HELLGATE TO HIGHWAY: ISLAND MAKING, DREDGING, AND INFRASTRUCTURE IN THE DETROIT RIVER, 1874-1938

By

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ABSTRACT

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This dissertation exposes the tensions, trials, and tribulations along the U.S.-Canada border in the Detroit River between 1874 and 1938. I study how dredging—a seemingly inert process of removing river bottom sediment and depositing it elsewhere—helped create landforms across and along the political border, in turn, revealing the myriad social and political tensions that undergird it. By exposing how infrastructure revealed border tensions, especially those related to resource extraction, scarcity, and national security—on both sides of the Canada-U.S. border—this dissertation offers a new way to link environmental and border history as well as environmental diplomacy.

The lower Detroit River forms the ideal study site for two interrelated reasons. One, its narrow and rocky riverbed along the shipping channel was a dangerous bottleneck, slowing traffic on one of the busiest waterways in the world. Two, dredging the lower part of the river kept this busy waterway running efficiently. The Livingstone Channel fundamentally reordered the Detroit River when it was carved out of the riverbed where hitherto there existed fish spawning grounds and shallow water. Concentrating on the lower Detroit River in general and the Livingstone Channel in particular, this dissertation will show how conflict and cooperation overlapped when it came to international diplomacy in the Great Lakes.

Cultural and social historians have analyzed Great Lakes borderlands. Environmental historians though have yet to fully analyze these lakes. The political border between the United States and Canada has often been portrayed as being benign and uncontested. Yet, as this

dissertation shows, border infrastructure, such as shipping channels, was seldom uncontested. By focusing on the political border, this dissertation aims to bring attention to the border as a site rather than a liminal space or an end zone of state sovereignty. The border in this reading is the origin of state sovereignty. Studies of the Canada-U.S. borderlands have often explored the role of international environmental diplomacy, especially in the joint management and conservation of binational water bodies like the Great Lakes through policy mechanisms such as the Boundary Waters Treaty (BWT) of 1908 and the International Joint Commission. As my dissertation shows, however, the BWT was an important staging point on which the different intercultural and international misunderstandings were exposed.

The Great Lakes have often been cast as being abundant, yet there is little or no work on how that plentitude was not just manufactured in thought, but also embodied in infrastructures. As a transformative process, dredging does not seem monumental. Yet, dredging in the Detroit River has permanently lowered the levels of Lakes Huron and Michigan by at least 25 cm. Dredging thus reveals how environmental transformation lies at the heart of Great Lakes geography as we know it. By exposing dredging in a connecting channel, this dissertation shows that infrastructural creation and imagination undergirds the Great Lakes environment. Infrastructure, as I show, is an important and unseen filter to understand intercultural and international relationships. This is especially true of countries such as the U.S. and Canada which pride themselves in intercultural similarities more than differences. Studying conflict and contestation offers a novel way to understand the cooperative mechanism that drives current borderlands diplomacy. Studying dredging along the lower Detroit River in the nineteenth and twentieth centuries reveals ideas about nature as well as historical challenges and contestations to them.

This dissertation is dedicated to the reasons I started this and persisted, from my present, future, and past:
Matsya and Maya
Krishneir Ramakrishnan (1911-2000)
Bhuvaneshwari Ramakrishnan (1917-2013)

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At MSU, I have been fortunate to have surrounded by a stimulating and engaged intellectual community. In my first semester as doctoral student in history (with no prior training in the field), my imposter syndrome was much higher than it is today. I would not have survived the semester if not the stimulating and kind classes led by Drs. Conroy-Krutz, Smith, and Steinberg. Taking a course by a scholar about to retire was a tremendous privilege. Thank you, Dr. Siegelbaum for engaging so thoughtfully with a novice. Mindy, I will forever be grateful for that hug you gave me in the Olin parking lot in the fall of 2019. It was a season from hell and every day was about survival. That hug saved me that day. Dr. Forner's class was truly exceptional. Seldom have I enjoyed theorizing and history as much as I did during his class. Not only have I learned immensely from these scholars about how to research, but I have also had the incredible opportunity to watch some tremendous pedagogues. I truly appreciate the clarity and compassion that both Professors Stamm and Hanshew showed me in their role as the Director of Graduate Studies.

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Introduction

Rivers, geologists tell us, have headwaters and a mouth.[1] They are moving bodies of water that transport silt, pebbles, and salts along their course to the ocean, building new land and extending continents. Predicating mobility and motion and privileging legibility, this idea of a river, devoid of social and cultural context, is a distinctly modern definition, one that essentializes water and its properties. It is based on the abstraction of water, as Jamie Linton wrote, into "undifferentiated stuff (H_2O) occurring in a universal form (the hydrologic cycle) that leaves behind all chorographic and cultural uniqueness."[2]

Studying water history raises the question: can water, as a modern product, have a history?[3] In the premodern world, as "a rule, rivers were not—could not—be known as abstract hydrological phenomena but were known, rather, in relation to the social context in which they became manifest."[4] They were "*part of society*, figuring as full actors in the founding myths, the legends, and the rituals out of which social relations were spun."[5] This is not to say rivers were left to run free in the premodern world, far from it. Manipulation, control, and exploitation in the

[1] According to the USGS, "A river forms from water moving from a higher elevation to a lower elevation, all due to gravity. When **rain** falls on the land, it either seeps into the ground or becomes **runoff**, which flows downhill into rivers and lakes, on its journey towards the seas. In most landscapes the land is not perfectly flat—it slopes downhill in some direction. Flowing water finds its way downhill initially as small creeks. As small creeks flow downhill, they merge to form larger streams and rivers. Rivers eventually end up flowing into the oceans." See "Rivers, Streams, and Creeks," *Water Science School,* June 6, 2018. Available at: https://www.usgs.gov/special-topics/water-science-school/science/rivers-streams-and-creeks. Emphasis original. Last accessed March 14, 2022.

[2] Jamie Linton, *What Is Water? The History of a Modern Abstraction*, Nature/History/Society (Vancouver: UBC Press, 2010), 94.

[3] In *H_2O and the Waters of Forgetfulness,* Ivan Illich applies historical methods to offer alternative ways of relating to and knowing water. Water, according to Illich, we moderns know water as a scientific abstraction. This mode of knowing means we lose the ability to experience water as "stuff." This "ineffable stuff called water," Illich argues, is formless and is disclosed to us in virtually infinite ways. Ilich laments that our loss in knowing the waters "of the deep imagination […] that stuff which can gurgle, and chant and sparkle and flow and rise in a fountain and come down as rain […] but also comes down [among the Lacandon people in the south of Mexico] as the souls of the women who have died and come down as rain." The very idea of studying the history of water, Illich thinks, might be a strange notion because we have come to think of water as not having any history. See Ivan Illich and David Cayley, *Ivan Illich in Conversation* (Concord, Ont: Anansi, 1992), 246.

[4] Linton, *What Is Water?*, 92–93.

[5] Linton, 93.Italics original.

premodern world were tempered by the recognition of water and rivers of their sacred dimensions "and an appreciation of the social context in which various waters were sustained."[6]

Studying water or river history then is a meditation on people and their ideas. Much like the ways water surfaces reflect and refract light rays, river histories imitate societal and historical processes and people. Privileging people over nature reflects our intellectual biases, revealing the drowning out of heterogeneity.[7] This is especially true for water histories. Despite writing about inherently different waters, river historians have seldom examined the very essence of the waters in their works.[8] This is not a critique as much as a comment on the kinds of voices that historians' privilege. The conceptual tools to listen to rivers and water are not available to historians, rather reading archival materials, maps, and data to look for traces of a river.[9] Even with these voices and opinions on what rivers should be and how they should behave, historians' privilege one form of knowledge over others. Specifically, scholars and historians acknowledge an understanding of water rooted in the hydrologic cycle, a representation that disembodies water

[6] Linton, 93.

[7] Christopher Hamlin considers how, water at earlier stages in Western history, represented in four literary traditions of classical natural history, classical natural philosophy, religion and folklore, and the medical literature that promoted mineral springs. Hamlin examines these traditions identifying a transition from an empirical emphasis on diverse "premodern waters"—heterogeneous entities with different qualities and properties—to a modern "essentialist conception of water itself." This transition into this essentialist conception occurred throughout the industrialized world by the end of the nineteenth century. C Hamlin, "'Waters' or 'Water'? — Master Narratives in Water History and Their Implications for Contemporary Water Policy," *Water Policy* 2, no. 4–5 (2000): 321, https://doi.org/10.1016/S1366-7017(00)00012-X.

[8] The loss of the heterogeneity of waters to the idea of a single, abstract, essential substance called water centered around the identification of water as a compound of oxygen and hydrogen in the late eighteenth century by proto chemists. This identification overturned the idea that water constituted an element, one that had been understood as truth for almost two millennia. The "H_2O…which industrial society creates" to "a discordant sound that is foreign to waters that reverberates through the plumbing of modern cities." The "twentieth century has transmogrified water into a fluid with which archetypal waters cannot be mixed." See Ivan Illich, *H2O and the Waters of Forgetfulness*, Ideas in Progress (London: Boyars, 1986), 7.

[9] Jamie Linton contends that the essentialist conception of water "not only destroyed the irreducible variety of waters encountered in premodern times but had the effect of disembedding these waters from the myriad social contexts and relationship that had constituted them in the first place." Unravelling the water molecule did not singularly destroy premodern waters, they constituted complementary processes like the evolution of scientific chemistry among others. Linton, *What Is Water?*, 75–76.

from both nature and society.[10] Although historians listen to sources, they often do so through materials that objectify, essentialize, and forget heterogeneous and socially embedded ideas about water. Some scholars and activists have begun to question this asocial water.[11] Detailed and constant quantification inevitably frames water as a resource, which can only be utilized through infrastructure creation, further severing the social connection that water as a compound once enjoyed. Quantities of flows and knowing the hydrologic cycle, i.e., being able to point to sources, mouths, and terrains, rendered rivers more legible for complete control.[12]

The desire to control rivers and water is premised on the hydrologic cycle, the continuous circulation loop between the earth and the atmosphere that conceives water as constantly changing states and in motion.[13] The history of this representation becoming truth reveals how water became fixed in space and time. The hydrologic cycle became the *only* accurate means to

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[10] A variety of waters persisted into the nineteenth century in people's imagination, environment, and language. The emergence of modern water deeply related to it being quantifiable accomplished through scientific hydrology. The term hydrology came to denote scientific practices dealing with quantities of water with little regard to quality. To be the preeminent and sole legitimate brand of hydrology, a need existed to jettison the particularities and varied properties of waters. The development of scientific hydrology as a discipline became a key turning point that both quantified water as well as abstracted it from its cultural and social contexts. The core of abstract, modern water, Linton describes it, is the construction of the idea of H_2O as well as the hegemonic status of the hydrologic cycle. Linton argues that despite being produced in relation to social (i.e., scientific) practice, modern water is nevertheless taken to be entirely independent of social relations. Drawing on Actor-Network Theory, Linton claims that modern water's independence from society is not only fictious but also at the former's core. Linton, *What Is Water?* See also Hamlin, "'Waters' or 'Water'?" 321.

[11] See Amita Baviskar, *Waterscapes: The Cultural Politics of a Natural Resource* (Permanent Black: Ranikhet, Uttaranchal, 2007).

[12] On the face of it, the hydrologic cycle "represents an important scientific achievement in understanding the behaviour of water in the hydrosphere." Considering the history of the hydrologic cycle, Linton points out "the mistake of confusing the representation with reality." The hydrologic cycle is, after all, a human story/ rendering of natural phenomena that have become fixed in space and time, alienated from social and cultural contexts. Linton suggests that there are two non-overlapping histories of the hydrologic cycle—the sacred and the scientific—whose tracing reveals how and why modern water became a resource to be exploited and conserved in ways unimaginable to the ancients and their waters. To be sure, the hydrologic cycle effectively describes "the potentiality and complexity of water within a range of possibility defined by the physical properties of H_2O on earth." Employing the Heideggerian term of *Gestell* in reference to the hydrologic cycle, Linton shows how hegemonic this representation of water is. Imagined only like this, compels humans to act, to use this water because the cycle had become so legible. Even the instruments hydrologists use to measure the movement of water are premised on helping better visualize the hydrologic cycle. According to Linton, eventually modern water became all water and rivers. See Linton, *What is Water?,* 106; for a longer discussion on this, refer to chapters 5-9 of this book.

[13] "The Hydrologic Cycle," *National Weather Service,* National Oceanic and Atmospheric Administration. See https://www.weather.gov/jetstream/hydro#:~:text=The%20hydrologic%20cycle%20involves%20the,transpiration

describe how water *ought* to behave.[14] Infrastructure embodies this intuition, guiding our reading of rivers. Reinforcing the artificial demarcation between land and water—maps, designs, and data, essentialize nature. Marking a river as a line on a map invents it, opening the door to designing it.[15] As Anuradha Mathur and Dilip da Cunha point out that perhaps, "the lines of rivers are not universal, but rather products of a particular literacy through which water is read, written and drawn on the earth's surface, on paper, and in imagination."[16] Rivers then need to be 'read' on a map not as primordial nature but as inventions and creations. A river is as natural as the infrastructure that transforms it. This tension informs the original questions undergirding this study: what if rivers were read through infrastructure? What if infrastructure were the lens to help understand change over time in both the built and natural environment?

So much of the ink spilled on rivers focuses on infrastructure—especially dams. This line of scholarship, though fruitful, reveals a vacuum in the literature. There is little or no work that investigates the invisible infrastructures that also disrupt natural rhythms.[17] The general

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[14] As Linton shows, modern water came into its own most starkly in the 20th century when the wave if large-scale infrastructure built upon the diffused propagation of modern water by scientific hydrology, creating physical artifacts. This was mostly visible in postcolonial where infrastructure embodied modernity and the nation-state. Large dams have long stored more ideas than water. Linton, *What is Water?,* see also Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002); Patrick McCully, *Silenced Rivers: The Ecology and Politics of Large Dams*, Enlarged & updated ed. (London; New York: Zed Books, 2001). Emphasis mine.

[15] Dilip da Cunha, *The Invention of Rivers: Alexander's Eye and Ganga's Descent*, 1st edition, Penn Studies in Landscape Architecture (Philadelphia: University of Pennsylvania Press, 2018).

[16] Anuradha Mathur and Dilip da Cunha, "Waters Everywhere," in *Design in the Terrain of Water*, ed. Anuradha Mathur et al. (Philadelphia, Pa.: Applied Research + Design Publishing with the University of Pennsylvania School of Design, 2014), 5.

[17] Environmental transformation did not mean the anthesis of nature. In *Rivers of Empire,* Donald Worster shows how multipurpose river valley projects, and pork-barrel politics together reordered the American West. He remarks that engineers in the American West conceived of the nature as irrational, allowing deviation, deluges, and droughts. If nature's imperfections could be cured by engineering projects, then such a rationally ordered world would yield steady result. Worster seems to suggest that engineers thought nature could be corrected through the use of technology. Nature without flaws was the demand of science, according to Worster. Such a corrective fundamentally changed the way nature came to be understood. To yield rational, steady results, rivers had to be studied as complete, singular units from source to sea to be wholly productive. No longer could they be associated with locality; they had to work as an entire watershed to be useful. Thus "conservation" to most American hydraulic engineers of the late 19th and early 20th century meant complete technological dominance of rivers to ensure maximum efficiency. As most of these engineers realized in due course, such a task could be undertaken only by the

scholarship on dams has created a nostalgia for wilderness, further reinforcing the human-nature binary. We do not often look for the myriad seemingly minor dikes or infrastructures that reorder and come to appear as nature themselves. With a reading of rivers through smaller infrastructures, we see that nature and infrastructure are not antithetical nor is their entanglement new.

Any river on a map is more human intention than natural, much like the hydrologic cycle. Both are representations that are taken to be faits accompli, losing sight of their mimetic functions. This representation, or essentialization, is where this dissertation begins. The central question driving this dissertation asks: why was the lower Detroit River modified the way it was? This dissertation traces the different ideas of transformation for engineers, the shipping lobby, policymakers, and politicians. This was an ontological question *and* a pragmatic one, for everyone involved. The nuances and differences lie in the different actors and their vantage points. Following how the ontological and the pragmatic are intertwined and for whom, underscores the tangled relationships between nature, technology, and culture.

