not the Connecting channels between Lake Huron and Lake Erie (the St. Clair River, Lake St. Clair and Detroit River) were being polluted, and whether or not boundary-crossing pollution was damaging the health or property of citizens in either country. In 1948, the reference was extended to include the Niagara River, which links Lake Erie and Lake Ontario.

\(^2\) File, “Pollution - Water, Jan 66-May 66” 1 of 2 and 2 of 2, Box 102, B290985, RG 3-26, AO.

\(^3\) The Conservation Authorities were created in 1946, each covering watershed or group of watersheds. Costs and responsibilities are shared between local jurisdictions and the province, which links each Authority’s levels of activity closely tied to local revenue and activism. As a result of the devastation and lives lost along watercourses and floodplains during Hurricane Hazel (1954), the provincial government amended the Conservation Authorities Act to allow Conservation Authorities to buy lands for recreation and conservation purposes, and to regulate that land for community safety. Box 51, RG 3-23, AO.

\(^4\) AO, RG 3-23, Box 73, B292349, file 136-G, “Humber Valley Conservation Authority”

\(^5\) Ontario objectives for Water Quality, made 1953. Folder 12, Box 8, A1118-80, NYSA.
agreeable standards for industrial pollution was, and still is, a critical part of effective abatement in shared waters.

Ontario was not the jurisdiction to disregard protocol. In 1948, the Michigan Department of Health wrote directly to Ottawa, asking for action to reduce pollution along the St. Clair River and Detroit River. Civil servants in Michigan and Ontario were in touch so frequently that they sent each other joking letters about whose employer's reimbursement process was the most miserly. Government documents are rarely amusing, in this case the camaraderie that developed in the boundary zone is readily apparent.

Hydroelectricity was another policy area where the increasing capacity of states and provinces became quickly evident in the mid-1940s. Following the costly and inconvenient brown-outs of Second World War years, New York State and Ontario met regularly, to discuss hydroelectric development on the St. Lawrence River, finally reaching an accommodation with each other and their respective federal governments in the early 1950s, which permitted the state and province to build dams and operate generating stations together across the boundary while the national governments built the St. Lawrence Seaway.

Beginning with its 1946 pollution reference, the International Joint Commission's involvement in water quality monitoring expanded significantly over a course of about three decades. State and provincial coordination also increased, because although state and provincial bureaucracies not supposed to communicate officially except through their federal governments, many employees of sub-national jurisdictions spent years working closely together via the IJC and the war effort.

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8 Multiple files, Box 74, B292350, and file 137-G, Box 75, B292351, RG 3-23, AO.
The IJC was another part of the institutional landscape whose administrative capacity was increasing. During the late 1940s, the IJC worked with state and provincial water management bodies such as the Michigan Stream Control Commission and the Ontario Water Resources Commission. Federal, state- and province-level scientists, doctors, engineers and administrators served on the Technical Advisory Boards which carried out the Commission’s monitoring program, compiling and analyzing the collected data, drafting suggestions for the Commission reports and recommendations. During the 1912 reference, jurisdictions around the Lakes had engaged in a similar lending process, which brought technical experts together regularly and strengthened informal professional networks around the watershed. Having different levels of government represented on the IJC’s technical boards reduced the cost of pollution monitoring and prevented duplication of effort.\(^9\) Making the case for smooth coordination among states, federal governments and provinces, and helping it to occur, was an essential part of the Commissioners’ work.

To complete its 1946 reference, the IJC began to collect a variety of data about pollution in the Connecting channels.\(^10\) After four years of monitoring, it presented its results and recommendations to the United States and Canada: the waters in question were badly polluted, remedial action should start immediately, and monitoring should continue.\(^11\) The Commission’s answer to the reference question - were the waters actually being polluted? - was not a surprise to anyone involved. Industrial pollution in the St. Clair River and Detroit River had been a

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\(^9\) Letter from US Chair of IJC, A. O. Stanley, to Adams, Exec Secretary and Engineer, MI Stream Control Commission., April 1949. Folder 26, Box 8, A1118-80, NYSA.
\(^10\) Interim report of Technical Advisory Board for Huron/Erie and Huron/Sup to IJC, March 1949. Folder 12, Box 8, A1118-80, NYSA.
\(^11\) Board of Technical Advisors, Lake Erie-Ontario, descriptive and data sets, Folder 10, “IJC, Monthly Reports – Canadian Section, 1948-49” Box 8, A1118-80, NYSA.
growing problem for decades, and the IJC’s work was the federal governments’ response to complaints from people on both sides. Furthermore, neither the governments nor the Commissioners expected that the reference to be a definitive solution. As one civil servant who worked on it later wrote for an audience of his peers, “It was apparent from the start [of the IJC’s investigation in 1946] that the work would be a continuing one.”

What the IJC’s report did provide was a well-supported, mutually agreeable answer that was created with input and ‘buy-in’ from both countries and the relevant states, provinces, industries, and cities.

During this period, the IJC’s role in the region occasionally branched out from its reference studies into active cooperative management. For example, in 1953 and 1954, the Commission worked with a binational group of local water management professionals to investigate complaints that coliform bacteria were going down the Niagara River from Lake Erie and jeopardizing public health along the river and the Lake Ontario shoreline. The issue was resolved without recourse to Washington or Ottawa, demonstrating that the local capacity to respond to pollution complaints had increased since the abortive attempts of the 1930s.

In addition to developing their own internal capacities for monitoring and reducing pollution, Great Lakes states and Ontario developed several new institutions aimed at smoother coordination on pollution issues. The proliferating array of acronyms in the documentary record attests to the enthusiasm for joint action during this period. The Great Lakes - Upper Mississippi River Board (GLUMRB) was established in 1950. Its goal was to create a place for water supply professionals to share ideas about new technologies and problems and to develop mutually acceptable technical standards. The organization included Canadian members in an ad hoc

13 Folder 12, “IJC – Misc. reports pertaining to areas other than New York State. 1949-54,” Box 8, A1118-80, NYSA.
fashion from the beginning. It created an Industrial Waste Committee that in 1953, which was terminated shortly afterwards for lack of results, and reanimated in 1968 at the suggestion of New York state’s sanitary engineers. It still exists, now known as the GLUMR Board of State and Provincial Public Health and Environmental Managers, showing its transnational character openly.

Barely two years later, in December 1955, regional governments created a more consequential new organization. A group of American states (Illinois, Indiana, Michigan, Minnesota and Wisconsin) signed the Great Lakes Basin Compact, which created an ‘interstate agency,’ the Great Lakes Commission or GLC. It was intended to facilitate information sharing about water issues in the Great Lakes-St. Lawrence River system. The Compact was created by the state governments without federal sanction, and each state decided for itself whether or not to join. Eventually, all of the states bordering the lakes did join. Representatives of the Ontario provincial government attended meetings regularly and shared the data and analysis created by their experts, another example of ad hoc transboundary coordination without federal interference.

In a striking example of state-to-province collaboration, a collaborative project undertaken by Ontario and Michigan in 1954 appears to have produced precisely the information that Wayne County, MI sought in the mid-1930s: tables of phenol pollution in the

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14 Memorandum “Great Lakes-Upper Mississippi Board of State Sanitary Engineers” from Dr. Thompson, Division of General Engineering, to Mr. Bogedain, Division of Pure Waters. March 13, 1968. Folder 2, Box 3, A1118-80, NYSA.
See also: Folder 2, “Great Lakes Basin Compact,” Box 3, Series B1882-05, NYSA.
16 Folder 29, IJC, “Minutes – Advisory Board, 1954-1956,” Box 7, A1118-80, NYSA.
17 It is interesting to note that a ‘Declaration of Partnership’ established associate membership for the provinces in the GLC in 1999. Folder 29, IJC, “Minutes – Advisory Board, 1954-1956,” Box 7, A1118-80, NYSA.
Detroit River, maps of where the pollution stream crossed the international boundary, and practical recommendations.\(^{18}\) (See Chapter 3.) The Ontario-Michigan study is interesting because it analyzed industrial waste without any industry participation, and without federal government permission, but included a detailed comparison to the IJC’s 1946-48 data. It is clear that the many policy-makers in the Great Lakes watershed were connecting in many new ways, at many levels between 1946 and 1960.

The emergence of state-to-state and state-to-province connections is one of the most significant changes in water management that occurred during the period 1946-1960. The province and state level was (and is) absolutely crucial to effective water management for several reasons: in both Canada and the United States, the provinces and states are responsible for large swaths of public health policy, industrial regulation, flood and irrigation policy, and local water infrastructure. State and provincial boundaries are also the units of government that come closest to covering the relevant geography for pollution abatement, making their participation essential to any sound water policy. In addition, regional water issues are very important at the state and provincial level, whereas federal governments have rarely made them a priority.

In addition to these developments, there was a small amount of interaction between the state-province level and the federal governments on the other side of the boundary, a departure from standard diplomatic procedure that was driven by geography and practical necessity. For example, the province of Ontario worked with the American Fish and Wildlife Service on Lake Huron during the mid-1950s.\(^{19}\) This kind of work was in keeping with the longstanding professional networks around the basin, such as the fish-egg collection between Canadian, New York and Ontario hatchery staff in the pre-war decades. (See Chapter 4.)

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\(^{18}\) Ontario-Michigan phenols report, 1954. Folder 12, Box 8, A1118-80, NYSA.

\(^{19}\) Folder 29, IJC, “Minutes – Advisory Board, 1954-1956,” Box 7, A1118-80, NYSA.
During the period from 1946 to 1960, state and provincial administrative capacity for water management grew, both internally and in the form of new cooperation with other sub-national jurisdictions, national governments, and the IJC. Bilateral cooperation between Canada and the United States continued and deepened during this time on several fronts as the Cold War intensified, and existing transboundary organizations like the Great Lakes Fisheries Commission continued their work. No basin-wide environmental movements had emerged by this point.

Data collection and analysis, 1946-1960

Pollution monitoring and research were two of the primary reasons for new connections between jurisdictions. One crucial component of the change in water management goals between 1946 and 1960 was the gradual growth of information about the lower Lakes’ and connecting channels’ water quality problems and, equally important, the growth of new shared knowledge derived from that data. For the reams of samples, statistics, and observations to have any practical value, they had to be analyzed and understood, which required time and effort from trained people. Finally, in order for their analysis to have an impact on water policy goals and institutions, policymakers at multiple levels in both countries needed to accept the expert analysis. The technical advisory boards of the International Joint Commission were the primary mechanism by which new information about water pollution was collected, jointly analyzed and transmitted to the bureaucracies on both sides of the border.

Between 1946 and 1948, an IJC technical advisory board studied the channels between Lake Erie and Lake Huron. When the IJC’s reference was extended to include the Niagara River in 1948, its purview expanded, too. The minutes of the IJC’s technical advisory board provide a detailed picture of how Canadians and Americans increased their shared knowledge of the lower Lakes’ water quality issues. The advisory board met in person at least once a month,
covering the division of labor between labs and field teams, accounts of progress on data collection, analysis of the field tests and lab results, and commentary on the public hearings that board members held.\textsuperscript{20} They also interviewed staff from local sewer authorities and treatment plants, mayors and other city officials, federal officials who worked on transboundary channel dredging, and staff of local businesses. IJC field teams conducted site-by-site visits to the industrial properties along the banks of the connecting channels and shorelines. They approached industry data with caution, weighing whether or not to accept factories’ data and whether or not they could grant requests for confidentiality.\textsuperscript{21} The board members’ records of these interactions include many expressions of concern about the impact of industrial pollution on health and property and vivid descriptions of the problems, but there is little record of contrition or assumption of responsibility from any party.\textsuperscript{22}

The various state, provincial and federal employees who served on the Technical Advisory Board reported regularly to their governments.\textsuperscript{23} These reports were important because they were the first, most formative interpretations of the new data collected for the IJC’s reference. The technical advisors’ choice of emphasis set the framework within which policymakers’ decisions were made, in the same way that federal researchers’ characterization of the lower Great Lakes fisheries’ problems as the result of overfishing, rather habitat reduction or chance variation, influenced fisheries policy. (See Chapter 4.) In this period of unprecedented environmental change, arguments about the problems that were backed by empirical observation and scientific authority were powerful shapers of opinion. The Technical Advisors’

\textsuperscript{20} Folder 27, “IJC, Minutes, Advisory Board, 1948-51,” Box 7, A1118-80, NYSA.
\textsuperscript{21} Folder 27, “IJC, Minutes, Advisory Board, 1948-51,” Box 7, A1118-80, NYSA.
\textsuperscript{22} July 1949. Folder 27, “IJC, Minutes, Advisory Board, 1948-51,” Box 7, A1118-80, NYSA.
Earl Devendorf, assistant director of Sanitary Engineering, correspondence, 1948. Folder 13, “IJC Objectives for Boundary Waters Control,” Box 8, A1118-80, NYSA.
\textsuperscript{23} Earl Devendorf, assistant director of Sanitary Engineering, correspondence, 1948. Folder 13, “IJC Objectives for Boundary Waters Control,” Box 8, A1118-80, NYSA.
work was both an influential force shaping the discourse of water management during this period and an indication of the increased administrative capacity of their home jurisdictions.