The historical actors I discuss all grew deeply interested in transforming the Detroit River. Their ideas about modifying, manipulating, and managing the river were premised on the received wisdom of *modern* water and the hydrologic cycle. Engineers, lobbyists, policymakers, politicians, and residents all acted on the river. The alterations they wrought were prefaced by institutions and intent, and ultimately, obscured over time by trees and tropes. These transformations over time reveal underlying processes. In this case, creating a hydraulic highway

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state- able to part with its vast resources, assemble a permanent body of expertise and patiently wait for returns. Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 1st ed (New York: Pantheon Books, 1985); Richard White, *The Organic Machine: The Remaking of the Columbia River*, 6. printing, A Critical Issue (New York: Hill and Wang, 1995); Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water*, Rev. and updated (New York, N.Y., U.S.A: Penguin Books, 1993); McCully, *Silenced Rivers*.

along the Detroit River highlights capitalism as the causal force underlying the multiple channels and waterways within the river.

Capitalist extractive processes brought technological and political attention to rivers in general, and the Great Lakes in specific. In the nineteenth century, the use of steam power changed more than the resting liquid state of water. It powered human imagination to think beyond the limited endurance of the human body. The political economy of capitalism is held together by its ability to fundamentally recast its relationship with nature through extractive practices. To support this extraction, transportation technologies especially seminal. Building on the most efficient technology available at the time—steam and water—engineers, capitalists, and the state all worked together to profiteer from nature. Reordering natural waterways and building new ones shrunk the natural world whilst expanding the industrial one. The growth of natural, physical, and applied sciences aided this in interrelated but discrete ways. Natural and physical scientists tried to better understand the natural world and its processes by collecting and collating data. Applied scientists like the engineers who animate much of this dissertation worked closely with capitalists to enforce an extractive regime on the world, using technology and data to better put this world to use. The engineers who thought about dikes and dams in the lower Detroit River were transforming nature, not for its sake but to service it for profit. Indeed, rendering a landscape or a waterscape legible was to make it more lucrative.[18] The rest of this introduction

[18] This is not an exhaustive list but there is a lot of recent work on the ways in which quantification of nature went a long way in aiding capitalist development of the world, embedding extractive processes. Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge, Mass: Harvard University Press, 2004); Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*, New edition (Princeton: Princeton University Press, 2020); Brian Larkin, "The Politics and Poetics of Infrastructure," *Annual Review of Anthropology* 42, no. 1 (2013): 327–43; McCully, *Silenced Rivers*; Worster, *Rivers of Empire*; Donald Worster, *Dust Bowl: The Southern Plains in the 1930s*, 25th anniversary ed (New York: Oxford University Press, 2004); William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England*, 1st rev. ed., 20th-anniversary ed (New York: Hill and Wang, 2003); William Cronon, *Nature's Metropolis: Chicago and the Great West*, 1st ed. (New York and London: W.V Norton & Company, 1991); White, *The Organic Machine*; Matthew D. Evenden, *Fish Versus Power: An Environmental History of the Fraser River*, Studies in Environment and History

begins with the geographical context, contributions to literature, and historical context and ends with the charting of narrative arcs, analytical tools utilized, and the key chapter themes.

Geographical Context

The Laurentian Great Lakes contain "84% of North America's surface fresh water," and "about 21% of the world's supply of fresh water."[19] "Shared with Canada and spanning more than 750 miles (1,200 kilometers) from west to east," these lakes empty into the St. Lawrence River and thence the Atlantic Ocean.[20] The lakes are one system, connected by straits—all called rivers—St. Mary's, St. Clair, Detroit, and Niagara. Initially settled by Indigenous Peoples, the Lakes caught the attention of Europeans when Samuel de Champlain spoke with a group of Algonquian people near the Lachine Rapids in modern-day Montreal. Thinking in terms of water bodies he knew like Lake Geneva, Champlain, and the explorers who followed him were not fully prepared for the enormity of these water bodies, often expecting to find the ocean where they found these freshwater behemoths instead.[21] Moving along St. Clair and Detroit rivers, explorers remarked on the variety and richness of wildlife.[22] Bringing the Great Lakes into the mental geographies of European explorers came at multiple ecological, social, and cultural costs. The misidentification of a strait as a river might have been a minor error at the time; the explorers labeling these

(Cambridge, U.K. ; New York: Cambridge University Press, 2004); Pierre Bélanger, ed., *Extraction Empire: Undermining the Systems, States, & Scales of Canada's Global Resource Empire* (Cambridge, Massachusetts: MIT Press, 2018).

[19] United States Environmental Protection Agency, "Facts and Figures about the Great Lakes," U.S. Government Website, U.S. Environmental Protection Agency, accessed April 26, 2022, https://www.epa.gov/greatlakes/facts-and-figures-about-great-lakes.

[20] United States Environmental Protection Agency.

[21] Wayne Grady et al., *Great Lakes the Natural History of a Changing Region* (Vancouver [C.-B.: Greystone Books, 2012), 7–8, http://www.deslibris.ca/ID/443045.

[22] J. L. Riley, *The Once and Future Great Lakes Country: An Ecological History*, First paperback edition, McGill-Queen's Rural, Wildland, and Resource Studies Series 2 (Montreal; Ithaca: McGill-Queen's University Press, 2014), 122.

waterways had no frame of reference to compare them to. Thus, while the Detroit River is perhaps better labeled as a river and a strait or a river-strait than a river since it connects two larger bodies of water (Lakes St. Clair and Erie), it continues to be called a river. However, the mislabeling of straits such as the Detroit did not end at the map; it created a larger vocabulary centered on improvement. In the nineteenth century, with the development of steam power, artificial canals such as the Suez, became the crucibles of improvement projects, from dams to canal networks.[23] As such, the 'rivers' of the Great Lakes improved along the same lines as their namesakes across the world.

Compared to other rivers on the continent, the Detroit River is not long, turbulent, or even grand. Unlike tempestuous rivers like the Mississippi or Colorado, the flow of the Detroit River is relatively constant, and 95 percent of its volume is drawn from Lakes Huron and St. Clair. The river runs around 28 miles long, unevenly flowing around multiple islands. Some of these islands—Zug, Crystal Bay and Island, Elizabeth Park—are all human-made. Others like Mamajuda no longer exist, blasted away to keep lake shipping safe. Engineers heavily augmented most of the islands, especially those in the lower river, and some more curiously than others.[24] Much of the river's velocity depends on the infrastructure guiding its flow, whether it is

[23] Although set in colonial India, Gilmartin chronicles the remarkable and monumental transformation of the Indus basin into the world's largest integrated irrigation system, premised on distinctly 19th-century ideas about water, rivers, and the need for improvements. Acciavatti also chronicles how the Ganges transformed through canals, barrages, and subsequently dams. Anthony Acciavatti, *Ganges Water Machine: Designing New India's Ancient River* (San Francisco: Applied Research and Design, 2015).David Gilmartin, *Blood and Water: The Indus River Basin in Modern History* (Oakland, California: University of California Press, 2015).

[24] Bois Blanc Island, known in the U.S. as Bob-Lo, was given a long tail to stabilize water levels in the 20th century. David H. Bennion and Bruce A. Manny, "Construction of Shipping Channels in the Detroit River—History and Environmental Consequences," Scientific Investigations Report, Scientific Investigations Report (Reston, VA: U.S. Geological Survey, 2011); U.S. Fish and Wildlife Service, "Department of the Interior, Fish and Wildlife Service, Availability of Draft Comprehensive Conservation Plan and Environmental Assessment for Wyandotte National Wildlife Refuge, Wyandotte, Michigan, and Ecorse, MI," August 21, 2001, https://www.fws.gov/policy/library/2001/01fr43898b.pdf.

the Livingstone or the Amherstburg channels, or the other artificial waterways within the river. Before engineers altered it, the Detroit River once supported extensive wetlands.[25]

The experience of the Detroit River is not an exception. People have long altered waterscapes across the Great Lakes, connecting channels and their tributaries. Some of the most prominent modifications, which will play key roles in this dissertation, were the Chicago diversion, the St. Mary's River, and canals such as the Welland. The largest diversions affecting Lake Superior's water levels are the Long Lac and Ogoki which are in northern Ontario. Operated by the Ontario Power Commission, these two diversions, completed in the mid-twentieth century, bring water into the lakes, accounting for about six percent of the largest lake's volume.[26] The Chicago Diversion, the most controversial of these improvements, stopped the river from reaching Lake Michigan and instead diverted its flow into the Mississippi via the Des Plaines and Illinois rivers. The diversion achieved two seemingly impossible feats. First, it ensured Chicago's sewage and refuse were not released into Lake Michigan, keeping the city's sole source of potable water clean. Second, by sending the city's pollution and its namesake river down to Illinois and eventually the Mississippi rivers, the diversion bridged a watershed gap between the Great Lakes and the Mississippi river valley, albeit a narrow one. The Chicago diversion was first begun in the early nineteenth and was not complete until the early twentieth century. During that time, the diversion became an epicenter of discord between the United States and Canada as well as American states. Since the Chicago River fed into Lake Michigan, the only lake within U.S. territorial waters, its diversion, although problematic to the Canadians,

[25] Bruce A. Manny, Thomas A. Edsall, and Eugene Jaworski, "The Detroit River, Michigan: An Ecological Profile," Biological Report (Washington D.C.: U.S. Fish and Wildlife Service, U.S. Department of Interior, April 1988), https://hdl.handle.net/2027/mdp.39015086473694. Today, there is a move to bring back such wetlands through initiatives like the Detroit International Wildlife Refuge, see e.g. John H. Hartig, *Waterfront Porch: Reclaiming Detroit's Industrial Waterfront as a Gathering Place for All* (East Lansing, MI: Greenstone Books, 2019).
[26] Nancy Langston, *Sustaining Lake Superior: An Extraordinary Lake in a Changing World* (New Haven; London: Yale University Press, 2017).

could not be a part of binational debates. That was until Lake Michigan was brought into the ambit of the regulatory purview of the International Joint Commission in the early twentieth century.[27] Today, operated by the U.S. Army Corps of Engineers (henceforth referred to as the Corps), the Chicago Diversion is the last line of defense against the invasive Asian Carp.[28] Until the Ogoki and Long Lac diversions into the Great Lakes, the Chicago diversion altered the hydrological rhythms of the lakes more directly as it was unregulated until the U.S. Supreme Court interceded in the 1920s. The Chicago Diversion remained a persistent thorn in the Corps' side because it was a central concern for the Canadians.

The St. Mary's River connects Lakes Huron and Superior. Over its course, the river goes over rapids creating a shipping obstacle. Instead of dredging out the rapids, the Corps, as well as the Canadian government, built locks to bypass the turbulent waters. Freight that went up the Detroit River inevitably went up the St. Mary's as well, and changes in the St. Mary's were important to and related to those in the Detroit River.[29] The Welland Canal "connects lakes Erie to Ontario," bypassing Niagara Falls.[30] Built-in stages over the nineteenth and twentieth centuries, the canal constituted the shortest route to Lake Erie, relative to the Erie Canal which connected the Atlantic via the Hudson River. [31]

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[27] Libby Hill, *The Chicago River: A Natural and Unnatural History* (Carbondale: Southern Illinois University Press, 2016); Herbert H. Naujoks, "The Chicago Water Diversion Controversy, III," *Marquette Law Review* 31, no. 1 (May 1947): 28–79; Stanley A. Changnon and Joyce M. Changnon, "History of the Chicago Diversion and Future Implications," *Journal of Great Lakes Research* 22, no. 1 (January 1996): 100–118, https://doi.org/10.1016/S0380-1330(96)70940-1.

[28] Jim Duncker, "The Chicago Area Waterway System, Asian Carp, and the Great Lakes," https://acwi.gov/monitoring/webinars/CAWS_AsianCarp_20111013.pdf; Dan Egan, *The Death and Life of the Great Lakes*, First edition (New York: W.W. Norton & Company, 2017); Jeff Alexander, *Pandora's Locks: The Opening of the Great Lakes-St. Lawrence Seaway* (East Lansing, Mich: Michigan State University Press, 2009).

[29] "The Sault Ste. Marie Canal and Hay Lake Channel: Official Report of the Proceedings of the Waterways Convention Held at Sault Ste. Marie, Michigan, July 20th, 1887" (Duluth: Daily News Print, 1887).

[30] W. A. O'Neil, "The Welland Canal," *Journal of the Waterways and Harbors Division* 84, no. 2 (March 1958), https://doi.org/10.1061/JWHEAU.0000072.

[31] Roberta McAfee Styran and Robert R. Taylor, *This Colossal Project: Building the Welland Ship Canal, 1913-1932* (Montreal, Quebec; Kingston: McGill-Queen's University Press, 2016).

Contributions to Literature

This dissertation helps fill three main gaps in the literature. First, I interrogate the trope of abundance that grew over the Great Lakes' history. Through examining the rise of the lakes' shipping lobby, I reveal the transformation of techno-infrastructural diplomacy run by technocrats, mediated by policy mechanisms, and rooted in infrastructure creation. The history of the environmental transformation in the lower Detroit River offers a lens to study the beginning of environmental diplomacy between the United States and Canada as well as the emergence of regulatory frameworks like the Boundary Water Treaty. It also traces the emergence of the shipping lobby and the preeminent boosters, the Lake Carriers Association (henceforth referenced as the Carriers) as well as a corrective to the images of the plentitude of the Great Lakes that obscure more than they reveal. Putting these changes in broader context reveals that the infrastructures in the lower Detroit River had effects on the hydrological regime of the Great Lakes whilst also laying a precedent for border relations between the two nations.

Abundance Through Hidden-in-Plain-Sight Infrastructure

Abundance is a major theme in Great Lakes historiography. Questioning the trope of abundance by centering on hidden-in-plain sight infrastructure, this dissertation offers a corrective to how we understand infrastructure. William Cronon, one of the first scholars to think about abundance in the American landscape, argues in *Changes in the Land* that when settler-colonists first came to New England, they found abundance in sharp contrast to the scarcity they had just left.[32] As the field of U.S. environmental history grew, "abundance" made way for "scarcity" as the hegemonic trope in the field, especially in the case of histories of the American West. Some of the defining works of western environmental history such as *Cadillac Desert,*

[32] Cronon especially addresses this in the second section of the book, *The Ecological Transformation of Colonial New England.* See *Changes in the Land, 19-158*.

Rivers of Empire, and *Silenced Rivers* revealed that water in the American West represented more a mirage than reality.[33] Recent scholarship has investigated changes to the western landscapes by analyzing them as settler-colonial water-and-landscapes.[34]

U.S. environmental historians became preoccupied with scarcity, virtually ignoring the Great Lakes and its perceived abundance. In their 2007 essay, Lynn Heasley and James Feldman argued that Great Lakes were understudied because these transnational bodies do not easily fit conventional environmental history frames, especially because abundance "has defined the cultural, economic, and environmental development of the Great Lakes region and its role nationally and internationally." This stood in stark contrast to the organizing principle of environmental scholarship on the North American West: scarcity.[35] Growing from that insight, recent scholarship has paid attention to these binational bodies, investigating the evolution and

[33] These three works constitute field-defining works for not only bringing more attention to how humans had deeply transformed the western United States but also for analyzing the effects of these transformations. Reisner, *Cadillac Desert*; McCully, *Silenced Rivers*; Worster, *Rivers of Empire*.

[34] This new line of inquiry has sought to show how settler colonial ideas of control and long-term capitalistic ideologies and processes completed altered Indigenous landscapes. Some of this new literature includes Andrew Needham, *Power Lines: Phoenix and the Making of the Modern Southwest*, Politics and Society in Twentieth-Century America (Princeton (N.J.) Oxford (GB): Princeton University Press, 2014); Traci Brynne Voyles, *The Settler Sea: California's Salton Sea and the Consequences of Colonialism*, Many Wests (Lincoln: University of Nebraska Press, 2021); Traci Brynne Voyles, *Wastelanding: Legacies of Uranium Mining in Navajo Country* (Minneapolis: University of Minnesota Press, 2015).

[35] To be sure, there had been some work on fishing the Great Lakes predating the essay as well as some early work on the environmental problems in the Great Lakes, an inheritance of industrialization in the Midwest. Some of this work like Annin's *The Great Lakes Water Wars* was very apocalyptic while others like Dempsey showcased regionally important stories. James Feldman and Lynne Heasley, "Recentering North American Environmental History: Pedagogy and Scholarship in the Great Lakes Region," *Environmental History* 12, no. 4 (2007): 953; see also Margaret Beattie Bogue, *Fishing the Great Lakes: An Environmental History, 1783-1933* (Madison, Wis: University of Wisconsin Press, 2000); Stephen Bocking, "Fishing the Inland Seas: Great Lakes Research, Fisheries Management and Environmental Policy in Ontario," *Environmental History* 2, no. 1 (1997): 52–73; Terence Kehoe, *Cleaning up the Great Lakes: From Cooperation to Confrontation* (DeKalb: Northern Illinois University Press, 1997); John H. Hartig, ed., *Honoring Our Detroit River: Caring for Our Home* (Bloomfield Hills, Mich: Cranbrook Institute of Science, 2003); *Burning Rivers: Revival of Four Urban-Industrial Rivers That Caught on Fire* (Brentwood: Multi Science Publishing, 2010); and *Waterfront Porch*; Dave Dempsey, *Ruin & Recovery: Michigan's Rise as a Conservation Leader* (Ann Arbor: University of Michigan Press, 2001); Dave Dempsey, *On the Brink: The Great Lakes in the 21st Century* (East Lansing: Michigan State University Press, 2004); Peter Annin, *The Great Lakes Water Wars* (Washington: Island Press, 2006); Jerry Dennis, *The Living Great Lakes: Searching for the Heart of the Inland Seas*, 1st ed (New York: Thomas Dunne Books, 2003); William McGucken, *Lake Erie Rehabilitated: Controlling Cultural Eutrophication, 1960s-1990s*, 1st ed, Technology and the Environment (Akron, Ohio: University of Akron Press, 2000).

impact of policies and institutions, as well as the myriad environmental challenges of these waterscapes exacerbated by infrastructure creation, hydroelectric development, and climate change.[36]

Between investigating scarcity and large-scale infrastructures—on both a material and policy level—environmental history has yet to pay adequate attention to the abundance that Heasley and Feldman outlined. I argue that while infrastructures will continue to be the starting point in any study of environmental transformation—unlike the gargantuan dams, canals, and irrigation schemes that dot many of the world's other riverscapes—the infrastructures in the Great Lakes are far more subdued, and sometimes even "natural" looking. These small dikes, dams, diversions, and even islands are often obscured by the veil of vegetation over them, rendering them indistinct in the larger waterscape. Indeed, these are hard to find on a map or a satellite image unless one is looking for them. Tracing hidden-in-plain-sight infrastructures, this dissertation shows that the plentitude of the Great Lakes is as much manufactured as it is natural.

The Detroit River constituted a microcosm of a larger transformation afoot across the lakes, one that we can only understand if we put some of these projects in conversation with one another, as some of the historical actors in this dissertation do. Yet others sought to downplay their interconnectedness. During the International Joint Commission (henceforth referenced as the Commission) hearings about the need for compensatory dikes in the lower Detroit River,

[36] Two of the most recent books that address the Great Lakes are *Border Flows* and *Water Without Borders.* Alexander, Egan, and Langston have recently written on the impact of human activities on the Great Lakes while others like Macfarlane have examined the St. Lawrence Seaway as well as the alteration of Niagara Falls. See Lynne Heasley and Daniel Macfarlane, eds., *Border Flows: A Century of the Canadian-American Water Relationship*, Canadian History and Environment Series, No. 6 (Calgary: University of Calgary Press, 2016); Emma S. Norman, Alice Cohen, and Karen J. Bakker, eds., *Water Without Borders? Canada, the United States and Shared Waters* (Toronto: University of Toronto Press, 2013); Daniel Macfarlane, *Fixing Niagara Falls: Environment, Energy, and Engineers at the World's Most Famous Waterfall*, 2020; Daniel Macfarlane, *Negotiating a River: Canada, the US, and the Creation of the St. Lawrence Seaway*, Nature, History, Society (Vancouver: UBC Press, 2014); Alexander, *Pandora's Locks*; Riley, *The Once and Future Great Lakes Country*; Egan, *The Death and Life of the Great Lakes*; Langston, *Sustaining Lake Superior*.

Canadian officials, media, and citizens outlined how the water level issues in the Detroit River interrelated to the Chicago diversion upstream while the Corps sought to downplay this connection. Diverting waters away from the lakes reduced levels in downstream areas such as the Detroit River, where shipping traffic faced treacherous waters due to low levels. The Corps' proposal to embed compact compensatory infrastructures to regulate levels in the Detroit River along with similar attempts in the St. Mary's, St. Clair, and Niagara rivers localized a system-wide problem in the hope that these smaller solutions would allow safe passage of freight.[37] Thus, when traced together and taking a step back, at a watershed level, these piecemeal infrastructures helped create the idea that the Great Lakes are abundant, even as the historical actors in this dissertation reveal that these blue behemoths were (and are) fragile because they are so plentiful. Tracing how, why, and when, these infrastructures were embedded in the lower Detroit River from 1874 to 1938, helps us uncover the interconnectivity, intractability, and impertinence obscured by the trope of abundance.

The planning and designs behind these infrastructures reveal how these water regimes came to be. In the Great Lakes, infrastructure creation became a part of sediment and water management regimes. These regimens, broadly classified as dredging, the removal of silt from waterbodies, included extraction and deposition. Fundamentally, these regimes altered how the Great Lakes functioned as an integrated system because dredged channels and corridors within these water bodies increased outflow as well as short-term water levels with more unpredictable and bothersome fluctuations.[38] There has been little or no interest in these regimes and their

[37] *Testimony in Re The Livingstone Channel on the Reference of the Governments of the United States and the Dominion of Canada Under Title IX of the Treaty of May 5, 1910* (Washington D.C.: U.S. Government Printing Press, 1913), https://www.loc.gov/item/13035458/.

[38] One of the first events voyagers noticed related to the short-term fluctuations in the Great Lakes. For instance, waves many feet high often raised water levels in the lower Detroit River for a few hours. John Disturnell, *The Great Lakes, or, Inland Seas of America: Embracing a Full Description of Lakes Superior, Huron, Michigan, Erie, and Ontario; Rivers St. Mary, St. Clair, Detroit, Niagara, and St. Lawrence; Commerce of the Lakes ...: Together*

impacts on how abundance came to define the Great Lakes, but there has been much written on the afterlives of these infrastructures.[39]

Relatedly, environmental history scholarship has long investigated the impact of large infrastructural projects with demonstrable and visible effects, specifically on large dams, canals, and aqueducts.[40] There is little work, however, on how incremental, iterative, and unobtrusive infrastructures transform the waterscapes they live in. In thinking about infrastructure and its effects, Richard White argues in *The Organic Machine* that the dams that transformed the Columbia River created a human-mechanical artifact that looked like a river but worked like a machine.[41] Since then, scholars have moved on to questioning the convergences between the environment and the history of technology questions.[42] Other scholars like Marc Cioc have taken a biographical route, outlining how the Rhine River Commission commodified and improved the river to serve commerce and industry.[43] There has, however, been a lack of interest in smaller, unassuming infrastructures of control and compensation such as the ones dotting the Great

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with a Guide to the Upper Mississippi River, Giving a Description of Cities, Towns, Etc. : Forming Altogether a Complete Guide for the Pleasure Traveler & Emigrant : With Maps and Embellishments (New York: American News Co., 1868).

[39] Landscape architects have especially been interested in how, where, and when these sediment landscapes, Confined Disposal Facilities (CDFs) could be redesigned to be a gathering place for communities. See Sean Burkholder, "Designing Dredge: Engaging the Sediment Landscapes of the Great Lakes Basin," *Journal of Landscape Architecture* 11, no. 1 (January 2, 2016): 6–17, https://doi.org/10.1080/18626033.2016.1144602.

[40] There is a lot of literature that considers the impacts of large dams like *Silenced Rivers* or *One Valley and a Thousand.* Ashley Carse offers a new way of analyzing the needs for and impact of the Panama Canal, paying close attention to the intersections between ecology, people, politics, and infrastructure in *Beyond the Big Ditch.* There is also new work examining the intersections and inconveniences of settler imposed extractive infrastructure on Indigenous communities like in *Aqueduct* and *Dammed.* McCully, *Silenced Rivers*; Daniel Klingensmith, *"One Valley and a Thousand": Dams, Nationalism, and Development* (New Delhi: Oxford University Press, 2007); Adele Perry, *Aqueduct: Colonialism, Resources, and the Histories We Remember*, Semaphore Series (Winnipeg: ARP Books, 2016); Ashley Carse, *Beyond the Big Ditch: Politics, Ecology, and Infrastructure at the Panama Canal*, Infrastructures Series (Cambridge, Massachusetts: The MIT Press, 2014); Brittany Luby, *Dammed: The Politics of Loss and Survival in Anishinaabe Territory*, Critical Studies in Native History 21 (Winnipeg, Manitoba: University of Manitoba Press, 2020); Reisner, *Cadillac Desert*.

[41] White, *The Organic Machine*.

[42] An early example of this is Sara B. Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, Harvard Historical Studies 172 (Cambridge, Mass: Harvard University Press, 2011).

[43] Cioc shows how the Rhine represented different entities for the different actors involved. Mark Cioc, *The Rhine: An Eco-Biography, 1815 - 2000*, Weyerhaeuser Environmental Books (Seattle: Univ. of Washington Press, 2002).

Lakes. By examining how engineers created and negotiated these infrastructures, this dissertation questions the very essence of how we understand infrastructure which has long been characterized as being the substratum.[44]

The term infrastructure is usually tied to concepts of visibility and legibility.[45] According to James Scott in *Seeing Like a State*, "legibility is a central problem in statecraft."[46] By legibility, he refers to the ability of the state to read the terrain and people within its borders through various technologies and infrastructures that centered on simplifications. Simplified landscapes and populations could be read easily and therefore extracted from. Although Scott considers scientific forestry in his book, there is much that can be extrapolated from the example. In abstracting and simplifying natural processes, scientists and engineers were able to order them, rendering them legible and manipulatable.

The ability to read and simplify landscapes is critical in studying them and getting them to 'work' for you. In the Great Lakes, legibility helped build up the image of plenitude. As much as these waterscapes could be read, they could also be alienated into smaller further intelligible parts and projects, where the actual construction work was concentrated. The abundant readability of lakes made them prone to losing the gradual, inconspicuous infrastructures which were iterative and incremental. In bringing forth piecemeal infrastructures, this dissertation also builds on new work on human-nature hybrid waterscapes.[47]

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[44] Ashley Carse, "Keyword Infrastructure – How a Humble French Engineering Term Shaped the Modern World," in *Infrastructures and Social Complexity: A Routledge Companion*, ed. Asturo Morita, Penny Harvey, and Casper Bruun Jensen (London and New York: Routledge, 2016); Brian Larkin, "The Politics and Poetics of Infrastructure," *Annual Review of Anthropology* 42, no. 1 (2013): 327–43.

[45] Carse, "Keyword Infrastructure – How a Humble French Engineering Term Shaped the Modern World"; James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*, Yale Agrarian Studies (New Haven, Conn.: Yale Univ. Press, 1998).

[46] Scott, *Seeing like a State*, 2.

[47] Carse, Cons, and Middleton edited a recent issue of *Limn* that examined the idea of chokepoints, investigating how in the Great Lakes chokepoints have led to dredging. There is also new work investigating the upper reaches of the Mississippi as an extremely transformed waterscape. See Ashley Carse, Jason Cons, and Townsend Middleton,

In his work on Niagara Falls, Daniel Macfarlane examines the use of at-scale physical models to better understand river behavior in the mid-to-late twentieth century to show how engineers learned from these models as they weighed the impacts of natural erosion against the aesthetic and economic use of Niagara Falls.[48] However, back in the late nineteenth century, without sufficient long term flow data, engineers in the lower Detroit River used maps and other two-dimensional projects to make sense of the river, rendering it legible both as a template for future change as well as outlining its current conditions for ship captains. These flattened projects fulfilled another important function: division and containment. The Great Lakes were not just contained in their original beds but could now be apportioned into smaller parts for specific uses and users. Flattened and easily allocated, these rivers were restrained to their localities. Different projects in the same river were reported separately when the Corps sought funding, fostering the delimitation. At first sight, the local and limited projects the Corps oversaw throughout the Great Lakes did not impact others. Localized and local projects obscured the legibility, footprint, and impact of these multiple infrastructures that fixed one issue at a time.

This explicitly localized thinking further embedded incremental and iterative infrastructure into the waterscape. The channels, and other compensatory structures in the lower Detroit River, essentially treated it like a live model. The very act of modeling is premised on trial-and-error methods. Each failed infrastructure became the starting point for a new effort, with none of this being malicious but meant to enable nature to reach its potential as defined by

eds., *Limn: Chokepoints*, vol. 10, 2018; John O. Anfinson, *The River We Have Wrought: A History of the Upper Mississippi* (Minneapolis: University of Minnesota Press, 2003).

[48] Macfarlane, *Fixing Niagara Falls*; D. Macfarlane, "'A Completely Man-Made and Artificial Cataract': The Transnational Manipulation of Niagara Falls," *Environmental History* 18, no. 4 (October 1, 2013): 759–84, https://doi.org/10.1093/envhis/emt065.

anthropogenic ideas. Engineers, ship captains, and the shipping lobby deeply believed that they worked to improve the river and help achieve its full potential.

Emergence and Growth of the Shipping Lobby

In both scholarship and public imagination, railroads are often associated with power and boosterism.[49] Some of the seminal work on the evolution and sustained presence of boosters relates to that on railroads. In *Railroaded,* historian Richard White argues that railroad expansion was inextricably tied to the state and collapsed both space and time, albeit unevenly. Railroad corporations were not harbingers of rationality, efficiency, or order; instead, anti-monopolistic movements kept them in check. White questions the mystery of modernity, i.e., how were powerful people so ignorant of the reactions they set in motion? He also shows how the transcontinental railroads opened "the question of a national market and the relation of the East and the West."[50] Tracing their evolution, White shows how these entrepreneurs running the railroads made tremendous amounts of money without necessarily ensuring solvency or success for their business. Railroads drew upon U.S. Congressional subsidies and appropriations to sustain both investment and expansion. White claims the transcontinental railroads "transformed government itself by making the government an arena in which the corporations themselves competed and by making Congress, bureaucracy, and the courts a mechanism for corporate competition."[51] The railroads scaffolded together bond sales, interest rates, legal loopholes, land

[49] In January 2022, when the Canada Northern line passing through East Lansing was being repaired rendering 500 or so feet of asphalt on South Harrison Road unusable for nearly three weeks without notice of how long it might take, I called the City of East Lansing who were unaware of the closure. The city engineer came down to the tracks to figure out why. She called me back and lamented about the 'power of the railroads' to just be able to shut down roads without notice or providing an estimate of when they might be done. The sheer lack of agency and power this city official felt in comparison with the perceived power of the railroads reminded me of just how ingrained these ideas are in public imagination.

[50] Richard White, *Railroaded: The Transcontinentals and the Making of Modern America*, 1st ed (New York: W.W. Norton & Co, 2011), 38.

[51] White, 512.

grants, and dummy constructions. Ultimately, as the scaffold collapsed, so did the roads themselves.

Railroad expansion after the Civil War has been a strong and consistent topic of inquiry.[52] In the American South, the destruction of railroads became seminal to the northern advance.[53] In Michigan, railroads predated statehood and proliferated around burgeoning urban areas as well as the mineral-rich Upper Peninsula.[54] One of the sustaining themes in scholarship is the ability, ambition, and coalescence of the railroad lobby. As this dissertation shows, the evolution of this lobby held lessons for shipping as well, an understudied phenomenon.

The Detroit and St. Clair rivers posed considerable problems for U.S. railroads as they were reliant on railroad ferries to cross the border. As this dissertation addresses, when talk of dredging began, there was immediate pushback from railroads as they wanted to bridge the Detroit River instead. What initially began as a confrontational relationship between shippers and railroads evolved into a far more cooperative framework. Through this process, shippers learned from the railroad lobby, crafting their organization—the Carriers—as well as methods to deal with labor strife. However, the fundamental difference between the railroads and the shippers related to the reliance and close relationship with the Corps. As they grew as an

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[52] This is not an exhaustive list as the work on railroads is voluminous. However, there is an increasing attention to how railroads transformed the shape, form, and properties of American capitalism and settler colonialism. Mark Wahlgren Summers, *Railroads, Reconstruction, and the Gospel of Prosperity - Aid under the Radical Republicans, 1865-1877* (Princeton (N.J.) Oxford (GB): Princeton University Press, 2016); David Haward Bain, *Empire Express: Building the First Transcontinental Railroad* (New York: Penguin Books, 2000); Michael J. Connolly, *Capitalism, Politics, and Railroads in Jacksonian New England*, Shades of Blue and Gray Series (Columbia: University of Missouri Press, 2003); Michael A Hiltzik and Ltd Mapping Specialists, *Iron Empires: Robber Barons, Railroads, and the Making of Modern America*, 2021; Manu Karuka, *Empire's Tracks: Indigenous Peoples, Racial Aliens, and the Transcontinental Railroad* (Oakland, California: University of California Press, 2019); Cronon, *Nature's Metropolis: Chicago and the Great West*, 1991.

[53] William G. Thomas, *The Iron Way: Railroads, the Civil War, and the Making of Modern America* (New Haven: Yale University Press, 2011); John E. Clark, *Railroads in the Civil War: The Impact of Management on Victory and Defeat*, 2. print, Conflicting Worlds (Baton Rouge: Louisiana State University Press, 2008).