The Technical Advisory Board’s first Interim Report, submitted in March 1949 built upon observations made since 1946, comparing them with IJC data from a 1912 reference and drawing upon the memories and opinions of people living along the connecting channels.24 This local input was essential to sketch in the gaps in the data series.25 The Interim Report estimated volumes of waste produced from businesses’ private plant outfalls and from municipal outfalls, and attempted to quantify and describe the waste stream, with sections for phenolic waste, cyanides, ammonium, oils and solubles, suspended solids, and biological oxygen demand. Describing conditions on the ground, the report included frequent references to the fact that their findings supported longstanding complaints and noted the problems that pollution posed for shoreline property owners, recreational users, domestic users, and animals. The Technical Advisory board suggested that federal, state or provincial governments should ‘promptly’ fund water treatment infrastructure, appending a list of cost estimates and noting the inability of some municipalities to pay for waste treatment. They also recommended that the IJC’s monitoring and evaluation should continue.

These ideas were very influential: the IJC endorsed the technical advisors’ call for new funding for municipal-level water treatment, and also called for harmonized water quality standards and for continuing and expanding the IJC’s reference to include Lake Ontario and the St. Lawrence River. The question of whether or not to study other parts of the watershed was framed as a question of provincial-federal politics, indicating the large role that state and

24 Comparison with 1913 data, p 5. Folder 12, “Interim Report of Technical Advisory Board to the International Joint Commission, March 1949,” Box 8, A1118-80, NYSA.
25 Folder 13, “IJC Objectives for Boundary Waters Control,” Box 8, A1118-80, NYSA. Folder 12, “Interim Report of Technical Advisory Board to the International Joint Commission, March 1949,” Box 8, A1118-80, NYSA.
provincial governments played in defining the character of transboundary cooperation in this policy area. The IJC’s recommendations to the United States and Canada were less ambitious in 1950 than in 1920, in that they did not propose any transnational enforcement mechanisms. However, unlike those in 1920, but they were adopted immediately and without alteration by the two governments.

In 1951, the jurisdictions involved agreed to give the IJC a mandate to conduct ongoing pollution monitoring and research. Two newly assigned Technical Advisory Boards, one for the upper lakes and Lake Erie (Superior-Huron-Erie) and one for Lake Erie and Lake Ontario, were created to monitor pollution indefinitely and report to the IJC. (The Superior-Huron-Erie board included the Western Basin of Lake Erie, which received pollution from the St. Clair and Detroit Rivers. The Eastern Basin of Lake Erie, whence pollution flowed down the Niagara River, which was covered by the Erie-Ontario board.) In addition, it was a substantial innovation for these multiple levels of government to permit the assignment to the IJC of a task that was neither an application nor a reference as originally conceived. The choice was not marked by a new treaty, but it was made and supported with regular practical commitments of people and money. The region’s oldest transnational water management institution was adapting its role in response to the environmental problems of the later twentieth century, well before the North American environmental movement was well underway and well before the publication of Silent Spring (1962). This commitment to monitoring and surveillance did not, by itself, reduce the pollution

26 Dec. 1949 minutes. Folder 27, “IJC, Minutes, Advisory Board, 1948-51,” Box 7, A1118-80, NYSA.
27 The United States and Canada, Michigan, Ohio, Ontario, Pennsylvania and New York
29 This is not to say that Silent Spring was not extremely influential around the Great Lakes and in the United States and Canada more generally.
of the Great Lakes, but it continued the learning process, ensuring that data were available to support future research, policy and activism.

Following the new mandate, in the early 1950s, the state and local governments of New York, Ontario, Michigan, Ohio and Pennsylvania worked with IJC commissioners and technical advisors to conduct another set of site surveys and interviews with industrial polluters. Civil servants in each jurisdiction wrote to local industries on behalf of the IJC, asking for detailed accounts of their waste streams, and received strikingly complete and apparently candid responses from large companies such as Bethlehem Steel, Union Carbide, Durez Plastics, DuPont, Niagara Alkali, and International Paper. Companies also provided self-reported data. In addition to their river testing, the IJC boards conducted research projects with the industries whose wastes were causing problems. In cases where the waste streams contained new or proprietary materials, IJC board members worked with private sector scientists and academics to develop lab tests to detect the presence of pollutants and to find ways to treat water that could reduce unpleasant tastes and smells in drinking water.

The binational data collection and analysis effort began as a result of complaints about the taste and smell of drinking water from the Detroit River in 1944, and that remained an important concern of the researchers. The IJC’s 1952 report to the federal governments

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30 Folder 24, “IJC, Industrial waste and General Correspondence,” Box 7, A1118-80, NYSA.
31 It is difficult to assess the accuracy of these self-reported waste statistics, because there are no other sources for comparison. However, the companies’ reports all list appalling volumes of all kinds of toxic pollutants, dumped without any attempt at treatment or recovery of waste. Presumably false reports would not be so damning. Folder 10, Box 5, Lake Erie and Niagara River, Series A1120-80, Drainage Basin Subject Files, NYSA.
32 Example: Report on Semet-Solvay Division of Allied Chemicals, 1955-57. For each sort of waste treatment described, there’s a note about how a big proportion of it is overflowing raw into river. Folder 1, “IJC, Miscellaneous reports, 1955-1957,” and Folder 2, “IJC, Miscellaneous reports, 1958.” ,” Box 8, A1118-80, NYSA.
33 Folder 1, “IJC, Miscellaneous reports, 1955-1957,” and Folder 2, “IJC, Miscellaneous reports, 1958,” Box 8, A1118-80, NYSA. Folder 29, IJC, “Minutes – Advisory Board, 1954-1956,” Box 7, A1118-80, NYSA. Folder 12, “IJC – Misc. reports pertaining to areas other than New York State. 1949-54,” Box 8, A1118-80, NYSA.
described some progress in municipal sewage treatment (Lake Erie, Lake Ontario) and on industrial waste disposal, though not enough to solve the quality problems.34 Between 1955 and 1957, the technical boards conducted a town-by-town taste survey, as well as a number of careful field trips to assess the smell and taste of the Connecting channels and inshore areas of the lower Lakes.35 To the frustration of residents, both smell and taste remained problematic.

The binational research teams also tried to determine the impact of pollutants on other species, tracking fish kills and bird kills along the waterways covered by the reference.36 Public-private collaboration in the middle 1950s focused on inventing tests for heavy metals and cyanides, which were known to be acutely toxic but whose impact at low dosage over a long period was unclear.37 In this area of research, the technical advisors frequently noted that their understanding of the processes was limited, for example, questioning whether or not fish toxicology was well enough understood to set a cyanide limit.38 The studies and data sets produced during this period of intense learning, from 1946 to 1960, were at the frontier of knowledge about the impact of industry on aquatic environments.

Over the course of the 1950s, as technical advisors collected and processed new data, they learned about the ways pollution flowed between the different Lakes, and their reports to the IJC generally recommended that their monitoring should expand to cover larger areas to more accurately reflect the network of relevant ecosystems.39 They grew convinced that the

34 Folder 16, “IJC – General Correspondence, 1928-1952,” Box 7, A1118-80, NYSA
35 Folder 12, “IJC – Misc. reports pertaining to areas other than New York State. 1949-54,” Folder 1, “IJC, Miscellaneous reports, 1955-1957,” and Folder 2, “IJC, Miscellaneous reports, 1958.”,” Box 8, A1118-80, NYSA.
36 Folder 13, “IJC, Fish Kills,” Box 7, A1118-80, NYSA.
37 Folder 29, IJC, “Minutes – Advisory Board, 1954-1956,” Box 7, A1118-80, NYSA.
38 G. E. Burdick to the New York Department of Health in 1954. Folder 13, “IJC Objectives for Boundary Waters Control,” Box 8, A1118-80, NYSA.
39 For example, one board’s minutes note their support for extending the pollution reference to the main body Lake Erie because phenols from Toledo and Cleveland were travelling to Buffalo. Folder 29, IJC, “Minutes – Advisory Board, 1954-1956,” Box 7, A1118-80, NYSA.
relevant geographic unit for water quality management was the watershed, not surface water. These years of monitoring, analysis and reporting increased the technical advisors’ awareness of the unintended consequences of past and present infrastructure development. For example, in 1951 they engaged in careful discussion of the relationship between dredging and pollution. These revelations slowly began to inform the IJC’s policy recommendations and the advisors’ work in their home departments.

While the IJC’s work was central to the creation of new knowledge about pollution during the 1946-1960 period, it was not the only mechanism involved. Informal professional networks of technical experts, academics and policymakers continued to exchange information, as they had done for decades. Direct Canadian-American cooperation at the federal level continued and deepened as the two countries moved into close Cold War alliance, collaborating on many scientific and engineering projects that received public funding and official attention, especially in defense and infrastructure. As mentioned above, states and provinces also began to collaborate directly, a very new phenomenon.

This ongoing internal and bilateral water quality research drove new conclusions about pollution policy that paralleled the IJC’s findings. For example, in 1952 a group of Ontario engineers discovered that industrial pollution from Lyons Creek, near Welland, Ontario, was finding its way into the Niagara River, about twelve miles (20 km) away. They had not thought that was possible for pollution from so far away to affect a boundary river. Revelations like these contributed to a better understanding of how watersheds and groundwater function, replacing older ideas that equated water management with control of surface water (visible lakes and rivers) and influencing later policies.

40 1951 May 28, Folder 27, “IJC, Minutes, Advisory Board, 1948-51.” Box 7, A1118-80, NYSA.
41 Pollution Survey of Lyons Creek, Ontario, 1952 by IJC tech. and board, done by Nat’l Health, Ont Health and Ont Lands and Forests. Folder 12, “IJC – Misc. reports pertaining to areas other than New York State. 1949-54,” Box 8, A1118-80, NYSA.
Another group of fact-finders was at work in the private sector. The private companies that operated waste-producing factories in the region cooperated with the government studies, but they also conducted their own research. For example, a group of companies operating on the St. Clair River hired a consultant, a Mr. Beak, to conduct bio-assay testing on fish and birds there, in 1958, 1959 and 1963. Bio-assay measures the amount of a given metal or ore in an organism, and the focus of Beak’s tests was mercury, a toxic metal whose presence was beginning to be politically and publicly contentious. The conclusion to his 1958 report stated clearly that there was so much mercury being dumped that ‘anyone who chose to look’ would have cause for legal action, and in his opinion, would get injunctions or convictions easily.42 (Further research in corporate archives would be needed to determine whether or not these kinds of private research affected the behavior of cross-border companies, which were many and important though not directly related to transboundary water management institutions.)

The fact that the main thrust of the experimentation, monitoring, and analysis took place under the aegis of the International Joint Commission shaped the agenda in several important ways. The research program was set with the goal of producing recommendations to reduce pollution; and funding and time were limited by the terms of the formal reference. As a result, the focus on public health and remediation remained strong, unaffected by scholarly curiosity or profit motive.