[54] Graydon M. Meints, *Michigan Railroads and Railroad Companies* (East Lansing: Michigan State University Press, 1992); Graydon M. Meints, *Railroads for Michigan* (East Lansing: Michigan State University Press, 2013).

organization and in their proximity to Washington, the Carriers also ensured they had trusted members stationed in Detroit to work closely with the district Corps engineer.[55] By following appropriations, calculations, and designs, I reveal how close the Corps and Carriers were. As the Corps increasingly became designers and intermediaries advertising projects for private contractors to do the construction, they served the needs of the Carriers.

The fact that the Carriers constituted the preeminent boosters in binational waters indicates not just the economic supremacy of American-origin cargo on these waters but also an acknowledgment of Canada's shifting priorities. Confederation in 1867 was in part thanks to railroads, as the intercontinental railway was written into the Constitution Act of 1867 (also known as the British North America Act) which created the Dominion of Canada.[56] Scholars have argued that Canada's very existence "as an economic unit is predicated upon transportation and communication technology."[57] The "very *idea* of Canada depends upon a rhetoric about technology."[58] Settler national space in Canada was premised on the annihilation of time and space through communication and transportation technologies such as the telegraph and the railway, especially the Canadian Pacific Railway (henceforth referred to as the Pacific) which "reproduced and extended a state apparatus and economy which concentrated power in metropolitan centres permitting the incorporation and domination of margins."[59] The Pacific more than connected parts of Canada, it "offered the possibility of a mythic rhetoric of national

[55] The shipping lobby did not just constitute a platform advocating for more monies but also addressing emergent labor issues, learning from the railroads. George R. Ryan, *Lake Carriers' Association History 1880-2015* (Place of publication not identified: Xlibris, 2017).
[56] Tom Murray, *Rails across Canada: The History of Canadian Pacific and Canadian National Railways* (Minneapolis, MN: Voyageur Press, 2011); A. A. den Otter, *The Philosophy of Railways: The Transcontinental Railway Idea in British North America* (Toronto; Buffalo: University of Toronto Press, 1997).
[57] Maurice Charland, "Technological [Canadian] Nationalism," *Canadian Journal of Political and Social Theory* 10, no. 1–2 (1986): 199.
[58] Charland, 199. Emphasis original.
[59] Charland, 199–200.

origin."[60] Simply put, it "was an element of a strategy based in the belief that a nation could be built by binding space."[61] The Pacific changed the scales of the Canadian settler experience binding space and people to technology whilst collapsing time, in ways that waterways could not. The pursuit of an east-west railway that embodied Canadian expanding settler nationhood did not necessarily destabilize the fundamental importance of water and waterways to Canadian identity. Waterways and the St. Lawrence continued to occupy Canadian national and political imagination.[62]

Though an interest to develop railways existed in Canada, this interest did not overshadow the long-term investment in canals, especially in the Welland. However, Canadians slowly realized and reconciled the possibility that their desire to dominate the Great Lakes shipping trade might remain unfulfilled.[63] Thus when the Canadian marine interests did come together to form the Dominion Marine Association in 1903, this body was self-reflective enough to acknowledge their limited sphere of influence when it came to dredging and infrastructure

[60] Charland, 199–200.
[61] State sponsored large infrastructural projects had long been at the base of settler selfhood in Canada, the construction of the Pacific amplified that, laying bare "the genesis of technological nationalism as a component in the project of building the national state." In connecting the disparate parts of the country through one rial line, the Pacific embodied a transportation system that facilitated the "territorial annexation, colonization, and the implantation of a military presence." Rhetorically, it also aided in the idea that Canada was for Canadians, "united in the national project and under the political authority of a national government." The use of technology and science as nationalizing forces is not new to Canada. Scholars such as Blair Stein have argued that Canadian settler national identity has a distinctly envirotechnical premise whose resonance draws upon the vast distances and landmass of Canada as well as the mastery over these distances. The traditional rhetoric has centered around railways. Blair Stein, "North Stars and Sun Destinations: Time, Space, and Nation at Trans Canada Air Lines/Air Canada, 1945-1970," in *Made Modern: Science and Technology in Canada*, ed. Edward Imhotep-Jones and Tina Adcock (Vancouver ; Toronto: University of British Columbia Press, 2018); Charland, "Technological [Canadian] Nationalism," 201.
[62] The possibility of a Trent-Severn Waterway became a major anxiety causing moment for American newspapers and boosters. See James T. Angus, *A Respectable Ditch: A History of the Trent-Severn Waterway 1833-1920* (Kingston and Montreal: McGill-Queen's University Press, 1988).
[63] Douglas Owram, *Building for Canadians: A History of the Department of Public Works 1840-1960* (Ottawa: Public Relations and Information Services, 1979), 66–67.

creation.[64] Canadians—politicians and locals—often also vociferously opposed developments, especially the Livingstone Channel. This local activism was not episodic, sustaining and winning small and big fights in the Detroit River region.[65] Following the development of the shipping lobby as well as antecedents to modern opposition to projects such as the Livingstone Channel then, this dissertation offers a corrective to historiography, which has thus far been preoccupied with ecosystem revivals and the age of environmentalism.[66]

Evolution of the Techno-infrastructural Diplomacy

Local activists in the early twentieth century usually confronted the Corps either directly and/or through their politicians. This dissertation closely follows engineers' correspondences with one another on projects as well as their responses to local activists. This approach offers another corrective to the extant and growing body of literature on binational environmental diplomacy. There has thankfully been a resurgence in scholarly interest in the Commission and its century of work.[67] While the cohesive work of the Commission has found some new interest, there has been longstanding attention on the policy outcomes stemming from this binational body.[68] Legal experts have tried to analyze why the Commission chose to investigate pollution

[64] International Joint Commission, "Report on the Livingstone Channel, April 8, 1913. Recommendations in Reply to Questions Submitted by the Governments of the United States and Canada, October 16, 1912. Treaty of May 5, 1910." (Government Printing Office, Washington DC, 1913), 171–74, IJC Files.
[65] In 2013, the Windsor Port Authority invited public comment about the possibility of developing Ojibway Shores, the last remaining natural shore on the Detroit River. A vociferous and continuous movement existed against it. Finally in 2021, the Canadian federal government and the city of Windsor announced that Ojibway Shores would likely be a part of a new national park. Anne Jarvis, "Jarvis: The Day That Was the Turning Point for Ojibway," *Windsor Star*, August 10, 2021, https://windsorstar.com/news/local-news/jarvis-the-day-that-was-the-turning-point-for-ojibway.
[66] Hartig, *Honoring Our Detroit River*, 2003; Hartig, *Burning Rivers*; David Stradling, "Dike 14, Cleveland, Ohio: Containing Pollution in the Age of Ecology," *Rachel Carson Center for Environment and Society, Munich, Germany*, June 21, 2018, https://doi.org/10.5282/rcc/8340; David Stradling and Richard Stradling, *Where the River Burned: Carl Stokes and the Struggle to Save Cleveland* (Ithaca: Cornell University Press, 2015).
[67] Daniel Macfarlane and Murray Clamen, *The First Century of the International Joint Commission*, 2020, https://www.deslibris.ca/ID/458677; Chirakaikaran Joseph Chacko, *International Joint Commission between the United States of America and the Dominion of Canada* (New York: Columbia University Press, 1932).
[68] Murray Clamen and Daniel Macfarlane, "The International Joint Commission, Water Levels, and Transboundary Governance in the Great Lakes: IJC, Water Levels, and Transboundary Governance," *Review of Policy Research* 32, no. 1 (January 2015): 40–59, https://doi.org/10.1111/ropr.12107.

instead of infrastructure in boundary waters.[69] Yet, there is little attention to when and how this shift occurred. This dissertation addresses parts of that transformation, centering on the 1912 Detroit River references. Much of the work on binational treaties and frameworks along the U.S.-Canada border has concentrated on the cooperative aspect of the Commission, without necessarily paying heed to these hearings.[70] The Livingstone Channel matter constituted an early instance of the Commission circumscribing its own rules in conjunction with the restrictive reference—a submission by the United States and/or Canada under the aegis of the Boundary Waters Treaty to the Commission seeking the latter's investigation and insight—sent by the Corps.

The 1912 hearings and consequent reports show how and when the Commission restricted itself, creating a space for the resurgence of infrastructure creation as being the ambit of engineers. Before the Commission came about, a strong culture of cooperation existed among engineers from both nations. As the purveyors of knowledge as well as the interlocutors between people, politicians, and special interest groups, engineers in both the United States and Canada had long worked together to ensure the creation and propagation of infrastructure.[71] In the Great Lakes, engineers in both the United States and Canada held politicians' hands as the latter apportioned monies to improve these waterways, writing extensive notes that went from engineers' offices in Detroit to Washington D.C. before crossing the border to Ottawa. Already laden with additional commentary from Washington D.C., these notes accumulated more

[69] James G. Chandler and Michael J. Vechsler, "The Great Lakes-St. Lawrence River Basin from an IJC Perspective," *Canada-United States Law Journal* 18 (1992): 261–82.
[70] Heasley and Macfarlane, *Border Flows*; Norman, Cohen, and Bakker, *Water without Borders?*; John E. Carroll, *Environmental Diplomacy: An Examination and A Prospective of Canadian-U.S. Transboundary Environmental Relations* (Ann Arbor: University of Michigan Press, 1983); Daniel Macfarlane, "Natural Security: Canada-US Environmental Diplomacy," in *Undiplomatic History: Rethinking Canada in the World*, ed. Asa McKercher and Phillip Van Huizen (Montreal: McGill-Queen's University Press, 2019), 107–36.
[71] Karen M. O'Neill, *Rivers by Design: State Power and the Origins of U.S. Flood Control* (Durham [N.C.]: Duke University Press, 2006).

opinions before being copied and sent to London, Toronto, and Windsor—the federal, provincial, and local offices respectively. Engineers worked with politicians in all these offices, the London office being the most consequential as the federal Public Works engineers. Eventually, this chain of correspondence, dovetailed with many missives, went back to the Privy Council and the Governor-General. Stamped and sealed with approval, thin memoranda would cross the border, much to the relief of the Detroit district engineer. Engineers, who conversed among themselves and with both governments, cultivated a specific and specialized vocabulary that centered cooperation over conflict, especially in politics. Engineers became cognizant of the political border and used collaboration to work along it by centering infrastructure creation as the bridge between the two nations.[72] Commerce, creation and compensation were the troikas undergirding infrastructure and cooperation. Technocrats and engineers ran this diplomacy, which I call "techno-infrastructural," rooted in infrastructure creation, compensatory regimes, and undergirded by cooperation,

The Commission briefly decentered this vocabulary and relationship for a few months. Yet, by the end of the hearings in 1912, the Commission had set its priority to pollution.[73] Adjudicating but once on the lower Detroit River, the Commission did not get back into those

[72] In the 1890s the Customs Collector at Amherstburg stopped dredging at the mouth of the Detroit River registered his intent to seize all dredges working on the limekiln crossing since he felt they were in Canadians waters. Without referencing this, O.M. Poe, head of the Army Corps in Detroit, wrote an oblique letter to U.S. Secretary of War Daniel S. Lamont indicating that something needed to be done. When he finally wrote to the Canadian Privy Council, his call for cooperation constituted a "request" for permission to continue dredging premised on the logic that both nations recognized the importance of the improvements and supported them without regard for the political border. Letter from O. M. Poe, Col. Corps of Engineers, Brevet Brigadier General, to the Secretary of War, RG 12 Vol. 3658 File part 2 1893-1943, File no 4800-3, Library and Archives, Canada.

[73] Even before completion of the 1913 hearings, the Commission had set its eyes on pollution. From 1913, the Commission conduced an in-depth and detailed investigation of pollution in the Great Lakes, representing this first time that the Commission took on pollution and has continued to be preoccupied with it through the 20th century. International Joint Commission, "Pollution of Boundary Waters. Report of the Consulting Sanitary Engineer upon Remedial Measures, March 8, 1816." (Government Printing Office, Washington DC, 1918), HaathiTrust, http://hdl.handle.net/2027/mdp.39015002110339; Chandler and Vechsler, "The Great Lakes-St. Lawrence River Basin from an IJC Perspective."

murky waters when engineers wanted to create more infrastructure, even new islands, even though it could have. Thus, the Commission left the door open for the return of techno-infrastructural diplomacy. Even while sidestepping the Commission, in their rehabilitated roles, engineers imbibed an added aspect of the border relationship—binational organizations. Thus, the Corps and the Public Works used the Commission's decision as the origin point on which they built their incremental plans for infrastructure creation. Today, these infrastructures appear as a part of the river, perhaps a little more curiously shaped than others, camouflaged by trees. Peeling away the layers of sediment deposition reveals how and why that residue was even called for. Centering a historical inquiry in a place obscured not by sight but by memory seems like a good place to begin contemplating how we got here.

Historical Context: Cadillac, Canals, and Chokepoints

In the early eighteenth century, on his observations of the river and its surrounding country, Antoine de la Mothe Cadillac reported that "Detroit is, probably, only a canal or a river of moderate breadth, and twenty-five leagues in length."[74] Despite having grossly overestimated the length of the river, Cadillac did remark that "so many vast meadows where the freshness of these beautiful streams" existed to keep the "grass always green."[75] Soon, Cadillac wrote back to France outlining his agenda and relations with Indigenous People. In the space of a few decades, the town that shared a name with the river would eclipse the latter.

[74] Ernest J. Lajeunesse, ed., *The Windsor Border Region: Canada's Southernmost Frontier: A Collection of Documents* (Toronto: The Champlain Society for the Government of Ontario, University of Toronto, 1960), 18.
[75] Lajeunesse, 18; Clarence Monroe Burton, *When Detroit Was Young*, ed. M.M. Quaife (Detroit MI: Burton Abstract and Title Co.a, 1930).

Detroit, as a central trade post, brought the French Empire closer to the heart of the continent.[76] Even as the French were learning the hard way, trying to find a middle ground, there were other western empires to consider.[77] Detroit and the Great Lakes were the epicenters of the Anglo-French animosity to capture the fur trade. Even so, as recent scholarship has reminded us, these empires did not decimate Indigenous communities, nor was western colonial power absolute.[78] European colonial powers had grown weaker than we might have first understood.[79] Most importantly, scholars have consistently challenged the representation of the river lines on maps that separated Indigenous People from their homelands.[80] Settlement was violent at all levels.

Often subsumed in the social and cultural disturbance of settlement is how colonizers approached and resolved land and water issues. The French built Fort Pontchartrain to solidify their presence in the Upper Lakes, considering the encroaching British. To do so, they replicated

[76]In *Masters of Empire,* McDonnel argues that the closure of the trading post at Michilimackinac and the setting up of one at Detroit seemed to signal a disadvantageous turn in French policy for the Anishinaabeg. By inviting other Indigenous Peoples without regard to their relations with each other, Cadillac sowed the seeds for French failure at Detroit. Michael McDonnel, *Masters of Empire: Great Lakes Indians and the Making of America* (New York: Hill and Wang, 2015).

[77] Richard White, *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650-1815*, First, Cambridge Studies in North American Indian History (Cambridge (UK), New York (USA): Cambridge University Press, 1991); Susan Sleeper-Smith, *Indian Women and French Men: Rethinking Cultural Encounter in the Western Great Lakes*, Native Americans of the Northeast (Amherst, Mass: University of Massachusetts Press, 2001).

[78] In her book, Marrero outlines how French-Indigenous families and their networks were to 18th-century Detroit. Karen L. Marrero, *Detroit's Hidden Channels: The Power of French-Indigenous Families in the Eighteenth Century* (East Lansing: Michigan State University Press, 2020).

[79] Michael J Witgen, *An Infinity of Nations: How the Native New World Shaped Early North America* (Philadelphia, University of Pennsylvania Press, 2012; Kathleen DuVal, *The Native Ground Indians and Colonists in the Heart of the Continent* (Philadelphia: University of Pennsylvania Press, 2006).

[80] In *Indigenous Prosperity and American Conquest,* Susan Sleeper-Smith challenges the perceived supposed ecological and social emptiness of the Ohio River Valley, arguing that Indians were not "minor obstacles to western expansion" but instead "constituted a viable alternative," one "lost for centuries under the ashes of burnt crops, charred villages, and the masculine monuments of a destiny made manifest only by amnesia and self-interest." Susan Sleeper-Smith, *Indigenous Prosperity and American Conquest: Indian Women of the Ohio River Valley, 1690-1792* (Williamsburg, Virginia: Chapel Hill: Omohundro Institute of Early American History and Culture; University of North Carolina Press, 2018).

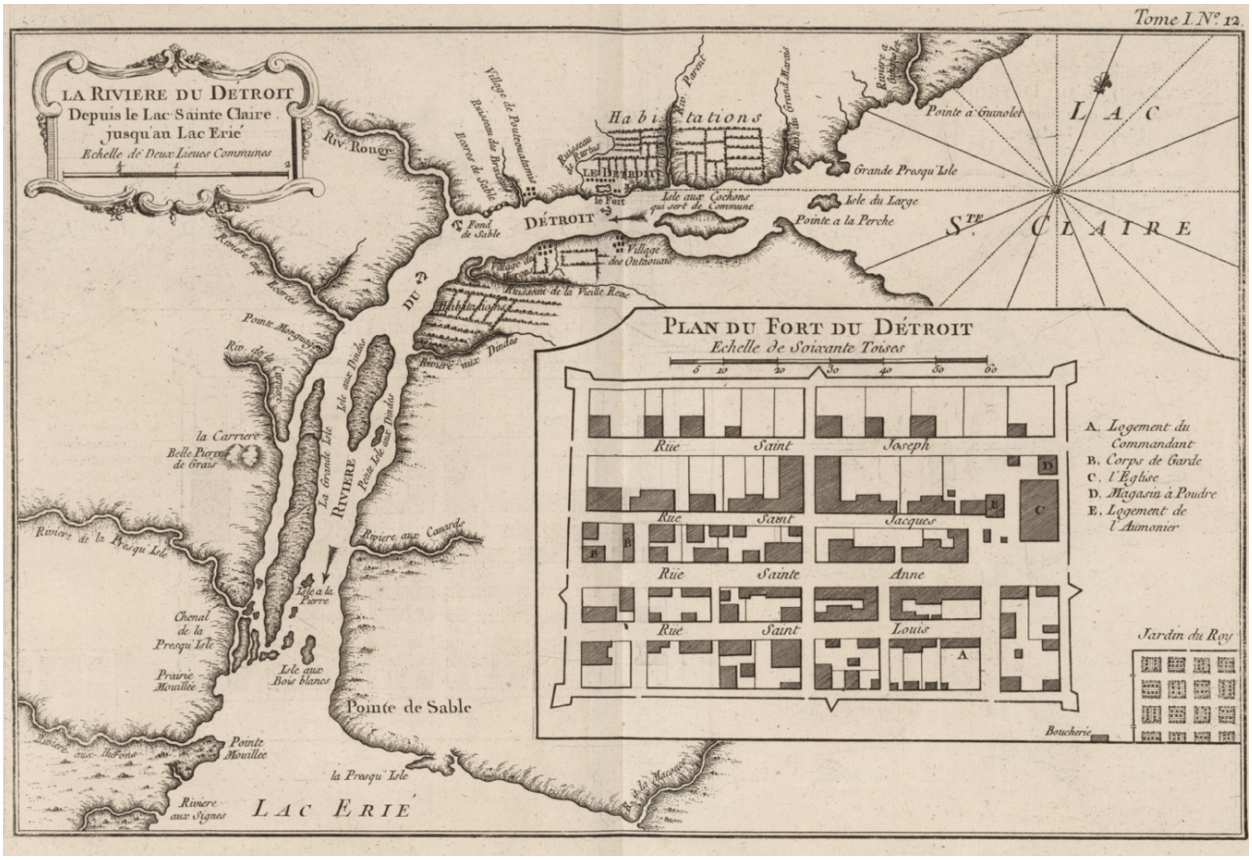

Figure 1: La Riviere Du Detroit Depuis Le Lac Sainte Claire Jusqu'Au Lac Erie, 1764. Publisher: Jacques Nicolas Bellin. Source: David Rumsey Map Collection, David Rumsey Map Center, Stanford Libraries. This map shows the ribbon farms dotting the countryside as well as the French fort. If one looks closely, one can also see Indigenous settlements around the fort as well as near the ribbon farms in modern-day Windsor.

replicating and embedded the agricultural society centered around the St. Lawrence to the Detroit River region, evident in where and how they allotted land. Ribbon farms that allowed river frontage they hoped would foster both settlement and agricultural production.[81] By the time Detroit changed hands to the British at the end of the Seven Years' War, ribbon farms and settlers were enmeshed in the land and waterscape. The river, meanwhile, continued to flow, now straddling ribbon farms and greater Euro (albeit French)-Indigenous families. Figure 1 shows

[81] Guillaume Teasdale, *Fruits of Perseverance: The French Presence in the Detroit River Region, 1701-1815*, McGill-Queen's French Atlantic Worlds Series 4 (Montreal ; Kingston ; London ; Chicago: McGill-Queen's University Press, 2018), 63.

this reality, magnifying colonial settlements, marking tributaries, islands, and the direction of the river current. At first glance, one cannot see Indigenous settlements magnified, although they are marked with a small degree of detail. This scale of representation aside, Indigenous leaders like Pontiac relied on the mounting discontent of their people to face the increasing colonial presence in their homelands. Indigenous People had actively used the river to their advantage for millennia, inhabiting its islands, farming, and fishing along wetlands. Pontiac was no different. Building coalition and drawing upon their knowledge of the river and its environs, Pontiac's attack and siege of the colonial settlement only further exposed the fissures in Indigenous-colonial relations.[82]

The brief British presence in Detroit from 1760 to 1796 changed some mainstays of the previous French occupation. For instance, the British disrupted "French claims to public property rights much more than their claims to private property rights."[83] This held especially true in the Hog Island (now Belle Isle) dispute during which the British changed usage from public to privately owned island.[84] Claiming islands for private parties became practice as both the British and later Americans embraced wholeheartedly, thus further reinforcing the embedding of colonial ideas about property and land into the river.[85] In transforming land, economic, and social relations, the British expanded Detroit, and its connections to the world. Placing this growing urban agglomeration in a transnational context, recent scholarship has shown how tenuous the place of Detroit in both the British and later American orbits, only fostered its unique

[82] McDonnell questioned the representation of Pontiac's Rebellion as the first instance of a pan-Indigenous unity, suggesting instead the Pontiac was built on a coalition first erected in 1757. McDonnel, *Masters of Empire*. See also George B Caitlin, *The Story of Detroit* (Detroit MI: The Detroit News, 1926), 1–70;
[83] Teasdale, *Fruits of Perseverance*.
[84] Teasdale, *Fruits of Perseverance*, 63–68.
[85] *Frontier Metropolis* examines changes to both land and representation between 1701 and 1838. See Brian Leigh Dunnigan, *Frontier Metropolis: Picturing Early Detroit, 1701-1838*, Great Lakes Books (Detroit: Wayne State University Press, 2001).

social, political, and institutional culture that was premised on localisms rather than paying heed to a distant empire or center.[86] Central to these trade flows was the Detroit River both as an enabling waterway as well as one along which passage needed to be controlled. U.S. customs officials and Indian agents as they "became interpreters of the Jay Treaty" found new ways to control movement across the border for British nationals and "American citizens."[87]

Controlling movement across and even along the river as well as the border was an important reality, especially after the American takeover of Detroit. This held especially true given the increasing cleavage between an American society rooted in the bondage of African Americans and a British colony across the river that would soon outlaw the practice. As Tiya Miles shows in *Dawn of Detroit*, enslaving people was not new in the city, no matter who the colonial power was. Decentering the notion that Detroit was devoid of its own enslaved population but instead principally the last stop to freedom, Miles outlines the long and deep connections between slaveholding and the city.[88] Even as the nascent American nation-state stamped its presence on people and places, the Detroit River came into sharp focus when the

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[86] The early story of Detroit demonstrates, Catherine Cangany argues "commerce and culture and localism and imperialism" instead of a linear story of eventual Americanization. The book is a striking attempt to combine Atlantic history as well as borderlands history, Cangany shows how the transformation of Detroit related to its inclusion as well as exclusion into larger orbits of trade, and politics. The numerous times Detroit changed hands, before the nineteenth century only increased its localisms, as the city could not particularly see itself as belonging to either empire or a particular central entity. She talks about its characteristic Atlantic Seaport nature in tracing commodities—books, porcelain, and textiles—that only reinforced the close trade links that the city had with its Atlantic peers. The growth of the shipping industry only further added to this. In her book, Cangany argues that arguing that its unique geographic location instead allowed Detroit a simultaneous existence as frontier entrepôt as well as an Atlantic one in the 18th and 19th centuries. Despite its embeddedness in global trade routes and circuits, Detroit was very much an outsider and took pride in its insularity. See Catherine Cangany, *Frontier Seaport: Detroit's Transformation into an Atlantic Entrepôt*, American Beginnings, 1500-1900 (Chicago ; London: The University of Chicago Press, 2014), 5.

[87] Lawrence Hatter' *Citizens of Convenience* shows how merchants utilized American and British identities to further trade, even as the then new American government kept trying to foster a sense of nationhood. These merchants deeply frustrated the growing U.S. government after the Revolutionary War. Lawrence B. A. Hatter, *Citizens of Convenience: The Imperial Origins of American Nationhood on the U.S.-Canadian Border*, Early American Histories (Charlottesville; London: University of Virginia Press, 2017), 9.

[88] Miles' *Dawn of Detroit* "is a chronicle of Detroit, an alternative origin story that privileges people in bondage, many of whom launched gripping pursuits of dignity, autonomy, and liberty." Tiya Miles, *The Dawn of Detroit: A Chronicle of Slavery and Freedom in the City of the Straits* (New York; London: The New Press, 2017), 2.

schooner *Cuyahoga* sailed past Amherstburg in 1812. Soon captured by the British, the ship revealed more than just passengers on board, it also contained the American Major Hull's plans for invading Canada. This gave the British a decisive edge, especially in this important war theater.[89]

Hardening a Border, Marking a River

Unlike the American Revolutionary War or the surrender of Detroit in 1796, the end of the War of 1812 led to many fortifications in the Detroit River region. As part of the Treaty of Ghent, the political border hardened further.[90] The treaty also opened the Great Lakes to American expansion. Coupled with the steam propeller as well as the canal craze that followed, Detroit would soon be an important shipbuilding port.[91] In September 1818, the first steamboat, named *Walk-in-the-Water*, traveled up the Detroit River on its first voyage from Buffalo to Detroit. Newspapers celebrated the power of this boat, as it moved "majestically and rapidly against a strong current, without the assistance of sails or oars," opined one author from the *Alexandria Times Gazette*.[92] A month after *Walk-in-the-Water*'s trip, the *Boston Commercial Gazette* expressed astonishment that the steamboat could carry "upwards of *one hundred and twenty passengers*" with significant room for cargo.[93] The steamboat made seven trips that season, taking about five days to make the trip and charging $18 for a cabin.[94] The arrival of

[89] One of the most important battles in the Detroit River region was Bois Blanc Island where the British worked with Indigenous leaders to thwart American plans. See Denver Alexander Brunsman et al., *Border Crossings: The Detroit River Region in the War of 1812*, 2012. -> give full citation since this is the first time this book is mentioned.
[90] Brunsman et al.
[91] Even though the War of 1812 changed political and social relations, it did not really change much for shipping and ship building in the region. The Welland and the steam propeller did more of that. Nadine Kopp, "The Influence of the War of 1812 on Great Lakes Shipbuilding" (East Carolina University, 2012), http://hdl.handle.net/10342/3839.
[92] "Steam Boat Walk-in-the-Water," *Alexandria Gazette* Vol XIX Issue 5340, September 24, 1818, 2. America's Historical Newspapers.
[93] "Water; Fish; Grand River; Erie; Cleveland; Sandusky; Detroit; Bay; New York," *Boston Commercial Gazette* Vol 50 Issue 32 (Boston MA), October 5, 1818, 1. America's Historical Newspapers. Emphasis original.
[94] William Hodge, *Papers Concerning Early Navigation on the Great Lakes* (Buffalo: Printing House of Bigelow Brothers, Pearl, and Seneca STS, 1883), 32-33

steamboats transformed the utility of the Detroit River and access to the upper Great Lakes. These boats brought emigrants, goods, and transported minerals from new mines to old and evolving markets, better integrating the Great Lakes into the emerging industrial capitalist economy.[95]

The *Walk-in-the Water*'s steam generated a new imagination about the Detroit River and its namesake city. These steamboats embodied a settler commitment to environmental transformation, industrialization, and 'improvement.'[96] By integrating the upper Great Lakes with the rest of the world, these boats also brought further attention to the places they traveled to. After the War of 1812, the Detroit River frontier became an important borderland transformed into bordered lands reinforcing national boundaries.[97] At the height of the canal boom in both the United States and Canada, nature could be moved with money and motivation to yield an artificial waterway. Canals represented a series of underlying currents—the creation and adoption of the hydrologic cycle and the desire to order nature through technology—over which the expanding United States and Canada laid their territorial claims. Considering the canal boom (and decline) then, helps us understand better the idea of a river that late nineteenth century Corps engineers inherited and negotiated.

After the War of 1812, both the United States and the Canadas "engaged in a battle of wits" in an attempt to "remain independent," and tried to outflank one another when it came to

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[95] Cangany, *Frontier Seaport*.

[96] In *River of Dark Dreams*, Walter Johnson charts the transformation of Mississippi valley into the Cotton Kingdom, showing how steamboats turned the river into a highway. The "Cotton Kingdom," as Johnson argues, premised on steamboat imperialism. See Walter Johnson, *River of Dark Dreams* (Cambridge MA and London: Belknap Press, 2017).

[97] In their essay, Adelman and Aron suggest recognizing a theoretical distinction between a frontier and borderlands, with the former being a meeting place and the latter being contested boundaries. Such a distinction allows the incorporation of transnational imperial histories into localized accounts of colonial actions. Doing so, helps shift "from inter-imperial struggle to international coexistence turned borderlands into bordered lands." See Jeremy Adelman and Stephen Aron, "From Borderlands to Borders: Empires, Nation-States, and the Peoples in Between in North American History," *American Historical Review* 103, no. 3 (June 1999): 814–41.

transportation infrastructure.[98] Americans considered the enlargement and construction of new Canadian canals "as efforts to strengthen Montreal's grip on Lake Ontario," including the American counties in western New York. As a result, New York canal promoters "agreed" that the proposed canal west of the Hudson needed to bypass Lake Ontario "altogether" to ensure a direct connection between western New York and "the American metropolis" i.e., New York.[99]

The first half of the nineteenth century saw tremendous growth in roads, steamboats, canals, and railroads across North America. In the Great Lakes region, canals dominated transportation from the 1810s to the 1860s. As Thomas McIlwraith outlines, this related to a decided move towards building bigger, wider canals that could handle greater traffic. Moreover, "the original Erie, Welland, Oswego, and St. Lawrence-Rideau canals were elements in an unstable boundary area," and their construction enjoyed a lot of attention in North America, as both the United States and British North America attempted to consolidate their territorial claims and as many commercial opportunities as possible, including that of the other. The agricultural potential of the Old Northwest also had not been realized until the 1820s. Great Lakes canal boosters "were thus conditioned to think in terms of large canals" with little regard for actual canal capacities.[100]

South of the political border, the U.S. Congress faced increasing demands to fund roads, canals, and harbors. In 1824, as the Erie Canal neared completion, President James Monroe addressed the national importance of internal improvements in his annual address to Congress.[101]

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[98] Thomas F. McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850," *The Journal of Economic History* 36, no. 4 (December 1976): 852–53.
[99] Thomas F. McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850," *The Journal of Economic History* 36, no. 4 (December 1976), 852–53..
[100] Thomas F. McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850," *The Journal of Economic History* 36, no. 4 (December 1976), 852–53.
[101] Even as it outlined the importance of internal improvements, it was the Monroe administration that "purchased stock in canal companies" for the first time, setting a precedent for federal involvement in canal development. See

He spoke about canal development in specific, and internal improvements in general, and challenged the Jeffersonian "vision of a national government of narrowly constrained powers" with another version of development that focused on a series of transportation projects to help "draw the nation together and improved the general prosperity."[102] Through the passage of the 1824 General Survey Act, Monroe gained significant powers over waterways for defense and commercial reasons.[103] That same year, the U.S. Supreme Court bolstered this position with its ruling that interstate commerce needed to be governed by the federal government. This allowed the president to use any "army engineers to survey (not build) roads and canals (not rivers)," potentially of national importance from a commercial or military point of view.[104] While the Survey Act did not address harbor improvements in specific, Monroe nonetheless used it to authorize the Corps to conduct surveys of important Great Lakes harbors. In turn, Congress allocated funds based on the engineers' recommendations.[105] Monroe appropriated funds under the act for the improvement of the Ohio and Mississippi rivers. These two acts "initiated the permanent involvement" of the Corps in rivers and harbors' work.[106] In 1826, Congress combined projects and surveys into one act, creating the first "true rivers and harbors legislation."[107]

Victor L. Albjerg, "Internal Improvements without a Policy (1789-1861)," *Indiana Magazine of History* 28, no. 3 (September 1932), 171.