The Technical Advisory boards’ correspondence and reports from the period 1950-1960 give an idea of how the specialists from many jurisdictions slowly found common ground as they tried to define the lower Great Lakes’ pollution problems and create standards by which water quality improvement could be measured.43 As the advisory boards’ data and analysis continued

42 File “Mercury Documents, Articles 1958-“ B140257, AO.
43 Correspondence and reports, 1950-1960, Folder 3, “IJC – Analytical Methods,” Box 7, A1118-80, NYSA.
to accumulate, their technicians’ meetings, the tests they performed and the reports that they made, acted as a way for Canada and the United States to decide that serious pollution existed in their shared waters, and how it should be addressed.\textsuperscript{44} The IJC’s public reports, based on their work also became valuable ammunition for environmentalists in later years, and they bolstered the state, provincial and local governments’ efforts to respond to citizen activism. In the same way that sanitation activists at the beginning of the twentieth century could point to the IJC study of biological pollution in the boundary waters as a reason for chlorination and sewage treatment, the postwar IJC, government and academic studies became the basis arguments for new funding and action on industrial pollution abatement.

The studies created a galaxy of points of agreement, in large part because the two countries shared a mutual confidence in scientific data as interpreted by engineers and scientists. If a government in the watershed had chosen to question the science, presumably the work of joint remediation would have been so much harder (although this is in some ways a chicken-and-egg process: if Americans and Canadians hadn’t been willing to agree, could the scientific evidence have worked so well as a basis for joint action?).\textsuperscript{45} Shared faith in the validity and morality of Western science was at historically high levels following the Second World War, both in the public at large and in government.

During the 1950s, the national governments accepted the IJC’s mild recommendation for continued monitoring, and the Commission based its suggestions upon the new data. However, as the monitoring continued into its fifteenth year without any visible improvement in water

\textsuperscript{44} Folder 10, Box 4, Series A1120-80, Drainage Basin Subject Files, NYSA. Board of Technical Advisors, Lake Erie-Ontario, descriptive and data sets: Folder 10, “IJC, Monthly Reports – Canadian Section, 1948-49” Box 8, A1118-80, NYSA. Paper, “Industrial Waste in Ontario” by A.V. DeLaporte, Purdue U. Industrial Waste Conference, May 10, 1954 in Folder 12, Box 8, A1118-80, NYSA.

\textsuperscript{45} Historiography on relationship of science to political cooperation on environmental issues. See Bocking on politics and ecology, see fights over fishing in 1920s-1940s, fights over phosphorus.
quality, the tone of the IJC’s recommendations changed. The Commission’s 1961 report to the governments, ‘Safeguarding Water Quality,’ was an urgently worded, thoughtful summary of their work since 1946, which expressed the growing conviction among technical experts that the water quality problems were serious, dangerous, and in desperate need of attention.46 During the mid- to late 1950s, policymakers and residents began to realize that businesses and governments were not moving quickly to remedy pollution, and the problem was increasing in volume and complexity, while tap water remained malodorous and foul-tasting. The ongoing data collection and analysis had succeeded, by 1960, in giving new impetus to proponents of pollution control around the Great Lakes.

Changing Political Culture, 1946-1960

The initial period of serious transboundary pollution research on the lower Great Lakes, from approximately 1946 until 1960, was marked by an intense learning effort by technical professionals from the United States and Canada. Most of them were employed by governments, although some were privately employed or worked as academics. Their studies as Technical Advisors to the International Joint Commission and as members of ad hoc intergovernmental or international teams created reams of new data, and their analysis of their findings began the more difficult work of creating a shared body of knowledge about pollution in the Great Lakes and, even more subtly and slowly, a new set of standards, goals and expectations for water management. These new goals and priorities reflected growing awareness of ecosystemic connections and concern about their meaning for human health.

One of their major accomplishments was to lay the groundwork for the development of shared water quality standards for the lower Great Lakes. It was a labor-intensive but relatively

46 File “IJC Re; Safeguarding Water Quality” 1961, Box 81, B292327, RG 3-23, AO.
straightforward task: in order to set a standard for a maximum acceptable amount of a given pollutant, scientists compared their ability to test for its presence with their understanding of its impact on water users at various levels of concentration over time, and produced a number, usually measured in parts per million (ppm), which they judged to signify a safe level. To create these standards, technical experts had to accommodate their awareness of each test's inadequacies, consider the gaps and ambiguities of the existing toxicology data, and make a judgment. This was difficult and subject to revision, as new information and techniques were developed, and as new pollutants entered the environment. While the creation of the mutually acceptable water quality standards in the years after the IJC’s 1946 reference was a triumph of transboundary cooperation, but standards must be enforced if they are to matter — and there are many decisions in enforcement that are cultural, rather than technical.

The more complex and significant task of assigning meaning to the new research unfolded over the course of many interactions, a region-wide, international series of judgment calls that were made through the interaction of politics, philosophy, economics, emotion and science. Residents and policymakers began to ask: Which pollutants were most important to control, and in what order? How much government revenue should be devoted to pollution control? Which people or jurisdictions should be responsible for enforcing new standards? The question of what the response to the new research findings should be, and how the response should be decided, was discussed frequently and in very fluid terms during the early years of the IJC’s second pollution references. Allowing for variations among jurisdictions, the discourse surrounding these topics had a decidedly transnational character.

Weighing the cost of pollution control against the losses and/or uncertainties and assessing the validity of the scientists’ recommendations. Three groups of people were engaged in the task: basin residents in all sectors of the formal and informal economy, experts creating standards, and political figures in the many relevant jurisdictions, legislators and
executives with the power to regulate. New York State’s 1950 pollution control law is a good example of these interactions. The law was drafted in cooperation with other Great Lakes states through a Committee for Interstate Cooperation’s work, which met from approximately 1944-1948 and included a Special Committee on Pollution Abatement. After passing its law, New York then held public hearings in an effort to determine how to apply, enforce, and pay for the changes required by the new legislation.47 A substantial part of the hearings focused on the need to motivate municipalities to address industrial waste, and the need to enlist the support of industries and public opinion for the necessary work. As one state official explained, the state of New York did not propose to demonize industry or excuse it, but rather hoped to foster a climate of urgency and cooperation:

We are definitely working in the realm of industrial and municipal cooperation so that the burden of industry might well be recognized and sympathetically understood by every municipality and every individual in the State of New York. All of these efforts have not then been sheer altruism on the part of the committee. We have done all these things [hearings, consultations before passing the new water quality standards] rather than ‘jamming them through’ if I may use that expression because we are convinced that law alone will not solve the pollution abatement problems of this great state. We need something else besides law. We need desire . . . to achieve clean waters to a reasonable limit of their best social usage.48

Given the appalling smells, sights, and tastes of pollution that residents experienced, and given the abundant evidence of pollution that had been accumulating for decades without a serious policy response, why did New York decide to legislate in 1950? The law’s passage was likely due to a combination of shifting public support, a growing interest among policy professionals, supported by the vast amount of newly available data produced after 1944. The same public outcry about phenols and other pollution problems had prompted the federal governments to assign the IJC its pollution reference in 1946 probably encouraged state governments to form the Special Committee and begin the drafting process. The New York officials’ insistence on

47 Transcript of 1950 hearing at Buffalo, Folder 10, Box 5, A1118-80, NYSA. The similarities to current climate discussions are striking: much like setting a carbon emissions reduction target, and then having the debate about how to go about reducing.

48 Transcript of 1950 hearing at Buffalo, p 10. Folder 10, Box 5, A1118-80, NYSA.
consultation and consensus-building indicates that there was a lot of uncertainty about how to balance reducing pollution with the perceived need to support the industries that were driving the region’s economy.

While New York was delicately building support for a law to control industrial pollution, the records of the IJC boards from 1953 show that state, provincial and federal officials were actively discussing versions of ‘polluter pays’ policies, a much more aggressive form of regulation. The range of options under discussion makes it clear that this was still a very young policy area.

During the first decades of the twentieth century, citizens demanded action to reduce disease mortality through water management. (See chapter 3, Pollution I) The pollution concerns expressed by basin residents to their governments remained largely the same from the mid-1930s until the early 1960s: they focused on phenols, oil, sewage, fish and bird kills, and a wide variety of industrial wastes. During this period, the wastes that technical experts

49 Correspondence and reports, 1953-1958 between IJC Field Unit; US Public Health Service unit at Buffalo, NY; Erie County Health Department; Mr. V.G. MacKenzie, Officer in Charge of the Robert A. Taft Sanitary Engineering Center, Cincinnati, OH; C. M Tarzwell, Chief of Biology Section, Research and Development Branch of Taft Center; Lake Erie-Ontario Advisory Board to the IJC on Control of Pollution of Boundary Waters; Mr. L.F. Warrick, US Public Health Service Division of Water Pollution Control; Mr. J. Ross Menzies, Chair of Lake Erie-Ontario Advisory Board; Mr. F. H. Waring, Chief Sanitary Engineer, Ohio Department of Health. Folder 13, “IJC, Fish Kills,” Box 7, A1118-80, NYSA. Reports, minutes and correspondence, 1951-1953. Participants: IJC Technical Advisory Boards on Air Pollution; Technical Advisory Boards of IJC on Control of Pollution (Erie-Ontario and Superior-Huron-Erie); Mr. D. E. McGuire, VP of Engineering, Great Lakes Steel Corporation; Mr. Hayse Black, Chief of Industrial Wastes Section, US PHS (and also Secretary of IJC Technical Advisory Board for Pollution on Lake Erie-Lake Ontario); Mr. Hugh Dewey, President of Western New York Water Company; Mr. Earl Devendorf, Director of Bureau of Environmental Sanitation, Department of Health for State of New York; Mr. Horace Evans, NY State Flood Control Commission; Col. W. P. Trower, Division Engineer, US Army Corps of Engineers, Great Lakes Division; Dr. Berwyn Mattison, Commissioner of Erie County Health Department; Mr. William Wallace, Superintendent of Filtration and Sewage Treatment, Department of Water Supply for Detroit; Mr. John Johnson, General Manager of Buffalo Sewer Authority; Canadian IJC Chairman AGL McNaughton; US IJC Chairman, A. O. Stanley. Folder 28, “IJC Minutes, Advisory Board, 1952-1953,” Box 7, A1118-80, NYSA. Meeting minutes, reports and memoranda from 1953, 1958, 1964 and 1971, created by Advisory boards to IJC on Control of Pollution of Boundary Waters, Lower Great Lakes and Connecting channels, New York State Water Pollution Control Board, US Public Health Service; Ontario Ministry of the Environment, Canadian Ministry of the Environment. Folder 6, “IJC - boundary waters and tributary studies,” Box 7, A1118-80, NYSA.
began to study monitor included broad categories such as cyanides, phenols, light and heavy metals, suspended solids, domestic sewage, dye wastes, radioactive waste and oil, as well as a handful of specific waste products that came from different plants along the connecting channels, such as paper fibers, flue ash, industrial acids including sulfuric acid and thiocyanate, ammonia, hexavalent chromium; and styrene. In general, citizens and journalists were concerned about the presence of acutely toxic substances in tap water (including cyanide and heavy metals) and deeply disconcerted by the tastes and smells of their drinking water, as well as frustrated by the oil, sludge, and dead wildlife that washed ashore on local beaches.

Hearings, newspapers, correspondence, legislation, reports and research from this period indicate a growing awareness of the vast scale of the pollution problems around the lower Great Lakes and curiosity and worry about their impact on human health around the Great Lakes. In a sense, this 1930s through 1950s period could be described as a time of waking up, collecting information and beginning to ask more questions.