[102] Theodore J. Karamanski, *Mastering the Inland Seas: How Lighthouses, Navigational Aids, and Harbors Transformed the Great Lakes and America* (Madison, Wisconsin: The University of Wisconsin Press, 2020), 50.

[103] Theodore J. Karamanski, *Mastering the Inland Seas: How Lighthouses, Navigational Aids, and Harbors Transformed the Great Lakes and America* (Madison, Wisconsin: The University of Wisconsin Press, 2020), 50-51.

[104] Martin Reuss, "The Development of American Water Resources: Planners, Politicians, and Constitutional Interpretation," in *Water Encyclopedia*, ed. Jay H. Lehr and Jack Keeley (Hoboken, NJ, USA: John Wiley & Sons, Inc., 2005), 56.

[105] Karamanski, *Mastering the Inland Seas*, 51.

[106] Reuss, "The Development of American Water Resources," 56.

[107] Reuss, 56.

Despite its subsequent repeal, the legacy of the General Survey Act of 1824 related to Congress' adoption of "a piecemeal approach to public works development" in the years that followed.[108] Between 1826 and 1829, Congress funded a multitude of projects aimed at surveying as well as the creation of infrastructure. Even so, canals did not take off in the United States until the Erie Canal.[109] In Canada, on the other hand, canals were an important aspect of defense infrastructure. The War of 1812 was a wake-up call for the British, leading first to the creation of military canals before commercial ones in response to the alarming American influence on Lake Erie. To "recapture" the trade lost to the Erie Canal, "the Canadas planned to canalize the St. Lawrence."[110]

The Welland, however, was not constructed before the Erie Canal, quashing British plans. Financial setbacks meant that the Welland had become nothing but a "miserable little ditch with minimum excavation" with the cheapest possible locks.[111] The supposed competition between the Erie and the Welland became a non-issue as both canals offered borderlands merchants "free choice of markets for their goods."[112] The Erie constituted the preeminent canal in U.S.-Canada borderlands, usurping Canadian ambition and traffic into its robustly built channel. The Erie Canal briefly paused the American dependence on the St. Lawrence, creating

[108] George Rogers Taylor, *The Transportation Revolution 1815-1860* (Armonk, N.Y: M.E. Sharpe, 1989), 32.
[109] George Taylor remarks that unlike in Britain where the completion of the Bridgewater Canal in 1785 heralded a boom in canal construction. Without adequate capital and the lack of engineering expertise in the United States, large infrastructural projects like canals grew impossible. See George Rogers Taylor, *The Transportation Revolution 1815-1860* (Armonk, N.Y: M.E. Sharpe, 1989), 32; 33-4.
[110] These were: one at the Lachine Rapids at Montreal, three short canals at rapids on the Ottawa River, and a canal via the Cataraqui and Rideau rivers thus connecting Lake Ontario and the Ottawa River. Indeed, Canadian commercial interests wanted a canal that ran the length of the St Lawrence, extending beyond Lake Ontario with a canal to bypass Niagara Falls. Robert Passfield, "Waterways," in *Building Canada: A History of Public Works*, ed. Norman R Ball (Toronto: University of Toronto Press, 1988), 115–18.
[111] McIlwraith, 867–68; Styran and Taylor offer an in-depth view of the engineering challenges and responses that the Welland posed. See Roberta McAfee Styran and Robert R. Taylor, *This Colossal Project: Building the Welland Ship Canal, 1913-1932* (Montreal, Quebec; Kingston: McGill-Queen's University Press, 2016).
[112] Janet D. Larkin, "The Canal Era: A Study of the Original Erie and Welland Canals within the Niagara Borderland," *American Review of Canadian Studies* 24, no. 3 (1994), 308.

in turn anxiety about American control of trade in boundary waters thus spurring the Canadian government "to construct canals to improve and extend the St. Lawrence system."[113]

Even before completion, the Erie Canal "gave unmistakable evidence of phenomenal success" for as soon as sections were concluded, "traffic crowded its waters."[114] The Erie attracted capital and travelers alike, linking two hitherto unconnected waters, and was considered one of the wonders of the world. Before the canal, a journey from Albany to Buffalo took about thirty-two days. After, even at a speed limit of four miles an hour, "passenger boats were making the trip from one end of the canal to the other in less than five days," and flatboats that carried bulk freight took about six days.[115] Operating day and night, these boats helped drastically reduce transportation costs whilst expanding the variety and quantity of merchandise profitably reaching the market. Canal development and the creation of navigational infrastructure brought settlers at unprecedented rates to the Great Lakes region which inevitably led to greater demands for infrastructural development. Lighthouses, harbors, and canals "were the embodiment of a

[113] The commercial and military intermingling of canal systems in Canada meant that the Lachine which was built before the Erie and became "a component of both the provincial (commercial) and military canal systems." The British Army's Royal Staff Corps constructed the Ottawa-Rideau military canals between 1819 and 1834, built by civilian contractors and military staff. As the Americans then went ahead and built the Oswego branch which connected to the Erie Canal giving them greater access to the growing Upper Canada trade and secure the American shore of the St. Lawrence, all before the Welland became usable, adding salt to the British wound. Planned military canals linking the Ottawa River with Lake Ontario through the Rideau were "considered too circuitous to compete with the Erie." The Rideau did, however, give the British a domestic passage between the Great Lakes and the ocean, in addition to simplifying the return of boats from Montreal. Built just after the opening of the Erie by the Corps of Royal Engineers, the Rideau was designed to accommodate steamboats, the first of its kind in the world. Its locks far exceeded those at the Erie in size as well as those of British barge canals. As construction of commercial canals continued in North America, it became apparent that when it came to financing, Canadian canals, especially the Welland extremely relied on government support. Between 1823 and 1837, the British constructed three important commercial canals: the Burlington Bay Canal that allowed lake vessels to reach Hamilton; the Desjardins Canal extended navigation from Burlington Bay to Dundas, and the Welland Canal, built to bypass Niagara Falls and rapids. The Welland constituted a joint enterprise through a stock company that had both provincial support and "two American engineers from the Erie Canal—Nathan Roberts and Alfred Barrett" who were superintendents for the project which used timber locks. Much like their southern counterparts, heavy debts as well as high maintenance costs on the timer locks "left the company dependent on government support. See Passfield, "Waterways," 115–17.
[114] Taylor, *The Transportation Revolution 1815-1860*, 34.
[115] Peter L. Bernstein, *Wedding of the Waters: The Erie Canal and the Making of a Great Nation*, 1. ed (New York: Norton, 2006), 325–27.

commitment" by settlers to join the "commercial union with the developed states of the East Coast."[116] The Erie Canal became the "single transportation factor in the early settlement and economic development of the lakes region."[117] Within a generation of the canal's construction, immigrant settler communities had displaced Indigenous People, their westward march "encouraged by local, state, and federal expenditures" to improve transportation routes.[118]

The Erie Canal's success spawned a national craze for canal building in the United States.[119] Three major kinds of canals were built on the back of the Erie Canal: "(1) those designed to improve transportation between the upcountry and tidewater in states bordering on the Atlantic from Maine to Virginia; (2) those, like the Erie, designed to link the Atlantic states with the Ohio River Valley; and (3) those in the West which were planned to connect the Ohio-Mississippi system with the Great Lakes."[120] Few of these new canals could be considered a success—in fact, most failed.[121]

North of the border, the Erie competed with Canadian canals as it was a "tacit recognition of the importance of an outlet from the lakes to the Atlantic," and an important impetus to the canal-building initiatives there.[122] Canals expanded more than waterways. They expanded human imaginations about what could be achieved through enforcing the latter's will on nature. Channeling water and carving land, these veins of commerce helped the beating heart of

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[116] Karamanski, *Mastering the Inland Seas*, 59.
[117] John Larson W., "History of Great Lakes Navigation" (Institute of Water Resources; United States Army Corps of Engineers, January 1983), 2–3, https://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/HISTORYOFGREATLAKESNAVIGATIONJANUARY1983.pdf.
[118] Larson, "History of Great Lakes Navigation,"3.
[119] Taylor, *The Transportation Revolution 1815-1860*, 34.
[120] Taylor, *The Transportation Revolution 1815-1860*, 37.
[121] In Ohio, there had been a long desire to connect Lake Erie with the Ohio River. Only eight months after the opening of the Erie Canal, the "Ohio legislature authorized the canal-building program" to "unite the waters of Lake Erie and Ohio River" through the construction of two state-owned canals leading to "one of the greatest systems of internal waterways in the country." These two canals led to a boom in canal building throughout the state. See Taylor, 37–46.
[122] G.P. de T. Glazebrook, *A History of Transportation in Canada* (New York: Greenwood Press, 1938), 78.

capitalist development. Besides encouraging migration into the Midwest, canals also brought hitherto far-flung places into the American union. Consequently, canals brought new attention to these regions.[123] As the lake commerce burgeoned, canals became the templates along which the natural waterways of the Great Lakes could be transformed.

Two canals, two cultures

By 1830, two "distinct" approaches to canal construction in North America existed: the British approach—confined to government-funded projects—that sought durability "with heavy cut-stone masonry locks constructed on a large scale," and the American method that "used building materials and skills readily at hand to construct crude, but efficient or rubble masonry locks no larger than immediately required."[124] The former approach required large capital outlays as well as highly skilled tradespeople before and during construction. Maintenance costs were, however, comparatively low. Although initial capital and labor costs were low in the second approach, maintenance costs were high. These two approaches also set up how these canals would adapt to technological and social change.[125]

[123] As Adler remarks, in this mode of expansion in the frontier i.e., the periphery, the U.S. Army "built the emerging American nation" by battling Indigenous Nations, surveying new land and waters, directing settlers to fertile lands making sure "a remote frontier region remained attached to the rest of the nation," without the scaffolding of an electoral system which left "many important decisions about its future to unelected officials, such as the secretary of war and Army bureau chiefs." The Army spearheaded settlement before the institutions of democracy could follow. Even as the region settled and democratic institutions created, landscape legibility and use still constituted the bastion of the Corps. William D. Adler, *Engineering Expansion: The U.S. Army and Economic Development, 1787-1860*, 1st edition, American Governance: Politics, Policy, and Public Law (Philadelphia: University of Pennsylvania Press, 2021), 3.

[124] Passfield, "Waterways," 117.

[125] After 1832, the focus shifted to modifying existing waterways based on their performance. Yet this review was blind to the fact that there no uniformity existed in the dimensions of the original structures. Except the Erie, all the other canals were originally meant to be deeper, but unanticipated cost increases forced construction to scale back. For instance, locks on the Erie and St. Lawrence were four feet deep, while those on the Welland—meant for ships—were eight feet deep, and those on the Rideau four and half and the Lachine five. Canal expansion, especially in the 1840s, did not constitute a function of capacity. For instance, in 1840 as canal traffic rose prodigiously, most canals—except the lower end of the Erie—were able to handle the same with ease even without improvements. See McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850."

The U.S. federal government, inspired by the Erie Canal's ability to repay its debts to the states, decided to pull away from funding canals.[126] In 1836, the U.S. federal government passed legislation that distributed federal surplus to the states, providing "vital support" to the latter.[127] That following year, in 1837, a financial panic gripped not only America but the globe. An international crisis "based not on politics but global monetary flows," the Panic of 1837 reinforced how imbricated the American banking and financial system had become with Britain and the rest of the world.[128] This financial crisis drove several state-funded canals to the ground, pushing an "exaggerated timidity" unlike the "boundless enthusiasm" that the Erie Canal had fueled.[129] The other canals survived due to a "healthy influx of state money, state-guaranteed bonds, and occasional federal and state land grants."[130] Indeed, as explained by George Taylor, engineers had greatly underestimated the costs of constructing canals, and "the revenues from tolls fell far short of popular expectation."[131] Instead of "freeing states from the necessity of taxation and providing numerous boons such as covering the cost of popular education, as

[126] According to McIlwraith, contributing factors included the 1842 New York State Stop Tax, the 1830 veto of the Maysville Road bill, elimination of national debt in the 1830s, American territorial gains, as well as the development of New England investment capital. See McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850," 869–870. In the case of the Erie Canal, its success came back to haunt it as by 1840s, the state of New York decided that any new canals would be those funded through revenue or taxation. Since the Erie supported itself, "new investors were attracted to what they imagined would be competing facilities: railways," even though the latter technology would not overtake the canal for another three decades. Even as canal development grew uneven, it ultimately became dependent on demand to drive profitability. At the same time though, it was demand that they often could not handle. Locks, portage railroads, as well as inclined planes all reduced speed and capacity appreciably. Droughts, floods, winter weather conditions further eroded dreams of profitability and sustained commerce. Maintenance and repair were ceaseless activities on these working waterscapes. Floods commonly and repeatedly brought damage to certain canals like those in Ohio and Pennsylvania. Ironically, poor business management was perhaps the last of the worries of canal companies. By 1840, over 3300 miles of canals in the United States existed, a sizable increase from 1200 miles in 1830. Between 1816 and the Civil War, over two hundred million dollars had been invested in canal construction, more than a third of spent after 1840. The canal boom did not end in a flaming bust, some were, "relatively prosperous as late as 1860 and a few, in fact, did not reach their traffic peak until after the Civil War." See Taylor, *The Transportation Revolution 1815-1860*, 52–55.
[127] Taylor, *The Transportation Revolution 1815-1860*, 49.
[128] Jessica M. Lepler, *The Many Panics of 1837: People, Politics, and the Creation of a Transatlantic Financial Crisis* (New York, NY: Cambridge University Press, 2013), 6.
[129] Taylor, *The Transportation Revolution 1815*-1860, 52–53.
[130] Reuss, "The Development of American Water Resources," 57.
[131] Taylor, *The Transportation Revolution 1815-1860*, 52.

promised by the enthusiasts," canals were, in fact, extremely expensive and did not produce commensurate revenue, so much so that "public credit was threatened."[132]

Thomas McIlwraith reveals how canal capacity and traffic constituted excellent indicators of political culture. Before 1850, British canals could have easily handled all the Great Lakes' tonnage, but they did not. Despite their large in-built capacities, British canals never took on the tonnage they could have for a variety of technological and political reasons. First, the British built canals, especially the Welland, for watercrafts such as ships that could carry 100-125 tons of freight, much larger than the thirty-five to forty-ton boats that the Erie could ferry.[133] Whereas the Welland was built for more voluminous watercraft, the Erie handled more shipping volumes. Built more substantially than the Welland and far more commercially important, the expansion of the Erie Canal needed to be expedient. Consequently, the second set of locks allowed twice as many boats without increasing the vessel size. While the Welland tried to accommodate *larger* vessels, the Erie expanded to accommodate *more* vessels, of the same size as before. By focusing on volume instead of ship dimensions, American canal builders became able to accommodate increasing traffic instead of playing catch up like the British.[134]

Second, British/Canadian and American canals belied the political, social, natural, and technological cultures that undergirded them. Even as Canadians built large canals, the size of their vessel fleet remained abysmally small. Total lake-origin tonnage eastbound of Lake Erie went up fourteen times between the 1830s and 1840s. During this period, American tonnage on

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[132] Reuss, "The Development of American Water Resources," 57.
[133] Larkin, "The Canal Era: A Study of the Original Erie and Welland Canals within the Niagara Borderland.," 305.
[134] The promoters of the Welland-St. Lawrence route for instance, had always championed a "series of short ship canals linking lakes and rivers capable of supporting the largest vessels that man could build." As ship sizes grew, "placing pressure upon canal people to make locks big enough to accommodate them." Canal builders could never win this race to keep up with rapidly growing ship sizes. By the time the Welland expanded in 1845, it had already grown obsolete as several vessels on Lake Erie existed too large for its locks. See McIlwraith, 867–68; Styran and Taylor offer an in-depth view of the engineering challenges and responses that the Welland posed. See Styran and Taylor, *This Colossal Project*.

this route grew five times while the British only doubled, pointing to the smaller Canadian shipping fleets. As much as the British government aided the development of canals, fleet growth depended on private investors in both Canada and the United States. The British Government also grew seemingly less interested in making smaller-scale changes, such as incorporating a system of tugboats and barges to support extant traffic movement instead of expanding the canals. Americans enthusiastically adopted other technological developments like screw propeller steamboats and grain elevators that seemed to bypass the Canadians. Though a large naval power, the British failed to consider the St. Lawrence as a system, integrating canal lines and developments like grain elevators into the same.[135] The third reason for a disparity in canal traffic related to nature: Canadian canals fed into the St. Lawrence thence to the Atlantic. Unlike New York, however, Montreal and the St. Lawrence were inaccessible for months on end during the winter. As a result, despite lower freight costs thanks to canal development, Montreal could never keep up with New York as the most reliable and efficient port of call in the wider region.[136] In pursuing stronger overseas connections to the British Isles through the creation of larger canals, the British also neglected to acknowledge the rising markets in eastern North America where the biggest and closest market for Canadian exports—grain and lumber—remained its southern neighbor.