Then, beginning in the early 1960s, public concern about persistent pollutants began to grow, as awareness of slow, cumulative poisons became more widespread and fears of irreversible human impact on ecosystems became more common. The most significant shift in the political culture of water management was the growing interest in other organisms, either because of their role in human health or sometimes for their own sake. Similarly, many more people around the Great Lakes came to see themselves as parts of an ecosystem, and many acquired a very different sense of ecological time: pollutants deposited decades prior to the 1960s came to be understood as a threat, and pollutants deposited in the present came to be regarded as a poisonous legacy without a quick solution. As a result of these shifts in perception, residents and policymakers began to approach water quality management with new urgency. There were also indirect forces at work that facilitated these changes: the long postwar economic boom produced more revenue for government activities, and after 1962, détente.
liberated northern North American industrial politics from their wartime and early Cold War focus priority of maximizing production at all costs.

Data collection and analysis, 1960-1972

The long work of understanding how and why the lower Great Lakes were polluted, and what Canadians and Americans could do about it together, continued through the 1960s until the 1972 conclusion of the Great Lakes Water Quality Agreement inaugurated a new regime of joint research. Building on the work of the 1946-1960 period, but with greater intensity and awareness of the threats posed by pollution, the trends of new data collection and analysis, growing administrative capacity and cultural change accelerated during these years. Many of these new water management efforts were connected with the International Joint Commission and its references, but some were binational and a growing number were collaborative state-provincial efforts.50

The International Joint Commission continued to work on its pollution reference of 1946/1948 through the early 1960s. The Commissionerers reported regularly to the national, state and provincial governments about their field units' findings, and also summarized their results in formal, public reports to the federal governments.51 The relationship between the Commission’s

50 For example, in 1952 the US Army Corps of Engineers was tasked to study the levels of the Great Lakes water, and then shared that data with International Joint Commission in 1966 as part of its levels reference. 1965-1966 report on water levels, US Army Corps of Engineers, Box 4, A1118-80, NYSA. For another example among many, see OWRC (Ontario Water Resources Commission) report on Lake Erie Water Quality, 1960. Folder 5, “Great Lakes Commission, General Correspondence,” Box 4, A1118-80, NYSA.
51 Report on water sampling from IJC field unit on Detroit River, 1961: Folder 5, “IJC, Miscellaneous Reports, 1961,” Box 8, A1118-80, NYSA. IJC field unit, Feb 1963 report on paper wastes in Niagara Falls, File 24, “IJC, Industrial waste and General Correspondence,” Box 7, A1118-80, NYSA. For IJC field unit, 1964-1966, setting up when Detroit River Unit folded into larger Detroit River Study c. 1964, and for 1959, 1960 field unit staffing and phenol studies: File 14, “IJC Field Unit,” Box 7, A1118-80, NYSA. 1967 Buffalo and Detroit field units' reports, File 18, “General Correspondence, 1966-67” Box 7, A1118-80, NYSA.
recommendations and the responses of the governments to their input was more complicated and ongoing than the text of the formal reports would suggest. The United States, Canada, and lower levels of government were aware of the contents of the public reports long before they were published, and in several instances, the governments acted on IJC recommendations before the Commission’s reference was officially completed.52 The growing urgency of the pollution research is evident: officials understood that they’re acting before the full report had wended their way through the various approvals. It also shows how research and policy were building upon earlier projects at an accelerated pace by the mid-1960s.

The IJC was also becoming part of the transboundary response to pollution. The IJC field units’ records from this time also include a variety of “special studies,” short write-ups of their investigations when called to look at instances of sudden, unusual pollution. The frequent appearance of these ‘special studies’ indicates that the field units sometimes acted as a quick-response team for boundary waters issues, a special sort of resource for local governments, without reference to Washington or Ottawa.53 This independent, real-time response was a precursor to the oversight duties that the Commission was assigned under Great Lakes Water Quality Agreement.

In 1965, the IJC’s pollution mandate expanded a third time: it began a dual reference to study pollution on Lake Ontario, Lake Erie and the international section of the St. Lawrence River, and lake levels in all five Great Lakes. In the same way that the worsening pollution of the

52 For example, the Chairman of the US Section of the IJC, Matthew Welsh, described the IJC’s 1964 pollution reference as a response to concerns that had been raised by the IJC during the early 1960s, which the Commission did not press publicly until its Interim Report of 1965. Similarly, in 1952 the US Army Corps of Engineers was tasked to study the levels of the Great Lakes water and shared that data with International Joint Commission in 1966 as part of its levels reference. “Statement by Matthew E. Welsh, Chairman, United States Section, International Joint Commission before the Natural Resources and Power Subcommittee of the House, Committee on Government Operations, Rochester, New York, 22 July 1966. Folder 30 “IJC,” Box 8, A1118-80, NYSA.

53 Folder 5, “IJC, Miscellaneous Reports, 1961,” Box 8, A1118-80, NYSA.
late 1940s led the governments of Canada and the United States to assign the IJC its 1946 pollution reference, the several years’ of public dissatisfaction with inconveniently high water levels prompted the governments to assign the IJC its 1964 reference.\textsuperscript{54} For this reference, the now-customary technical advisory boards were set up.\textsuperscript{55} The reference work continued until 1972, with monitoring pollution and eutrophication,\textsuperscript{56} conducting public hearings to collect local opinions about the need for pollution abatement,\textsuperscript{57} and releasing data and recommendations through occasional reports.\textsuperscript{58} Over the course of the reference, the technical boards’ internal correspondence and its confidential, ongoing reports to the governments conveyed increasingly urgent warnings about the costs of the Lakes’ deteriorating water quality.\textsuperscript{59}

The IJC’s reference during the mid- to late-1960s provided a mechanism whereby governments and residents on both sides of the border could discuss the character, extent and meaning of the water pollution problems. During the Commission’s public hearings, residents and interest groups had an opportunity to ask questions and present their opinions of the

\textsuperscript{54} Briefs from PASNY and HEPCO re L. Ontario. levels, correspondence re relationship between St. L hydro and GL levels. File 138-G, Box 80, B292356, RG 3-23, AO.
\textsuperscript{55} Briefing note, NY State Department of Health, Mr. Donald B. Stevens to Mr. Hennigan, September 8, 1966. folder 18, “General Correspondence, 1966-67,” Box 7, A1118-80, NYSA.
\textsuperscript{56} IJC field unit at Rochester, 1970 report, covering Connecting channels, Superior-Huron-Erie section. February 1971 report, includes description of training industrial waste treatment plant operators, a then-new job. Folder 9, “29th Progress Report of IJC” Box 7, A1118-80, NYSA, and Folder 7, “IJC, Miscellaneous Reports, 1963-”, Box 8, A1118-80, NYSA.
\textsuperscript{57} Clippings reporting IJC hearings at Niagara. Folder 10, “IJC Minutes, Advisory Board, 1968-” (2 of 2), Box 8, A1118-80, NYSA.
\textsuperscript{58} In 1968, IJC’s pollution work being reported in several ways: 33rd annual progress report, April 1968, a March 1968, Lake Erie-Ontario-St Lawrence Boards, all reported to IJC in two ways: one as 4th progress report to IJC and governments, one as 2nd interim, just IJC. Folder 10, “IJC Minutes, Advisory Board, 1968-” (2 of 2), Box 8, A1118-80, NYSA. Folder 10 “IJC, Dissemination of IJC Data Meeting” Box 7, A1118-80, NYSA.
\textsuperscript{59} Report of Erie-Ont advisory board re. pollution at Niagara, duck kills at Detroit, Bethlehem Steel at Buffalo. Folder 8, “IJC Minutes, Advisory Board” (282), Box 8, A1118-80, NYSA. Reports from Canada’s FRB and Canada’s Department of Energy, Mines and Resources, 1966 for 1967, as well as records of Feb 8, 1967, connecting channels board meeting, incl. comments on NY state’s inaction on phosphate removal, Feb 1967. Folder 9, “IJC Advisory Board, 1967 (1 of 2) 17i,” Box 8, A1118-80, NYSA. IJC draft recommendations, lab reports on GL and phosphorus and pollution, 1969. Folder 19, “General Correspondence, 1968-72,” Box 7, A1118-80, NYSA

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problem. The hearing testimony became part of the technical advisory boards’ data set, and at board meetings, officials seconded to the boards from state, municipal, provincial and federal governments analyzed the hearings together. In the context of the technical advisory board, state and federal and provincial and sometimes municipal officials reached consensus about the meaning of their collected data and hearing testimony. There were other fora that mattered a great deal to this consensus-building process, including the Great Lakes Commission, Great Lakes Basin Commission, ad hoc conferences, professional societies. There were also triggering cultural events like the publication of Silent Spring (1962), the Torrey Canyon oil spill (1967), fires on the Cuyahoga River (many, but especially 1969), and an oil spill off Santa Barbara (1969). However, the IJC’s data was central to the consensus about which pollutants could and should be covered by a common set of water quality standards, and the IJC’s recommendations were influential in the discussions about the format that an effective response for the Great Lakes could take. Even before the Great Lakes Water Quality Agreement was concluded, policymakers at federal, state and provincial levels discussed using the IJC’s recommended levels for industrial pollutants as possible benchmarks. The presence of specific recommendations from the IJC also raised the more contentious question of which jurisdiction's standards took precedence.

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60 The Cuyahoga River in Ohio caught fire in 1912, 1936, 1948, 1949, 1951, 1952, and 1969. The 1952 fire was by far the worst, but only the 1969 fire was widely reported outside the Cleveland area. The 1969 fire was featured on the cover of Time magazine as an example of the need for environmental laws.

61 NY and PA correspondence, re. whether the IJC, federal or state water quality standards take precedence. Folder 10, “Minutes, Advisory Board, 1968-” (1 of 2), Box 8, A1118-80, NYSA. For a Canadian example, see records re. Sarnia water supply not meeting IJC’s criteria in 1968, 1969. File, “WRC - Sarnia Water Supply, Jan 68-Dec 68” and file, “WRC - Sarnia Water Supply, Jan 69-Dec 69” Box 110, B290953, RG 3-26, AO.

62 NY state lawyer arguing that state regulations had to follow IJC guidelines. File 26, Box 8, A1118-80, NYSA.
Beginning in 1967 at the level of the IJC’s technical advisory boards, Canadian and American experts and civil servants began to formulate a mutually agreeable set of water quality standards, designed to apply to the entire Great Lakes basin.\textsuperscript{63} When the United States and Canada set up formal working groups to write the GLWQA in 1970, the treaty writers used the technical boards’ draft standards and the IJC’s reports as their starting point.\textsuperscript{64} The Agreement’s final format and content are closely related to the Commission’s proposals.\textsuperscript{65} Other levels of government were increasingly interesting in and capable of formulating water management policy by the late 1960s, such as the Ontario Great Lakes Institute at the University of Toronto, a research foundation that conducted academic research and whose members worked with the IJC’s technical boards.\textsuperscript{66} Ontario’s GLI notwithstanding, the IJC played a crucial role as the primary coordinator, judge and synthesizer of the available research and recommendations. In this way, the organization helped to create the content of the basin-wide agreement.

\textit{A More Crowded Field: Growing Administrative Capability, 1960-1972}

Over the course of the 1960s, policymakers and residents became increasingly concerned that businesses and governments were not moving quickly enough to reduce pollution around the lower Great Lakes, and that the region’s water quality problems were

\textsuperscript{63} 1967 notes on very early meeting of Erie-Ontario-St. Lawrence committee on water quality objectives. Folder 30, “IJC,” Box 8, A1118-80, NYSA. Minutes of August 1967 and Feb 1968 meeting, report on Editing committee. Folder 10, “Minutes, Advisory Board, 1968-9” (1 of 2), Box 8, A1118-80, NYSA.

\textsuperscript{64} “Canada-US Working Group, Sub-group Membership, Canadian Section. Revised, December 1, 1970.” Attached to memo from Mr. W.F. Stone, Department of Fisheries and Forestry, Water Planning and Operations Branch, to Mr. Paul Tremblay, Associate Under-Secretary of State for External Affairs, February 25, 1971. Correspondence re. creation of the Working Group and sub-groups that wrote the Great Lakes Water Quality Agreement, with IJC input. File “Great Lakes Pollution General,” B367414, AO. Membership lists and IJC docs: Files for Subgroup 4, Subgroup 2, B352257, AO. Comments on working up water quality standards: File “6025.1, Pollution, 1971-73,” Box 1F, B397136, RG 1-282-1, AO.