In the 1840s, the Canadian government stepped in to rescue the Welland and other canals, despite private capital floundering based on the rebellions that had shaken the Canadas in 1839.

[135] McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850."
[136] Passfield, "Waterways," 119–20.

Given the social unrest and Upper Canada's financial troubles, Britain pressed for a merger for the two Canadas, mobilizing infrastructural funding to create solvency and peace.[137] In 1841, in "an effort to restore political stability and foster economic development, the British government gave the Canadas an interest guarantee for a £1.5-million loan and united Upper and Lower Canada to form the Province of Canada."[138] The unification of the two provinces "greatly accelerated" the pace of canal building as more public works could be undertaken under a united legislature.[139] The interest-free loan led to the creation of the Board of Works (henceforth, referred to as the Board) in 1841. It set out on a five-year program funded by the Province of Canada to build three kinds of works, the first of which constituted "national works" such as canals.[140] Institutionally, when it came to lake developments, the Board had no U.S. equivalent in both the degree of centralization and federal authority that the institution emphasized.[141] It spent most of the funds of the 1.5-million-pound loan on the Welland and St. Lawrence canals, providing a much-needed economic stimulus and creating an enlarged waterway. Unification did not, however, combine the two Canadas' "divergent attitudes" towards canal building. Canal enthusiasts in Canada, for instance, "were counting not only" on the "direct value" of an efficient and reliable trade route between the Great Lakes and the Atlantic, "but also on securing a

[137] One of the islands in the Detroit River, Fighting Island off the Canadian coast, ostensibly got its name during one of battles of the Rebellion. See Shaun J. McLaughlin, *The Patriot War along the Michigan-Canada Border: Raiders and Rebels* (Charleston, SC: The History Press, 2013).
[138] Passfield, "Waterways," 118.
[139] Glazebrook, *A History of Transportation in Canada*, 78.
[140] The other two were "inland communication," such as roads and bridges, and "roads underway." Owram, *Building for Canadians: A History of the Department of Public Works 1840-1960*, 15.
[141] In the late 1840s, an unparalleled interest in railways existed in Canada, far surpassing any funding for canals. Larson, "History of Great Lakes Navigation," 10; see also Owram.

generous share of the American carrying trade, which would enrich the country through which it passed."[142]

South of the border, especially in Congress, Canadian canal development caused "a stir," alleviating fears that it could take trade away from New York and benefit Montreal instead, elevating the commercial importance and shipping volumes of Canadian waterways.[143] Championing a "more aggressive policy of their own," a Special Senate Committee on Commerce "recommended consideration of all the many improvements desired by the lake communities."[144] This call resonated with northwestern congressmen who consistently "pressed their colleagues in the House and Senate" to invest in more lighthouses, chart the lakes, and improve the region's harbors.[145] All this fell on deaf ears as President James Polk vetoed all funds for these improvements in 1846, arguing that these lakes did not connect to foreign commerce and improvements to their harbors met no fiscal, territorial, or constitutional requirements needed to become law.[146]

In a world predating railroad development and expansion, canals also brought unprecedented numbers of settlers into unfamiliar places, propelling western expansion, especially in the old Northwest.[147] Much of this expansion could be attributed to the deep

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[142] Owram suggests that the fundamental difference between the Corps and the Board is that the latter initially involved in building railways in Canada as well, see *Building for Canadians*. See also Glazebrook, *A History of Transportation in Canada*, 78.
[143] Larson, "History of Great Lakes Navigation," 11.
[144] Larson, 11.
[145] Karamanski, *Mastering the Inland Seas*, 82.
[146] James Polk, "August 3, 1846: Veto Message Regarding Funding Internal Improvements," *Presidential Speeches.* Available at: https://millercenter.org/the-presidency/presidential-speeches/august-3-1846-veto-message-regarding-funding-internal
[147] Carol Sheriff, *The Artificial River: The Erie Canal and the Paradox of Progress, 1817-1862* (New York: Hill and Wang, 2000); Bernstein, *Wedding of the Waters*. The population of Michigan Territory in the 1820 census was 8,896 with a fourth of those people living in Detroit and its environs. The population of Michigan Territory in the 1820 census was 8,896 with a fourth of those people living in Detroit and its environs. In the next census, population had jumped to 31,639, half of whom lived in Detroit and its surrounding areas. Michigan's population rise in those twenty years constituted the highest in the United States for that period. See "Census for 1820" (Gales and Neaton, 1821), 18 and 161, https://www.census.gov/library/publications/1821/dec/1820a.html.; "Census for 1830" (Duff

transformation that canals had wrought. Canals connected people and commerce to the wider world and were inextricably tied to industrialization. In the Midwest, canals inspired an unprecedented reordering of nature. Undergirded by tenuous technical claims in the absence of reliable river flow data, the soon-to-empowered Corps would alter waterways in the Great Lakes in the mold of these canals.

By the end of the 1830s, canals became deeply imbricated in the evolving settler improvement ethic premised on surveying, transmitting knowledge, and infrastructure creation. Increased ability to survey, communicate, and study the westward marching American landscape played a significant role in the ability and ambition of the U.S. Congress and presidents to contemplate these improvements. Westward settler migration also brought newer communication technologies to these areas, further aiding the ability of the American settler state to evaluate extractable resources at hand. The creation and deployment of the U.S. Topographical Engineers to survey these new land and waterscapes grew important in leading the territorial and technological interventions that followed. In other words, by laying out national boundaries and promoting settler migration through internal improvements, the Topographical Engineers became central to the very mission of Manifest Destiny.[148]

Green, 1832), 42, https://www.census.gov/library/publications/1832/dec/1830b.html; "Census for 1840" (Thomas Allen, 1841), 94, https://www.census.gov/library/publications/1841/dec/1840c.html; Arthur M. Woodford, *Charting the Inland Seas: A History of the U.S. Lake Survey* (Detroit MI: U.S. Army Corps of Engineers Detroit District, 1991), 10.

[148] In addition to the economic and political reasons for mapping in the aftermath of the War of 1812, U.S. Congress established the American Topographical Bureau in 1832, separate from the Corps within the U.S. War Department. The Topographical Engineers, according to William Goeztmann functioned "as a department of public works for the West."-Along with the Lake Survey, they compiled knowledge about the Great Lakes shipping channels and conveyed the same to Washington D.C. This compilation and communication became seminal to the territorializing ambition of the young American settler state. Both the Topographical engineers and the Lake Survey performed an important function. In territorially engineering the confines of the young American settler state, both behaved as its eyes and ears, aiding expansion. The epistemological simplification driving the consolidation of state control "often to the detriment or complete silencing of indigenous forms of knowledge and society." See Woodford, *Charting the Inland* Seas, 18; William H. Goetzmann, *Army Exploration in the American West, 1803-1863*, The Fred H. and Ella Mae Moore Texas History Reprint Series (Austin: Texas State Historical Association, 1991) ; John Dean Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape, 1865-1885* (Cambridge MA:

Before the U.S. government mapped, surveyed, and settled the Great Lakes region in earnest, the British had already appraised and created over fifty charts of the St. Lawrence and the Great Lakes including the St. Mary's River at Saulte Ste. Marie in 1815. The British, however, did not update these charts, nor did they aggressively desire to further map the lakes in more detail. Unlike the later U.S. hydrographic surveys, the British ones were "the result of rapid reconnaissance," showing shorelines very accurately but were not very useful in signposting underwater dangers—like shoals, sandbars, and sudden changes—in depth.[149] Controlling mapping as well as rising navigational and safety needs of U.S.-controlled Lake commerce, powered the U.S. government's mapping impulse.

Throughout the 1830s and 1840s, the U.S. Lake Survey connected data and mapped the lakes region, carrying forward the settler mission. In the latter decade, it became particularly important as much of the lake shipping traffic transported iron and copper from Michigan's Upper Peninsula where they had been recently discovered. The St. Mary's Falls in the river by the same name connecting lakes Superior and Huron constituted a definitive break in navigation, stalling watercraft making their way up from the St. Lawrence.[150] The only way was portaging around the falls, an onerous task, and one that created a bottleneck in an area already dealing with lesser ships in service than needed to keep up with demand.[151] These were exactly the kinds of problems the Lake Survey and the Corps were interested in solving while reinforcing American territorial claims.

Doctoral dissertation, Harvard University, Graduate School of Arts & Sciences. Unpublished PhD Dissertation, 2018), 18, http://nrs.harvard.edu/urn-3:HUL.InstRepos:41129139.

[149] Woodford, *Charting the Inland Seas*, 14.

[150] While the Canadians did not construct a canal in the St. Mary's River until the 1890s, the Americans did construct the St. Mary's Falls Canal between 1853 and 1855, even as the canal building petered south of the border. Taylor, *The Transportation Revolution 1815-1860*, 52.

[151] John Larson W., *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers* (U.S. Army Corps of Engineers Detroit District, 1995), 67.

Bottlenecks of Various Kinds

While U.S. Congress contended with internal improvements between the 1840s and the 1860s, the details of these projects were left to the Corps.[152] This coincided with the American lake shippers' campaigns for large-scale infrastructure, including "lighthouses, port improvements, a Fox-Wisconsin canal, a St. Lawrence seaway, and a passage through the mud near Detroit."[153] In the 1840s, the U.S. Congress authorized the Lake Survey to make harbor maps. Instead, William G. Williams, an active Lake Erie Superintendent and topographical engineer "proposed a precise hydrographic triangulation and an atlas of construction plans," and essentially "confirmed the need for a beacon and harbor of refuge for every hundred miles along America's interior coastline."[154]

During his travels, Williams became aware of the problems that steamboats and sailing vessels faced at the mouth of the St. Clair River, also known as the Flats. Declining water levels had exacerbated the "impediment to navigation" more marked, causing "great anxiety" amongst the shippers.[155] He argued that "it was imperative" dredging in the Flats begin immediately without a preliminary survey or estimate because the river handled all the shipping traffic between the upper and lower lakes. In 1842, Williams noted that with two distinct bars at the mouth of the St. Clair River: an upper narrow one that allowed a draft of nine feet and a lower

[152] Larson, 44.
[153] Todd Shallat, *Structures in the Stream: Water, Science, and the Rise of the U.S. Army Corps of Engineers.* (Austin: University of Texas Press, 2013), 189.
[154] Shallat, 170.
[155] "Report from the Secretary of War Communicating, in Compliance with a Resolution of the Senate, Copies of the Report on the Impediments in Lake St. Clair; and of the Report and Survey of the Straits of Detroit." (United States, War Department, 1842), 4, https://books.google.com/books?id=CJjhAAAAMAAJ&pg=PA1&lpg=PA1&dq=%22Report+from+the+Secretary+of+War,+communicating,+in+compliance+with+a+resolution+of+the+Senate,+copies+of+the+report+on+the+impediments+to+navigation+in+Lake+St.+Clair+;+and+of+the+report+and+survey+of+the+Straits+of+Detroit.%22&source=bl&ots=KtdEiCWwn6&sig=ACfU3U3c4G5JvWDqEVaB7uo9pjc93o9G1g&hl=en&sa=X&ved=2ahUKEwj-qb2DkZv0AhUSWs0KHaEcAnMQ6AF6BAgDEAM#v=onepage&q&f=false.

wider bar at a depth of about nine feet. A shoal below the lower bar existed, spread uniformly in the shipping channel, and whose depth below the surface varied. The shipping channel in use at the time was circuitous and could be "greatly shortened" by dredging, in addition to taking out the "torturous" bar at the mouth of the river.[156]

According to Williams, this shoal constituted the "only" obstruction to navigation upstream of Niagara "to the southern end of Lake Michigan, a distance of about one thousand miles."[157] Despite being narrow, as he astutely noted, the St. Clair River emptied the "whole mass" of the Great Lakes and, therefore, its channel became immensely important. However, lake levels had fallen "considerably," causing "unusual delays" for steamboats as they had to "frequently have their cargoes taken out by lighters," until they had passed by the shoal, adding a tremendous amount of time to their transit.[158] In suggesting that the Flats be improved, Williams brought forth a new site for improvement. Multiple topographical engineers, as well as locals, backed his claims about the dangers of the Flats in Congress.[159]

By proposing dredging, lighthouse, and harbor development, Williams pointed to infrastructure creation and sediment extraction in the Great Lakes. Infrastructures like lighthouses and harbor improvements were arguably internal improvements since they would be within U.S. territorial boundaries. Dredging was sediment extraction and more challenging for natural as well as political reasons, as these waterways were also international. The natural deep-water sections of Great Lakes rivers were often impeded by siltation, rapids, shoals, and

[156] "Report from the Secretary of War Communicating, in Compliance with a Resolution of the Senate, Copies of the Report on the Impediments in Lake St. Clair; and of the Report and Survey of the Straits of Detroit.," 3.
[157] "Report from the Secretary of War Communicating, in Compliance with a Resolution of the Senate, Copies of the Report on the Impediments in Lake St. Clair; and of the Report and Survey of the Straits of Detroit." (United States, War Department, 1842), 3.
[158] "Report from the Secretary of War Communicating, in Compliance with a Resolution of the Senate, Copies of the Report on the Impediments in Lake St. Clair; and of the Report and Survey of the Straits of Detroit.," 3.
[159] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 53–54.

sandbars. The open waters of the Great Lakes, like all water bodies, were uneven in-depth and temperament and were also an international border. To improve these, the Corps would not only need viable designs but also work with their Canadian counterparts to ensure politicians in both countries would sign off on these developments. Dredging, whether through new locks and channels to bypass rapids or control shifting shoals, or augment extant deep channels, became the standard practice in alleviating these bottlenecks. Much of the increased traffic transported the newly discovered minerals and agricultural goods from the Midwest to a growing market.

Along with the burgeoning mineral extraction economy, the region's wheat production boomed, coinciding with the repeal of the British Corn Laws in 1846 that had long limited the export of American grain to Great Britain. Their repeal opened a whole new market to American farmers. American Great Lakes ports also captured a "large share of the Canadian colonies' grain exports."[160] Great Lakes waterways also handled increased commercial traffic north and west of Detroit as well as larger vessels whose smooth movement became impeded by low water conditions, further reinforcing the need for improvements.[161] When President Polk vetoed the Rivers and Harbors Act of 1846 authorizing nearly half a million dollars in lakes' improvements, it was inexplicable to lake shipping interests. Great Lakes states had supported the Mexican American War, but could not understand why appropriations had been held up for a war that took longer than expected when the "creation of maritime infrastructure on the lakes was as much a part of nation building as expanding its national boundaries," and foreclosing "one for the sake of the other seemed self-serving and hardly keeping in step with the spread-eagle nationalism of Manifest Destiny."[162] In the short term, this meant that U.S. Congress routed

[160] Karamanski, *Mastering the Inland Seas*, 84.
[161] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 53.
[162] Karamanski, *Mastering the Inland Seas*, 83–85.

funding and staff to the war instead of surveying the lakes. After the war, it reinstated funds and staffing when surveying and mapping began afresh, focusing attention on areas of concern such as the St. Clair Flats, the St. Mary's River, and Lake Superior.[163]

Despite increased U.S. attention to the bottlenecks of the Great Lakes in Canada, the undercurrent was to step away, even if temporarily. Between 1846 and 1848, revenues from the Welland dropped by 60 percent and those from the St. Lawrence canals dropped by 40 percent. Canada's crushing debt and lack of revenues drove London's desire to rein in expenditures. Beginning in 1848, Public Works suspended as many projects as possible to reduce the expenditures of an overextended government.[164] The Canadians stepped away from big public expenditures just as the United States federal government increased its interest in Great Lakes development. Though the Great Lakes waterways remained international, they could now be acted upon as U.S. federal waters.

The Corps and the U.S. federal government developed domestic, interstate waterways for commerce. In international waters like those of the Great Lakes, fundamental legal and jurisdictional questions remained unanswered. How could these waters be developed? Were they indeed internal? Or were they, as border waters, outside the ambit of congressional approval and therefore the Corps? If the Corps could develop these waters, what kinds of channels should they consider? The topic of internal improvements had long been a thorny issue in American politics.[165] The political border running along the Great Lakes waterways only complicated that

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[163] Woodford, *Charting the Inland Seas: A History of the U.S. Lake Survey*.
[164] Owram, *Building for Canadians: A History of the Department of Public Works 1840-1960*, 50–51.
[165] Albjerg, "Internal Improvements without a Policy (1789-1861)"; Carter Goodrich, "American Development Policy: The Case of Internal Improvements," *The Journal of Economic History* 16, no. 4 (December 1956): 449–60; John Lauritz Larson, "'Bind the Republic Together': The National Union and the Struggle for a System of Internal Improvements," *The Journal of American History* 74, no. 2 (September 1987): 363, https://doi.org/10.2307/1900027; John Lauritz Larson, *Internal Improvement: National Public Works and the Promise of Popular Government in the Early United States* (Chapel Hill: University of North Carolina Press, 2001).

prickliness. On one hand, the Lake Survey and the Corps needed to safeguard and maintain waterways and harbors to ensure navigational and commercial supremacy. On the other, there remained a jurisdictional question of who could develop these waters and to what extent since these were not internal waters.