\textsuperscript{65} Jan. 1970, draft compact as described by GLC Commissioner at IJC Hearing. Folder 19, “General Correspondence, 1968-72,” Box 7, A1118-80, NYSA

\textsuperscript{66} Correspondence re. fitting GLI’s work into Ontario’s provincial water policy and re. collaboration with IJC, 1966. File “Ont. Research Foundation - Great Lakes Institute, Nov. 61-Dec 65,” File, “Ont. Research Foundation - Great Lakes Institute, Jan. 66-Jan 67,” Box 371, B292402, RG 3-26, AO.
growing. The IJC’s references were only part of their response. However, the governments were responsible for administering the policies that reflected the increasing concern for water quality, for staffing the boards and agencies, and for funding the research, drafting, and enforcement of cooperative policies. States, provinces and national governments worked with each other directly and through intergovernmental organizations to handle essential parts of the evolving Canada-US transboundary water management challenge during the 1960s and early 1970s.

In part, this flowering of intergovernmental cooperation, evident in a wave of new committees, working groups, task forces, acronyms, budget allocations, and new hires that pepper the written record, was due to the expansion of government during and after the Second World War. This expansion is evident in health, education and welfare programming in both countries, in as well as new forms of taxation, infrastructure investments, and Cold War military spending. Also, during the postwar period, Canada and the United States maintained and extended their military alliance through ongoing joint boards, shared procurement processes, mutual support in multilateral forums such as NATO and the United Nations peacekeeping, which brought their bureaucracies into closer and more frequent contact. Finally, in addition to the general liberalization of global trade under the General Agreement on Tariffs and Trade and later the World Trade Organization, successive American and Canadian federal governments pursued a policy of bilateral trade agreements which knit their economies and regulatory frameworks together through thousands of transactions each year. The most notable for the Great Lakes’ regional economy was the Auto Pact of 1965.67

In the context of this increasingly comprehensive cross-border collaboration, it is not surprising that Canadian and American civil servants found ways to collaborate on water issues. While it would be impossible to measure precisely what proportion of their teamwork was due to

which causal factor, it does seem clear that jurisdictions around the Great Lakes built up their administrative capacity for water quality monitoring and regulation during the 1960s and early 1970s in response to growing concern (expert, public and political) over pollution, both independently and jointly.68

During this uncertain period, the jurisdictions of the Great Lakes tended to approach water policy in a reactive way, responding to problems as they arose rather than approaching them as an ongoing, planned part of governance. The province of Ontario, for example, began testing algicides in the early 1960s, trying to address eutrophication in shallow inshore areas of Lake Erie and Lake Ontario, as well as smaller lakes in the province.69 Later in the 1960s, having failed to find any effective algae control method, provincial efforts to address eutrophication shifted to plans for limiting fertilizer inputs to the lakes, before moving still later to support for a basin-wide ban on phosphorus in detergents.70 In a similar fashion, Ontario's first attempts to seriously study and manage the role of pesticides in reducing biodiversity and resilience in aquatic ecosystems began around 1964, when the province initiated studies of DDT and other pesticides in the Lake Ontario Basin. These early efforts were apparently prompted by a report from New York State about 'biocides' and PCBs.71 All the while, sea

68 In one particularly striking example, the Water Resources Branch of the Canadian federal government doubled its staff in 1963 because of pollution concerns. File “Great Lakes Water Levels, (Apr 65-Dec 65), Fed Gov't,” Box 497, B292429, RG 3-26, AO. In another, example, a detailed memo compared Ont/MI/NY laws for boat pollution, part of the gradual learning and collaboration that grew into consensus. “File PSP02-2, Reports - Pollution Control Activities - National Research Council, Vol 2,” B855927, AO. See also, File “PSP05-1, Enforcement - Vol 1, General,” B855919, AO.


70 Correspondence re. eutrophication control, a joint effort by Ont's Department of Agriculture, Conservation Authorities, Fish and Wildlife. File “6025, [Water Pollution], 1968-71,” Box 1F, B397136, RG 1-282-1, AO.

lamprey control efforts were ongoing and the Great Lakes Fisheries Commission was studying the lakes and their fisheries. These discrete, topical research projects serve to highlight the lack of a unified water policy or responsible agencies.

The inadequacy of this approach was not lost on political leaders. Ontario's government made a series of efforts to connect those parts of its bureaucracy responsible for different aspects of water quality. The provincial agency that most closely resembled a 'ministry of water' was the Ontario Water Resources Commission (OWRC), which had been created in 1956 to help small municipalities set up and finance water supply systems and sewage disposal systems, and in some cases to solve problems related to unsafe water supplies. In the mid-1960s, the OWRC began to impose fines for pollution, and in 1968, a Commission report proposed that the OWRC should be assigned to enforce pollution reduction policies, a longstanding grey area. The OWRC's evolving area of responsibility is a good example of institutional flexibility: an organization created to facilitate rural and village access to sufficient clean water slowly became part of the response to perceived need for controlling water quality, at a provincial level and in coordination with other jurisdictions.

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73 Clippings from Toronto newspapers, Globe and Star, May 17-18 and 26, 1965. Box 63, RG 19-4-7, AO.

74 OWRC report, notes on institutional history. Folder 8, “IJC, Meeting, Niagara Falls, 1/16/68, Niagara River Pollution,” Box 8, A1118-80, NYSA.

The OWRC was also an important part of Ontario’s relationships with other jurisdictions. For part of the 1960s, provincial Premier John Robarts set up a “Water and Pollution Advisory Committee” as part of the OWRC, with a mandate to represent Ontario in provincial-federal consultations about pollution. Its meetings and annual Industrial Waste Conference served as a point of connection between water policy professionals from municipal governments, different provincial departments, industry and from the United States. Robarts also linked the Water Resources Commission to Ontario’s health officials and to land use planning boards through a Liaison Committee, beginning in 1962. New York state experienced similar changes in the arrangement of its water policy agencies. These committees, with their dedicated staff and budgets, improved inter-ministerial coordination and they show that water pollution was receiving an increasing amount of high-level attention from political leaders and bureaucrats over the course of the 1960s. They also served as a way for the province of Ontario to connect directly to American policymakers at each level of government, and to work with IJC boards. In practical terms, they replaced diplomatic protocol with direct transboundary relations, if only for certain subjects.

Representatives of the two federal governments attended conferences, corresponded regularly with members of these liaison committees, and did not try to suggest that they should be replaced by formal international relations. In some ways, this benign neglect recalls British imperial government’s implicit decision, during negotiations for the Boundary Waters Treaty of

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77 Memos and reports on industrial waste and pesticides. Early refs to manure disposal. File “OWRC Liaison Committee,” B352615, AO. File “Advisory Committee on Pollution Control, General, 1966-68,” B352556, AO.

78 Speech by D. Metzler, report with a history from City Manager. Folder 8, “IJC, Meeting, Niagara Falls, 1/16/68, Niagara River Pollution,” Box 8, A1118-80, NYSA.
1909, to turn a blind eye to direct correspondence between the British ambassador in Washington, DC and the governor-general in Ottawa and to allow Canadian negotiators to meet with Americans directly. These impromptu forms of collaboration also recall the circumstances before the Great Lakes Fisheries Commission was created in 1954. In each case, the need to respond jointly to new kinds of environmental change appears to have taken precedence over the exact rules concerning who had permission to conduct international relations. Existing transboundary arrangements were overlooked, and the institutional framework was later reformed to reflect the new forms of cooperation.

In addition to developing their internal ability to make and implement water quality policies, provinces and states increased their capacity to work with each other during the 1960s. The two primary mechanisms were purpose-built multilateral organizations and direct contact between elected political leaders. The most active of the multilateral creations was the Great Lakes Commission, or GLC, which had been created in 1955 when the states of Minnesota, Wisconsin and New York signed the Great Lakes Basin Compact and later expanded to include the rest of the states that bordered the lakes.\(^7^9\) Canadian provinces (Ontario and Quebec) participated as informal members, though they were initially wary of an organization so closely linked to Illinois, which had initiated the infamous Chicago Diversion of 1900.\(^8^0\) The American commissioners were pleased with the Canadian attendance, and noted in 1960 that they believed official interest in Great Lakes issues was growing.\(^8^1\) One way to tell that this organization was effective is to note the extent to which state and provincial bureaucracies

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\(^8^0\) Correspondence, 1961. File “International Joint Commission, Federal Gov’t,” Box 500, B292422, RG 3-36, AO. Correspondence re. OWRC attendance at GLC meeting, June 1968. File “Water Resources Commission, Jan 68-Dec 68,” Box 101, B290981, RG 3-26, AO.

\(^8^1\) Folder 6, “Minutes of GLC’s 1960 Meeting,” Box 4, A1118-80, NYSA.
interacted with it: for example, there was a long-standing connection between Ontario Hydro, the OWRC and the GLC.\textsuperscript{82} As with the IJC’s technical advisory board, this Compact was a predecessor of some components of the Great Lakes Water Quality Agreement in 1972.\textsuperscript{83} Because states and provinces were responsible for many policy areas that either affected or were affected by water quality, organizations such as the GLC were extremely important for developing the basin-wide administrative capacity needed to remediate the pollution problems.\textsuperscript{84}

The two national governments were not entirely indifferent to this growing web of sub-national connections. In 1965, the United States gave its states retroactive permission to participate in the Great Lakes Commission, and also created a Great Lakes Basin Commission (GLBC, the same acronym as the agreement that set up the GLC) under federal control.\textsuperscript{85} A member of the GLC’s executive board referred to the new federal commission as a “Johnny-come-lately,” and the federal and state governments negotiated at length before Congress passed its consenting law.\textsuperscript{86} In the same way that state involvement in hydroelectric development along the international boundary prompted a lengthy wrangle between New York state and Washington, DC before the St. Lawrence Seaway and Power Project could go forward in 1952, state-to-state organizing around water quality control was a contentious topic for a time, as the American federal government asserted its preeminence in international relations.\textsuperscript{87}

\textsuperscript{82} Correspondence. re. 1970 GLC semi-annual meeting. No folder number, Box 4, A1118-80, NYSA. Memo reporting on GLC Executive meetings, mid-1960s. Folder 4, “Great Lakes Commission Executive Committee Box 4, A1118-80, NYSA.
\textsuperscript{83} 1971, comments on a Great Lakes Basin Compact. File 2, “Great Lakes Basin Compact,” Box 3, B1882-05, NYSA. 1967-92, GLBC comments, letters, notes on GLWQA process.Folders 1-5, Box 12, B1882-05, NYSA.
\textsuperscript{84} Notes. No folder number, Box 4, A1118-80, NYSA.
\textsuperscript{85} Internal New York state documents re. role of Great Lakes Basin Compact, whether GLBC served NY State’s interests, 1964. Folder 3, “Compact Membership,” Box 4, A1118-80, NYSA.
\textsuperscript{86} 1965, GLC minutes, p 5. Folder 8, “Minutes of Meetings, 1964-66.” Box 4, A1118-80, NYSA. GLBC comments, letters, notes on GLWQA process, 1967-92. Folders 1-5, Box 12, B1882-05, NYSA.
\textsuperscript{87} Notes. No folder number, Box 4, A1118-80, NYSA.
\textsuperscript{87} Folder 5, “Great Lakes Commission, General Correspondence,” Box 4, A1118-80, NYSA. GLC Annual Meeting Report, 1968. No folder number, Box 4, A1118-80, NYSA.
Despite these tensions, the two organizations, the original GLC and the new GLBC functioned simultaneously and in 1966 the Great Lake Commission (the original state-to-state organization) struck a committee to draft “A Water Management Compact for the Great Lakes.” This committee presented its result in 1968, and like the IJC’s proposals, it is another partial ancestor of the Great Lakes Water Quality Agreement. The committee and its draft show the growing importance of sub-national jurisdictions in their policy area, and also the developing consensus that a basin-wide, multi-level coordination tool was needed.

During the mid- and late 1960s, American states worked more frequently and directly with the International Joint Commission, trying to enforce pollution control legislation.\(^88\) States also worked with their federal government to create and implement new water quality standards, a difficult task that required a lot of consensus building. This trend mirrored a growing number of joint provincial-federal water management efforts in Canada, which were also contentious on occasion.\(^89\) In addition, the relationship between provincial governments and the International Joint Commission also grew closer during this time.\(^90\)

While participating in multilateral organizations and building up their individual capacities for water management, state and provincial political leaders also engaged directly through

\(^{88}\) Some correspondence on whether a citation from the IJC would help NY get action on a pollution problem and re. NY state’s inaction on phosphate removal, Feb 1967. File 9, “IJC Advisory Board, 1967 (1 of 2) 171,” Box 8, A1118-80, NYSA.


\(^{90}\) IJC/Ontario correspondence, 1968. File, “PSP02-2, Reports - Vol 1. International Joint Commission Great Lakes Water Quality Agreement - Land Use Activities, Etc.” B855926, AO. Correspondence about lake levels issues and pollution, between provincial, federal, IJC, HEPCO, American municipalities, IJC hearings, Army Corps of Engineers, GLI. Multiple files covering 1964 and 1965, B292418 and B292419, RG 3-26, AO.
conferences and ‘talks.’ The impact of this direct, interpersonal democracy should not be underestimated: when state governors and provincial premiers paid sustained attention to water pollution, it signified strong public and political interest, a sign that money and staff time were being devoted to these issues, and an indication that substantial policy changes were in the works. In 1964, the Premier of Ontario and the Governor of Michigan held conferences less than a month apart, at which Great Lakes premiers and governors discussed shared water pollution problems in closed session.91 The mid-1960s witnessed significant increases in administrative capacity for managing the lakes in both countries: during the summer of 1964 the IJC was beginning its pollution and levels reference, the leaders of Great Lakes states and provinces demonstrated their commitment to action, and the following year the American federal government created the Great Lakes Basin Commission.

The 1969 discovery of that the massive amounts of mercury polluting the sediments of the St. Clair River were poisoning fish and birds, with possible effects on human health, was partly responsible for a second set of transboundary pollution conferences in 1970.92 After laying groundwork at the Great Lakes Commission’s semi-annual meeting, Premier Robarts hosted a Great Lakes Environmental Conference that year, and also sent representatives to attend the Great Lakes Governor’s Conference.93 In the months before these meetings, Robarts met with stakeholder groups, including the Great Lakes Fisheries Commission, Imperial Oil, the Ontario Naturalists organization, professors from the University of Michigan, the Fisheries

92 Minutes and correspondence. No folder number, Box 4, A1118-80, NYSA.
93 File “Great Lakes Environmental Conference,” Box 3, Series B1882-05, NYSA.
Research Board, and the Canada Centre for Inland Waters. This eclectic list of people he consulted is strikingly binational and includes a wide variety of water uses; fishing, recreation, industry, as well as numerous experts on ecosystems and affected organisms in addition to people. By 1970, the definition of water management had stretched from its original, early-twentieth-century focus on bridges, shipping channels and epidemics, to include the goal of restoring a healthy aquatic ecosystem (or at least arresting the eutrophication problems and mercury poisoning).

After the conference, in his correspondence with Governor Nelson Rockefeller of New York, Robarts presented the idea of expanding the International Joint Commission's role in water management as one result of the conference. Whether or not the idea originated there, this indicates that how high-level conferences provided a forum for discussion and consensus building between sub-national jurisdictions and other important groups. States and provinces did not maintain embassies or ambassadors to facilitate communication, and so events like these were important to make progress on problems such as water pollution, whose solutions absolutely required cross-border cooperation. Once industrial and urban pollution had been established as a significant threat to health and well-being of basin residents, the many jurisdictions with responsibility for water management around the lower Great Lakes worked to develop the ability to address the new problem, both internally and in concert.

The federal governments were also engaged in expanding their capacity for water policy, within their areas of responsibility. The Canadian government created a dedicated research center, the Canada Centre for Inland Waters or CCIW on Lake Ontario at Hamilton, Ontario in

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95 Letters and attachments, Stevens to Seebald, 1973. Folder 12, Box 8, A1118-80, NYSA.
96 Folder 19, “General Correspondence, 1968-72,” Box 7, A1118-80, NYSA.
1967.97 The Canada Water Act was passed in 1970 and the Canadian federal Department of the Environment was created in 1971. The province of Ontario was not particularly pleased with these indications of permanent federal interest in water issues, questioning the constitutionality of Canada Water Act, and whether or not it constituted an encroachment into provincial areas of responsibility.98 In the United States, a similar expansion of federal capacity for environmental policy and water policy occurred when the Environmental Protection Agency was created in 1970, and the Clean Water Act passed in 1972. The United States had also passed a Federal Water Pollution Control Act in 1948, though that had little impact. The new national-level agencies and laws of the early 1970s indicate the growth of political commitment to environmental quality.

Changing Political Culture, 1960-1972

What drove premiers and governors, presidents and prime ministers to meet and discuss these issues, to fund research and hire specialists? As people around Lake Erie and Lake Ontario shared an increasingly intense and unpleasant experience of environmental change, their attitudes to environmental regulation and industrial pollution shifted and they called for water quality regulation. There are many indications that cities and towns around the lower Great Lakes became increasingly concerned about the impact of water pollution on human health and work between 1946 and 1972 and that these expressions of concern multiplied after 1960.99 Municipalities questioned the wisdom of allowing offshore drilling for oil

97 Correspondence re. eliminating overlap between CCIW and GL Institute, GLI and IJC c. 1966. File “Ontario Research Foundation - Great Lakes Institute, Jan. 66-Jan. 67,” Box 371, B292402, RG 3-26, AO.
98 File “Canada Water Act, Jan 67- Dec 67, Fed Government” and “Jan 69-Dec 69” and “Jan 70- Dec 70”. Provincial bureaucracy analyzing new federal legislation, seem to see it as an encroachment. Doubts about constitutionality, discussions of federal/provincial water management agreement c. 1970. Box 481, B395405, RG 3-26, AO.
99 Correspondence regarding industrial water pollution, 1969-70. Stelco, detergents, constituents and municipalities. Internal correspondence re tax breaks on treatment plants, press coverage, specific
and natural gas in Lake Erie, and various authorities weighed the risks in a more careful way than earlier eras. A few examples capture the changing attitudes: in the early 1960s, the outgoing premier of Ontario, Leslie Frost exempted an oil drilling company from the province’s pollution regulations and then become a director of that company as soon as he left office, without triggering a public outcry. Conversely, by the late 1960s, governors of American states met to consider limiting pesticides and PCBs around the Great Lakes, partly because of the news coverage of the Santa Barbara Channel oil spill and discussion about it at the National Governors’ Conference.

Another indication of growing public interest is the increase in the premier of Ontario’s correspondence about pollution increased noticeably during the 1960s. A single file sufficed for all the letters between 1961 and 1965, but each following year needed at least one folder. The expressions of concern in these folders came from unions and trade associations (even a binational one sponsored by the UAW), from municipalities around the province, from individuals and recreation groups and from members of popular environmental groups like Pollution Probe. It is interesting to note that the government of Ontario gave financial support

industrial sites. B280060, RG 3-26, AO. Correspondence about how to respond to requests for information about Ontario’s pollution policy, B280055 and B280056, RG 3-26, AO. Clippings levels and pollution, April and May 1965. Red folder, Box 62, RG 19-4-7, AO.

100 File 109-G “Great Lakes Waterways System - Offshore Drilling 1959-61,” Box 58, B292334, RG 3-23, AO. Files “Pollution - Water - Drilling for Oil, Jan 66-Dec 66” and “Nov 61-Dec 65” and “Jan 68-Dec 68 [incl. 1967],” Box 103, B290983, RG 3-26, AO. Files “Pollution - Water - Drilling for Oil, Jan. 69-Dec. 69” and “Jan. 70-Dec. 70,” Box 103, RG 3-26, AO.

101 Minutes and correspondence. No folder number, Box 4, A1118-80, NYSA.

102 File, “Pollution - Water, Jan 66-May 666” 1 of 2 and 2 of 2. Box 102, B290985, RG 3-26, AO. Multiple folders of complaints from residents, municipalities, trade groups, recreation groups, 1967-70. Boxes 103 and 103, B290985, RG 3-36, AO.


104 Responses from Robarts to Pollution Probe, to/from constituents re. pollution, drafts of public policy statements c. 1970. File, “Pollution, May 1-31, /70,” File, “Pollution, Jan-Feb-March/70,” File, “Pollution,
from 1970 to 1972 to some of the most active environmentalist groups which criticized the government’s pollution control policies.\textsuperscript{106}

In addition to the continuing experience of industrial pollution, with its revolting smells, tastes and sights (foaming, colored liquids, oily sludge and floating debris, waves of dead fish and dead birds), people around the Great Lakes were experiencing a side effect of petroleum-driven agriculture and urban sprawl: eutrophication. Eutrophication is the over-enrichment of an aquatic environment due to the addition of phosphorus, nitrogen, potassium or organic matter. In the lower Great Lakes, it was caused by runoff from farms and urban areas and by untreated sewage. Eutrophication causes massive algae blooms that come ashore stinking mats, that kill fish and water plants, and that breed toxins. The experience of worsening and more frequent eutrophication drove much research and activism up to 1972.\textsuperscript{107} Citizens and organizations around the Great Lakes basin mobilized in support of banning phosphorus in detergents as a way to control eutrophication, including Pollution Probe in southern Ontario and Earth Day events in American cities around the Lakes. A series of phosphorus bans were enacted by states, cities and the Canadian government during the early 1970s. However, scientists and policy professionals at the time were aware that banning phosphorus would only fix the problem temporarily; a long-term solution would require controlling agricultural runoff, a far more difficult task.\textsuperscript{108}

\textsuperscript{106} File, “Pollution, June 1-15/70” and File, “Pollution, June 16-30/70” B280055, RG 3-26, AO. Correspondence with constituents re. Pollution Probe. File “Energy and Resources, Pollution Probe Brief, Apr-June 1970,” and File “Energy and Resources, Pollution Probe Brief, June-August 1970,” Box 100, B280062, RG 3-26, AO.

\textsuperscript{107} File, “Pollution Probe, 1971-1972” (2 files) and “Pollution Probe, 1970,” B352615, AO.


\textsuperscript{108} Folder 19, Box 7, A1118-80, NYSA.
Public opinion about the condition of the lakes was also shaped by the discovery of methyl mercury’s ability to move up the food chain and the confirmation that mercury (and other toxic pollutants) bio-accumulated in local fish, which forced the closure of the fisheries in the late 1960s. The combination of the ‘dying’ lake, the urban industrial pollution, the inconvenient water levels, and the poisoned food fishes added up to a widespread, fairly unanimous conviction that the condition of the lower Great Lakes was an urgent problem by 1969.

Creation of a New Consensus: The Great Lakes Water Quality Agreement and the Second Generation of Canada-US Water Policy

From its creation in 1909 until the 1960s, the International Joint Commission was apolitical, never criticizing the governments of Canada or the United States and, apart from its hearings, rarely engaging with the public. Beginning in the early 1960s, before its levels-pollution reference, the Commission began to shift its tactics, as its officers and staff became convinced that the governments of the Great Lakes region were responding too slowly to the water pollution problems that they were monitoring. The IJC began to promote its reports, comment publicly on the political obstacles to pollution control, and call publicly upon the governments to act. For example, the IJC held a public meeting to present its report on pollution in the Niagara River in January 1968. The American chairman noted that the meeting

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110 D. Stevens, 1966, proposed not using water as a waste sink. (It took so long!) Folder 13, “IJC Objectives for Boundary Waters Control,” Box 8, A1118-80, NYSA.

was large and public, with carefully worded press releases and public relations. Among the attendees were a Congressman, a Coast Guard Captain for the US Department of Transportation, a Colonel of the Army Corps of Engineers, the Deputy Assistant Secretary of the Department of the Interior and representatives of the Hooker Chemical company. The list of attendees shows how public interest had sharpened by this time.

The IJC’s public call for a permanent transboundary pollution abatement program is an example of how old water management institutions were adapting to meet new challenges and how people working on water management were trying to cope with a new set of challenges (new pollutants, new scale of pollution, new stakeholders, new appreciation of risks to human health, new understanding of ecology) by using existing tools differently and by creating new tools.

The GLWQA was the first of a new generation of transboundary water infrastructure in the Great Lakes, most fundamentally shaped by the lessons learned between 1940 and the mid-1960s, further catalyzed by local and national activism in the 1960s and 1970s (movements which themselves drew upon the unwelcome discoveries about the health risks to humans and other species posed by industrial development.)

Until the Great Lakes Water Quality Agreement was signed in 1972, the IJC’s references had always ended after the completion of a report. However, the GLWQA gave the commission a permanent, ongoing role in water quality maintenance in the watershed. Under its provisions, the International Joint Commission is responsible for monitoring the highest priority ‘hot spots,’ evaluating plans for remediation, and coordinating binational teams of technical experts using the advisory board model. This evolution is a re-imagining of the IJC’s role, a sort of a variation on the monitoring of levels and flows that it had been doing since the 1910s, but also an

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112 Folder 8, “IJC, Meeting, Niagara Falls, 1/16/68, Niagara River Pollution,” Box 8, A1118-80, NYSA.
acknowledgement of the scope of human impact and the transboundary nature of its negative effects.

When the IJC began its second pollution reference in 1946, parts of the scientific, bureaucratic and political communities on both sides of the border committed themselves to learning about the Lakes’ water quality problems. New organizations sprang up and existing organizations took on new roles, indicative of growing public and official interest. Beginning in the later 1960s, the groups that had been learning about the Lakes’ conditions since the mid-1940s began to argue for coordination, consolidation, and rationalization of the many overlapping efforts/units that were engaged in trying to improve water quality.

There are many examples of these calls for coordination. Premier Robarts of Ontario expressed interest in a coordinating agency to manage the Great Lakes organizations in 1965, argued in 1966 that the Canada Centre for Inland Waters, Great Lakes Institute and IJC were inefficiently duplicating effort. The briefing books and memos from the Ontario Water Resources Commission argued in 1967 and 1968 that the region needed comprehensive water management, and a Great Lakes Commission memo named the overlapping agendas of the between IJC, GLC and GLBC as the cause of a bureaucratic “donnybrook.” While negotiations were underway for the Great Lakes Water Quality Agreement, New York’s chief sanitary engineer wrote to colleagues in other jurisdictions, analyzing the pollution programs of states, province, the Great Lakes Commission and the International joint Commission, noting

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113 Re. Ontario premier’s interest in a coordinating agency to manage Great Lakes organizations, 1965. File, “WRC - St. Thomas and Lake Erie, Nov. 61-Dec 65,” Box 109, B290952, RG 3-26, AO.

114 File “Ont. Research Foundation - Great Lakes Institute, Jan. 66-Jan 67,” Box 371, B292402, RG 3-26, AO.


116 Folder 3, “Compact Membership,” Box 4, A1118-80, NYSA.
how they overlapped and compared. In 1971, civil servants from Ontario and New York state and the federal governments corresponded about the simultaneous negotiations, ongoing IJC studies, and the International Field Year of the Great Lakes (a transnational research effort organized by academic researchers with government scientists’ support and participation). In 1972, the United States and Canada signed the Great Lakes Water Quality Agreement. It is a complex document, combining permanent IJC monitoring with new, state- and provincial-level pollution abatement programs as well as federal government funding and involvement. The binational groups who staffed the IJC’s boards were instrumental in framing its terms. The 1972 agreement is much more than the expansion of the IJC’s earlier pollution references, but the IJC’s recommendations from the 1964 reference did provide the model for a large part of it. Underlying that binational accord were several other layers of agreements. In 1971, Canada and Ontario concluded a formal agreement, laying out how they would cooperate with each other and with American jurisdictions. The Environmental Protection Agency drafted and enacted regulations for the new joint standards. The two governments and the International

117 Folder 19, “General Correspondence, 1968-72.” Box 7, A1118-80, NYSA.
118 Folder 6, “IJC – boundary waters and tributary studies,” Box 7, A1118-80, NYSA. Folders 1-5. 1967-92, GLBC comments, letters, notes on GLWQA process. Box 12, B1882-05, NYSA.
120 "In 1964 The Governments sent a bigger Reference (Docket 83) with regard to Lake Erie, Lake Ontario and the international section of the St. Lawrence River. The Commission’s Report led to the conclusion of the Great Lakes Water Quality Agreement of 1972, and to the initiation of two additional References now in progress. (Dockets 94 and 95) The 1972 Agreement confers important responsibilities on the IJC . . . information gathering and investigation, advice and recommendations to governments (federal, state and provincial), assistance in coordination of joint activities, assistance in the coordination of research, and publication of IJC reports. The Agreement also provided for the establishment by the IJC of a full-time Board to assist the Commission - the Great Lakes Water Quality Board. Administratively, this is a new departure for the IJC." Wershof, Notes on the Jurisprudence, 70-71. File “Great Lakes Pollution General” and file, “International Joint Commission,” B367414, AO. File “Subgroup 4,” B352557, AO. Metzler to Commissioner, 1971, Folder 19, “General Correspondence, 1968-72,” Box 7, A1118-80, NYSA.
Joint Commission met at length to decide exactly how the new water management arrangements would be implemented.¹²¹

The Great Lakes Water Quality Agreement was the culmination of thirty years of tangled study and discussion. Its final form shows that the civil servants who drafted its clauses, the politicians who approved it, and the people who lobbied for it were thinking about the Lakes differently than their predecessors in the mid-1940s: they were aware of ecosystems.

¹²¹ Folder 10, “IJC Minutes, Advisory Board, 1968-“ Box 8, A1118-80, NYSA. Folder 7, “IJC, Miscellaneous Reports, 1963-“ Box 8, A1118-80, NYSA.
Conclusion

Around the lower Great Lakes, transboundary water management always originated at the local level, driven by watershed residents’ shared desire for, or experience of, environmental change. At no point during the period 1900-1972 did the national, state or provincial governments of Canada or the United States decide to manage the lakes proactively — in each case, changes evolved in response to local people’s perceived needs. Once begun, the shape and tenor of the arrangements were never simple bilateral diplomacy or top-down realpolitik: they were molded by local people, by relationships among state and provincial governments, by two evolving species of federalism, and sometimes by global forces such as imperial politics and war. Water management was also shaped by the material realities of the region: by the geography and hydrology of the lakes and connecting channels, by the physical characteristics of pollutants such as mercury and phenols, and by other species such as lake trout, typhoid bacteria, and sea lamprey.

This dissertation has also shown that the relationship between empirical observation of environmental change and residents’ perception of their watershed was complex. In most cases, the local needs that pushed the various levels of government to cooperate were as closely linked to residents’ sensory perception as they were to lab-based science. Local dissatisfaction with the direction, flow and location of water resources prompted joint infrastructure projects. Human horror at waterborne diseases and distaste for the sights and smells of sewage and chemical waste prompted the International Joint Commission’s first pollution study and early attempts at cross-border pollution control. Suspicion of phenolic pollution, rather than any verifiable knowledge of the toxicity of benzene compounds, prompted the first attempts to monitor transboundary industrial pollution. The shared experience of seeing and reacting to fish and bird kills, algae blooms, waves of sludge and closed beaches
encouraged Canadians and Americans to press for pollution control. Residents’ fear of oil spills and mercury poisoning, rather than measurable harm, forced the closure of the lower Great Lakes’ fisheries in 1970 and helped push the Great Lakes Water Quality Agreement to completion. Disputes over the relative impact of overfishing versus habitat change versus natural variation upon fish populations hindered joint regulations for decades, which is one reason why the statistics and analyses of the Great Lakes Fisheries Commission are so crucial to maintaining the current sport fishing. During the seventy years covered by this dissertation, the evidence of human senses was at the root of changing water management institutions around Lake Erie and Lake Ontario, and only when people perceived a need for environmental change did the evidence marshalled by technical experts — engineering studies, lab reports, field work and archival research — come to shape policy. The weight both countries accorded to scientific research during these decades was an extremely important part of joint management of the lakes, but it was mediated by the less verifiable but undeniably powerful mechanisms of human experience.

What people perceived about their shared environment changed a great deal between 1900 and 1972. While the shared American-Canadian commitment to altering the region’s hydrology to suit human convenience remained unchanged, other aspects of transboundary water management evolved in response to anthropogenic environmental change around the lower Great Lakes and to changes in relationships between the political jurisdictions there.

Environmental historians and ecologists now know that human activities during the early and middle decades of the twentieth century were causing massive, widespread pollution through industrial activities, farming, population growth and urbanization; destroying wetlands, introducing invasive species; reducing the watershed’s forest cover and increasing its paved areas; and overfishing. Overall, people living around Lake Erie and Lake Ontario understand that these activities damaged both the watershed’s ecosystems and human health. Americans
and Canadians living through these changes were initially enthusiastic in their support for some of the most transformative joint projects, including bilateral dredging and shared hydroelectric dams. These collaborative infrastructure projects and growing economic integration across the border contributed to the region’s wealth, which was accompanied on both sides of the border by higher incomes and by improvements in public health and education – compared to these very immediate benefits, the longer-term, unintended consequences of industrialization and urbanization were difficult to assess. However, as the negative impacts of anthropogenic environmental change increased and accelerated over time, water quality and the health of the aquatic environments suffered. From the 1940s onwards, Americans and Canadians became increasingly aware of human pollution in the watershed and cooperative attempts to control it evolved in tandem with their new consciousness.

Joint water management shifted after the Second World War in several ways. Residents became less tolerant of highly polluted living spaces, and new research was conducted into the causes and consequences of industrial pollution. As people living around the lower Great Lakes gradually became more aware of the link between human health, ecosystem health, and industrial waste, their efforts to improve water quality in the connecting channels, Lake Erie, and Lake Ontario intensified and became more coordinated. Canadian-American fisheries policy moved away from unstinting support for a commercial fishing industry on the lower Great Lakes, and began to focus on the suppression of invasive species and support for recreational fisheries instead. At the same time that people’s perceptions of the Great Lakes and their hopes for water management policy were changing, the character of government in both countries and their transboundary relationships were also evolving.

During the decades between 1900 and 1972, relations between the United States and Canada grew significantly closer, and Canada’s federal government expanded its capacity for foreign policy. The two countries became military allies during World War II, and continued to
align their military policies throughout the Cold War period. The economic relationships across the border multiplied and deepened, pushed along by all levels of government and many organs of civil society. Corporations installed branch plants on both sides of the border, trade deals facilitated flows of goods and capital, professional organizations recognized each other’s credentials, and people moved across the boundary without hindrance. By the time the Great Lakes Water Quality Agreement was signed in 1972, the lower Great Lakes had become a tightly integrated and extremely prosperous region with efficient networks of steel production, chemical and petroleum refining, and auto manufacturing. These many political, military and commercial connections boosted the region’s industrial economy and contributed indirectly to its environmental impact of industry.

While national, state, provincial and local governments facilitated the industrialization of the lower Great Lakes, they were also the most important mechanisms for people living in the region to address the concomitant environmental problems that became increasingly obvious and upsetting as the years passed. State and provincial governments became more involved in both domestic and transboundary water management between 1900 and 1972, gradually acquiring administrative and expert staff, research funding, enforcement legislation, and transboundary institutions such as the Great Lakes Basin Compact. As Ontario and the states began to interact directly, they became important players in the joint management arrangements and influenced the two federal governments’ relations on these topics.

Transboundary water management was a complex, multi-jurisdiction effort whose dynamics defy a simple diagram. Different levels of government became steadily more involved in water management on Lake Erie and Lake Ontario. Depending on the division of labor within each country, federal politics, and available staff or resources, the momentum for a given water policy area might lie with national, state, provincial or municipal government. Beginning with the relatively simple Boundary Waters Treaty in 1909, Canadians and Americans developed an
increasingly sophisticated suite of institutions and informal arrangements to pursue shared management goals in the lower Great Lakes together. When the Great Lakes Water Quality Agreement was created in 1972, its terms encompassed a more ecosystemic understanding of the aquatic environment and recognized the presence of a much larger group of actors in the transboundary political space, including state, provincial and local governments. Over the course of the following three decades, the Great Lakes Water Quality Agreement became the foundation for a qualitatively different, more holistic water management agenda on both sides of the Canada-US border, which produced a remarkable reduction in point source pollution and an enormous improvement in water quality in Lake Erie, Lake Ontario and their connecting channels.

As the twenty-first century progresses, it is becoming increasingly clear that these successful joint institutions and networks are no longer adequate: goals for water management are changing again, as climate change and new forms of pollution and invasive species affect Americans, Canadians and other organisms around the lakes. In the same way that local perceptions of environmental change were instrumental in transforming the earlier joint water management tools, it is likely that our response to these new conditions will come from within the watershed, anchored in the preceding generations of treaties, laws and traditions, and shaped by the altered hydrology and geography there.

*Envoi*

People from the Great Lakes get their ideas, sometimes, around campfires. Watching the flames, we call upon storytellers and singers and we chew over big questions. Since I began this project, whenever I have gone to the Great Lakes for a summer visit, people from both sides of the border ask me, “Are the Lakes going to be given away or sold down some river?”
Are they getting better? Are we killing them? Are they going to be okay?” This dissertation contains - in footnoted, academic prose - some of my answers.

This is not a history with vivid tales of conflict and pathos. There is no single heroine or hero, or much comic relief, though there is some irony. This history will not lend itself to dramatization or picturesque re-enactment. But my hope is that it may provide a counterpoint to the familiar tales of irreparable damage caused by thoughtless people.

More and more people are aware that we are what we eat and drink, that our health and our economies depend upon the geology, biology, chemistry, and climate of our home places. The coming decades may bring those truths home, as resoundingly as the ‘Buffalo Wave’ or methyl mercury revelations did in the twentieth century. With any luck, Americans and Canadians will follow their twentieth century enthusiasm for a rich, populous Great Lakes region and their subsequent determination to revive the dying Lakes with mutual enthusiasm for a healthy, welcoming, well-cared-for space in the twenty-first. The horror and determined legal action that have accompanied the revelations of lead exposure in Flint, Michigan since 2014, and the perseverance of advocates for victims of mercury poisoning around the Grassy Narrows and Whitedog Reserves in Ontario since 1970¹ suggest that these topics matter deeply to many people and that our political systems are responding, frustratingly slow though they can be.

Scarred and invaded though they are, the shores of Lake Erie and Lake Ontario are wonderful places to live, and the people who live there care about the lakes. They care because, now more than ever, they understand that environmental stability is not a given, and

they know that their families and their livelihoods depend upon clean water. They care because they love their homes, their playgrounds, their promenades, their fishing spots. They care because the grandeur of the Great Lakes is always in the background there: a dark, silent presence at the end of city street; a raucous, teeming assembly of birds and fish and insects in a marsh at the end of the spring; the center of centuries-old cultures that endure even as the shorelines change; an abundant, clean tap that runs in all seasons. They want to live safely and peacefully by the Great Lakes, and trust that their descendants will be able to do the same.

I write this history for them, to present a clear picture of the ways in which the people who live around the lower Great Lakes perceived their changing environment, learned about it, and organized themselves to change it for the better. They were civil servants, scientists, politicians, businessmen, activists, negotiators, doctors, fishermen, conservationists, journalists, engineers, environmentalists, students, teachers, boat captains, Girl Scouts, hunters, secretaries, diplomats, farmers, and many other things. Their collective actions are worthy of an epic, a campfire tale, a history. And they are a good foundation for the next generation of joint endeavors.
Appendix A — Outstanding Canadian-American Differences, April 1906

1. The questions in respect to the fur seals in Behring Sea and the waters of the North Pacific Ocean.

2. Provisions in respect to the fisheries off the Atlantic and Pacific Coasts and in the inland waters of their common frontier.

3. Provisions for the delimitation and establishment of the Alaska-Canadian boundary by legal and scientific experts . . . or otherwise.

4. Provisions for the transit of merchandise in transportation to or from either country across intermediate territory of the other, whether by land or water, including natural and artificial waterways and intermediate transit by sea.

5. Provisions relating to the transit of merchandise from one country to be delivered at points in the other beyond the frontier.

6. The question of the alien-labor laws applicable to the subjects or citizens of the United States and of Canada.

7. Mining rights of the citizens or subjects of each country within the territory of the other.

8. Such re-adjustment and concessions as may be deemed mutually advantageous, of customs duties applicable in each country to the products of the soil or industry of the other, upon the basis of reciprocal equivalents.

9. A revision of the agreement of 1817 respecting naval vessels on the Lakes.

10. Arrangements for the complete definition and marking of any part of the frontier line, by land or water, where the same is now so insufficiently defined or marked as to be liable to dispute.

11. Provisions for the conveyance for trial or punishment of persons in the lawful custody of the officers of one country through the territory of the other.

12. Reciprocity in wrecking and salvage rights.

13. The use and disposition of international waterways, now under consideration by the International Waterways Commission, and herein, of the diversion of water which threatens the destruction of Niagara Falls.

14. The question relating to the use of the logging booms on the St. Johns River.

15. A considerable number of pecuniary claims which have arisen on both sides, which ought to be taken up in a body and disposed of.

16. There appear to be some minor matters in which citizens of Canada are interested, such as exemption from the immigration head tax upon Canadians temporarily entering the United States, and the relief of vessels coming from the Atlantic ports of the Dominion from being required to produce bills of health.

1 Durand to Grey, enclosure. May 3, 1906. File 192A, 294-316, Vol. 93, Governor General's Office, Governor General Grey Correspondence, LAC.
<table>
<thead>
<tr>
<th>Appendix B: Typhoid Death Rates (per 100,000 people)</th>
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</table>

<table>
<thead>
<tr>
<th>Typhoid death rates (per 100,000 population)</th>
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<tbody>
<tr>
<td>Chicago</td>
</tr>
<tr>
<td>New/Improved source of supply</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>Detroit</td>
</tr>
<tr>
<td>New/Improved source of supply</td>
</tr>
<tr>
<td>20.0</td>
</tr>
<tr>
<td>Cleveland</td>
</tr>
<tr>
<td>New/Improved source of supply</td>
</tr>
<tr>
<td>37.2</td>
</tr>
<tr>
<td>Buffalo</td>
</tr>
<tr>
<td>New/Improved supply, part of water filtered</td>
</tr>
<tr>
<td>23.4</td>
</tr>
<tr>
<td>Windsor</td>
</tr>
<tr>
<td>New/Improved source of supply</td>
</tr>
<tr>
<td>1906</td>
</tr>
<tr>
<td>Toronto</td>
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<td>Hamilton</td>
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<td>Windsor</td>
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<tr>
<td>USA</td>
</tr>
<tr>
<td>Canada</td>
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<td>35.5 (1912)</td>
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### Appendix C: Populations of Markets for Great Lakes Fish, 1900-1940

<table>
<thead>
<tr>
<th>City</th>
<th>1900</th>
<th>1910</th>
<th>1920</th>
<th>1930</th>
<th>1940</th>
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<tbody>
<tr>
<td>NYC</td>
<td>3,889,705</td>
<td>5,382,131</td>
<td>6,332,675</td>
<td>7,689,498</td>
<td>8,185,928</td>
</tr>
<tr>
<td>Chicago</td>
<td>2,092,883</td>
<td>2,752,820</td>
<td>3,521,789</td>
<td>4,675,877</td>
<td>4,825,527</td>
</tr>
<tr>
<td>Buffalo</td>
<td>508,47</td>
<td>621,021</td>
<td>753,393</td>
<td>911,737</td>
<td>958,487</td>
</tr>
<tr>
<td>Rochester</td>
<td>217,854</td>
<td>283,212</td>
<td>352,034</td>
<td>423,881</td>
<td>438,230</td>
</tr>
<tr>
<td>Cleveland</td>
<td>460,800</td>
<td>660,352</td>
<td>972,162</td>
<td>1,243,129</td>
<td>1,267,270</td>
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<tr>
<td>Detroit</td>
<td>426,829</td>
<td>613,773</td>
<td>1,305,798</td>
<td>2,177,343</td>
<td>2,377,329</td>
</tr>
<tr>
<td>Toronto</td>
<td>208,000</td>
<td>376,538</td>
<td>522,000</td>
<td>631,207</td>
<td>925,000</td>
</tr>
<tr>
<td>Hamilton</td>
<td>68000</td>
<td>114,151</td>
<td>175,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sources:**
Bibliography

Section 1 — Unpublished Sources


Archives Canada, Ottawa, Ontario. Governor General Grey Correspondence, Governor General's Office.

J.R. MacNicol Fonds.

RG 11, Department of Public Works fonds

RG 12, Department of Transport fonds.

RG 13, Department of Justice fonds

RG 23, Fisheries Research Board of Canada, Central registry files.

RG 24, Department of National defence fonds.

RG 29, Department of Public Health fonds.

RG 25, Department of External Affairs files.

RG 43, Department of Railways and Canals fonds

RG 51, International Joint Commission fonds.


Wilfrid Laurier Papers.


“Premier John P. Robarts General Correspondence.” RG 3-26.

“Premier Leslie M. Frost General correspondence.” RG 3-23.


National Archives and Records Administration, College Park, MD. Fish and Wildlife Service, United States Government. Record Group 22.

State Department, United States Governemnt. File 1910-29, Box 6601, 711.42155/114.


Section 2 — Published Primary Sources


“The Chicago Canal: Canada’s Case Has Not Been Fairly Stated.” 24 October 1906.

“Another Raid on Niagara Falls.” 29 May 1911.

“Chicago Scheme Stoutly Opposed.” 28 March, 1912.


The Minneapolis Journal. “Two Big Furnaces: Clergue, the Western Cecil Rhodes, to Outdo Previous Effort.” 18 February 1901.

“What Clergue is Doing at the Soo: Modern Steel Worlds with Electrical Power Furnished by New Canals - Associate Industries of Wonderful Character.” 31 August 1901.


“Funds for Irrigation” Eight Million Dollars Available for Reclaiming Arid Lands.” 16 August 1902.

“Irrigation by the Great Milk.” 24 March 1903.


“Niagara Falls Bill: Measure Likely to Pass, House Commits Reports One to Restrict Diversion of Water.” 3 June 1906.

“Oppose Lake to Gulf Waterway.” 17 January 1908.


“Big Irrigation Project: Explanation of the Proposed St. Mary Division Canal.” 19 April 1902.


“Reclaim Arid Lands: This the Subject of Secretary Maxwell’s Address to Commercial Bodies.” 11 March 1900.

“Montana’s Reclamation: The St. Mary irrigation project - An Ingenious Method of Changing a River’s Course.” 1 July 1902.

“Rainy River is to Have Power Plant: This is One of the Chief Items of Development in Canadian Northwest.” 25 June 1904.

“Supply Water for Canadian Users: Plan is Devised to Remove International Difficulty over Irrigation.” 29 April 1905.


“Preserve Niagara Falls: Secretary Taft urged to Save its Scenic Beauty.” 27 November 1906.

“Shall Chicago be a Seaport? Plans for a Ship Canal from Gulf to Great Lakes,” 2 September 1907.


Section 3 - Secondary Sources


For Better or For Worse: Canada and the United States into the Twenty-first Century.


MacFarlane, Daniel. “‘A Completely Man-Made and Artificial Cataract’: The Transnational Manipulation of Niagara Falls,” Environmental History 18, no. 4 (October 2013): 859-784.