As this conflict played out in courts and Congress, the Lake Survey continued its work of surveying and mapping, outlining several important bottlenecks that continued to thwart commercial expansion. Relaying this valuable information to Congress created two important consequences: one, the language and ideology of bottlenecks governed how the Corps worked on projects. In other words, by solving one bottleneck after another, the Corps used a piecemeal approach to create, design, and rework the infrastructure of improvement. Two, this continued surveying and mapping in the service of infrastructure creation preceded the overt and pronounced post-Civil War infrastructural state. In the American South, Reconstruction constituted a deeply infrastructural process whose modern ambition grew all-encompassing. To firmly quell any further incendiary thoughts, the Corps created and embedded infrastructure to map territory and people. This was a process, built on experimental and provisional engineering practice in the absence of long-term flow data, where engineers learned from each new infrastructure.[166] This was not unlike what the Corps had been learning in the Great Lakes and would continue to employ.

Marking territory, in water

In his address after the close of the 1851 shipping season, President Millard Fillmore reminded Congress of the great "numbers of lives and vast amounts of property are annually lost for want of safe and convenient harbors" on the Great Lakes. Leaving many harbors in an

[166] Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape*.

"unfinished state" had "consequently exposed to the action of the elements" destroying them.[167] Yet, were these Great Lakes "mere lakes or should they be regarded and funded as genuine inland seas"?[168] In 1851, the U.S. Supreme Court established in *Genesee Chief v. Fitzhugh* that federal jurisdiction extended to not just coastal waters "but to all waters where interstate and international commerce take place."[169] This decision established that "all public navigable waters came within the admiralty and maritime jurisdiction of the federal courts, thus expanding the reach of the federal courts at a time when steamboat traffic surged."[170]

This decision pushed back against former President Polk's 1846 argument that federal jurisdiction extended only to coastal waters and reversed an earlier decision. The U.S. Supreme Court had previously held "had adopted the British rule confining admiralty jurisdiction to those navigable waters affected by tidal flow," thus excluding the Great Lakes.[171] Given the "great and growing commerce" on the lakes, admiralty laws that extended federal jurisdiction to the ocean applied "with equal force to the lakes."[172] The reliance of admiralty laws on tidal flows did not factor in commerce, instead privileging the precedent set by English laws. Chief Justice Taney questioned limiting federal jurisdiction and improvements of coastal waters thus leaving the Great Lakes and the West undeveloped, couched in the equality principle of the U.S. Constitution. Developing and improving only coastal waters as federal waters and actively disregarding the Great Lakes and the West would be to the detriment of the growing trade and

[167] Millard Fillmore, Second Annual Message Online by Gerhard Peters and John T. Woolley, The American Presidency Project https://www.presidency.ucsb.edu/node/200741
[168] Karamanski, *Mastering the Inland Seas*, 90.
[169] Karamanski, 91.
[170] Timothy S. Huebner, "'The Unjust Judge': Roger B. Taney, the Slave Power, and the Meaning of Emancipation," *Journal of Supreme Court History* 40, no. 3 (November 2015): 250, https://doi.org/10.1111/jsch.12081.
[171] William H. Rehnquist, "Remarks by Chief Justice William H. Rehnquist. Rededication of the Roger Brooke Taney House and Museum," April 7, 2004. Available at: https://www.supremecourt.gov/publicinfo/speeches/sp_04-07-04.html
[172] U.S. Supreme Court, *The Propeller Genesee Chief v. Fitzhugh, 53 U. 443 (1851) 53 U.S. 443,* December Term, 1851, accessed October 2021, https://caselaw.findlaw.com/us-supreme-court/53/443.html

commerce he argued.[173] Furthermore, the decision rebuffed Democrats' hopes for restricting federal jurisdiction in the build-up to the Civil War.[174] In reversing the lower court decision, the Supreme Court brought the lakes into the ambit of the American federal government, paving the way for the Corps being able to operate in these waters. This judgment, combined with some presidential goading, ensured the U.S. Congress "finally acted on navigational improvements" by "making a huge federal land grant" to Michigan to pay for the St. Mary's Canal to make passage around the St. Mary's Falls easier.[175] Congress created a legal armature to treat the Great Lakes as federal waters despite an international border running through them. The Corps added mapping infrastructure to improve these waters and technological expertise to be the interlocutor between the first two by proposing iterative and piecemeal projects and improvements.

In border waters, these improvements needed land to be tethered to, which added more layers of government and permissions. In 1852, Fillmore approved "An Act Granting to the State of Michigan the Right of Way and a Donation of Public Land for the Construction of a Ship Canal Around the Falls of St. Marys," signing over 750,000 acres to finance canal construction.[176] He also signed a bill appropriating funds for a federal project in the Flats that was "barely sufficient" to construct a dredge "to carry out the work."[177] Two years later, President Franklin Pierce "vetoed a comprehensive rivers and harbors bill which would have provided funds to put the dredge to work" on the Flats.[178] During the 1854 shipping season, damages from accidents and groundings at the Flats cost over $600,000 with the detention of

[173] U.S. Supreme Court, *The Propeller Genesee Chief v. Fitzhugh.*
[174] Karamanski, *Mastering the Inland Seas*, 91.
[175] Karamanski, *Mastering the Inland Seas*, 92.
[176] The act also stipulated that the canal had to be at least 100 feet wide and 12 feet deep, and the locks must be at least 250 feet long and 60 feet wide. See Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 69.
[177] Larson, "History of Great Lakes Navigation," 14.
[178] Larson, 14.

over 5000 vessel days. Addressing U.S. Congress, Senator Lewis Cass from Michigan considered the presidential veto "unfathomable" because the connecting straits of the Great Lakes—the St. Mary's River, the St. Clair River, and the Detroit River—were "free of constitutional doubts" that united "the purposes of peace and war, and free from all charge of possessing only a local interest." In labeling the St. Clair River improvements as internal in his veto, Pierce had inevitably put it "bad company" without tracing "a true constitutional source."[179]

Reinforcing the importance of safeguarding the lakes for defense purposes, Cass advocated "free access for our ships of war to the upper lakes, so that a single establishment" would be sufficient for all the lakes.[180] To "accomplish this," it became necessary to dredge deeper channels in the St. Clair River and the St. Mary's River and, "in effect, form a single sea."[181] Cass also brought up the specter of Canadian improvements and the possibility of a Canadian naval base in the Georgian Bay, eventually controlling all the lakes militarily.[182] The signing of the Reciprocity Treaty in 1854 furthered trade on the Great Lakes as a wide range of raw materials and agricultural produce now enjoyed navigational concessions. U.S. vessels could now use the Welland Canal and the St. Lawrence while Canadian vessels plied on Lake Michigan in addition to the other binational lakes, as well as all the American canals connected

[179] Lewis Cass, "Speech of Hon. Lewis Cass, of Michigan, on the President's Veto Message on the River and Harbor Appropriation Bills: Delivered in the Senate of the United States, July 7, 1856" (1856), 18, https://hdl.handle.net/2027/miun.agm1231.0001.001.
[180] Cass, 19.
[181] Cass, 19.
[182] Cass, 19.

to them.[183] The treaty stimulated trade between the Upper Great Lakes and Europe.[184] Reciprocity had been on the horizon for a while between the change of British policy and problems in Canada—the repeal of British Corn Laws, the 1849 repeal of navigation laws, and the 1839 Upper Canada rebellion—which led to Canada regulating its own tariff, instead of London controlling the same.

In 1847, the Canadian legislature removed any existing differential duties thus admitting U.S. goods on the same terms as those from Great Britain.[185] Consequently, the treaty opened the door for greater North-South trade instead of Canada looking across the Atlantic. Over the course of the nineteenth and twentieth centuries, as Canadian settler national identity gained cohesiveness, this changing balance of trade would be important in extricating Canada from British orbits even if it imbricated the northern nation deeper into American ones, much to the chagrin of loyalists. Reciprocity continued to be a thorny issue as protectionists on both sides of

[183] However, the lack of federal will and expenditure "exasperated" commercial interests especially the Buffalo Board of Trade whose members had experienced large losses at the Flats and, therefore, decided to "take the initiative." In 1855, the Board raised $18,000 from members, with assurances from Detroit and possible help from Canadian government. With the funds and permission from U.S. Secretary of War Jefferson Davis, a hitherto unused dredge in the Flats carved 60 feet wide and 10 feet deep channel, creating a deep channel connecting Lake St. Clair and the river. The navigation season in 1855 was 230 days long and an "ideal year" demonstrating the commercial importance of the Flats with over $251 million worth of agricultural produce passed down the river. That year, crops were abundant and due to the Crimean War, there was increased foreign demand for grains. Growing networks of railroads "tapped new markets for merchandise brought to Chicago by water from the East." That same year, 603 disasters happened in the river that could be "attributed almost wholly to the want of harbors" offering vessels refuge. The Flats "were the terror of vessel-men and skippers." Despite these pleas, Pierce vetoed a second bill—sent three days after Cass's comments—for improvements. Eventually Congress passed over the presidential veto in July 1856, and work started in 1857. By the next year, in 1858, [add by whom] exhausted all improvement funds but not before the shipping channel in the Flats had been expanded to an average breadth of 230 feet and a depth of 14 to 15.5 feet. The Canadian government which had committed to $20,000 towards improving the Flats then took over the work from the United States, dredging the shipping channel to a width considered sufficient for navigational purposes at the time. See Lloyd Graham and Frank H. Severance, *The First Hundred Years of the Buffalo Chamber of Commerce* (Buffalo NY: Foster & Stewart Publishing Corp., 1945), 44–55, https://hdl.handle.net/2027/nnc1.cu03357708; Larson, "History of Great Lakes Navigation," 14–15; Cass, Speech of Hon. Lewis Cass, of Michigan, on the President's veto message on the river and harbor appropriation bills. : Delivered in the Senate of the United States, July 7, 1856, 18.

[184] Karamanski, *Mastering the Inland Seas*, 104–105.

[185] The treaty was wildly successful in the time it remained in effect. According to Haynes, in the first year itself, trade increased more than twice as much than the previous three years without the treaty. Frederick E. Haynes, "The Reciprocity Treaty with Canada of 1854," *Publications of the American Economic Association* 7, no. 6 (November 1892), 7–70.

the border protested it. A relatively favorable tariff would not obviate natural limitations of width and depth that continued to plague the carrying capacity of the Great Lakes shipping channels—ones that invited increased attention from the Corps.

The channel depth became a critical problem at the Flats, varying yearly based on sedimentation. One Corps engineer estimated that a channel 13.5 feet deep in 1858 would be less useful than 8.5 feet deep based on lake levels in 1849. The Corps recommended a $50,000 appropriation from Congress to dredge a 150-foot wide that would 18-feet-deep during high waters and at least 12 feet deep during periods of extremely low water. In his history of Great Lakes navigation, Larson argues that this recommendation "set the stage for a confrontation" between a nascent Republican Party that supported federal and harbor improvements and the incumbent Democrat James Buchanan who firmly opposed such developments.[186] In 1859, after the Corps' recommendation for an appropriation, the Republican-led Michigan state legislature passed a resolution supporting such an action by the federal government. This resolution also "asserted that such improvements were a federal responsibility."[187] Taking a cue from that resolution, Congress in late 1859 passed "a bill for a special $35,000 appropriation to continue St. Clair Flats improvement."[188]

Unsurprisingly, President James Buchanan vetoed the appropriation after concluding that regulating commerce did not include the power "to construct roads and canals and to improve the navigation of water courses."[189] He believed such actions would allow the federal government a wide latitude of powers contrary to the will of the U.S. Constitution. Instead of expecting federal

[186] Larson, "History of Great Lakes Navigation," 16.
[187] Larson, 16.
[188] Larson, 16.
[189] James Buchanan, Veto Message Online by Gerhard Peters and John T. Woolley, The American Presidency Project. https://www.presidency.ucsb.edu/node/203221

help, states could easily tax tonnage more heavily to finance such improvements, much like the Erie Canal had financed itself a few decades ago. Whenever Michigan "ceased to depend" on the U.S. treasury, it could, along with Upper Canada, find the "necessary means" to keep such improvements and repairs going.[190] As a result, Buchanan voiced the Southern Democrats' oft-repeated concern about the burgeoning size of federal government and power. Cognizant of the St. Clair River being a boundary water, he reiterated that he did not "mean to intimate a doubt" Congress' power "to construct such internal improvements as may be essentially necessary for defense and protection against the invasion of a foreign enemy."[191] He argued that the river's boundary status meant that any improvements made by the Americans would "equally inure" to Great Britain, who happened to be the only enemy in those waters.[192]

Even if a war did break out, Buchanan felt confident it would not be fought in the St. Clair River or the Great Lakes. Buchanan's veto simultaneously cast dredging in the St Clair River as an internal improvement that Congress could conduct, but one that Congress needed to move away from because the river flowed along a boundary. This understanding of the lakes and their connecting channels tried to hold a trickly line between what should be done and what could be done. Buchanan's veto also represented the seventh appropriation bill overruled by Democratic presidents between 1838 and 1860, interrupted only by a significant appropriation made by Whig President Fillmore in 1852 that authorized the canal around the St. Mary's Falls.

[190] Buchanan believed that the "distinctive spirit and character" of the U.S. Constitution related to how the powers of the federal government "confined chiefly" to foreign relations, war, "and to subjects of common interest to all the States, carefully leaving the internal and domestic concerns of each individual State to be controlled by its own people and legislature." See James Buchanan, Veto Message Online by Gerhard Peters and John T. Woolley, The American Presidency Project https://www.presidency.ucsb.edu/node/203221

[191] James Buchanan, Veto Message Online by Gerhard Peters and John T. Woolley.

[192] James Buchanan, Veto Message Online by Gerhard Peters and John T. Woolley, The American Presidency Project, https://www.presidency.ucsb.edu/node/203221.

Chasm and Rebuilding

By this point, the build-up to the Civil War was in full swing in the American South. Larson remarks that the "development of lake transportation after the completion of the Erie Canal" not only helped settle the Great Lakes region but that it also bound "its economic interests with those of the North Atlantic seaboard."[193] Rail lines in the 1850s between the eastern seaboard and the lakes region further strengthened the east-west canal traffic. Despite the deep financial toll of the Civil War, the U.S. Congress continued to apportion money to Great Lakes projects. In 1864, for instance, legislators approved a House bill that provided an amount of $250,000 for the preservation and repair of Great Lakes harbors.[194] After the war, Congress appropriated more money towards the St. Clair River's improvement without imposing any conditions "as to the kind of improvement" nor did it require that "the money to be expended in a prescribed spot of channel of the flats."[195] Over the next couple of years, Congress further appropriated $150,000 for St. Clair River improvements through the River and Harbors Act. It added an interesting point though that the work being funded needed to be contracted out, opening the way for the lowest bidder to win. Consequently, the Corps started contracting out the actual work of improvements whilst providing the intellectual and economic rationale for them.[196]

After the end of the Civil War in the United States, the Corps spearheaded improvement efforts in the Great Lakes, decisively shifting gears from canals to dredging channels. The Great

[193] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 94.
[194] Larson, 93–94.
[195] According to the Corps, 22,274 vessels passed through the flats. Carrying sediment that it emptied in the delta, the river created multiple shoals and other hidden dangers for navigation, at its mouth. The Corps reported that collisions, towage, beacon lighting, range lights etc., i.e., infrastructure that made the channel safer cost nearly half a million dollars annually. "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1866 in Six Parts" (Washington D.C.: Government Printing Press, 1866), Appendix N, 43-58.
[196] The officer in charge of the work in the Flats, pushed back against this stipulation, championing quality over quantity. Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 107–8.

Lakes' rivers served as large, swift bodies of water with deep and useful channels that did not, like the Niagara, crash down.[197] Unlike Niagara Falls, which needed to be bypassed and offered a clear map for completely human-made technological intervention, the other connecting channels of the Great Lakes—the St. Mary's River, the St. Clair River, and the Detroit River—all acted as chokepoints for vessel traffic whose mastery by technology embedded into the waterscape iterative and incremental change. Congress, commerce, and nature forced engineers to consistently rethink and reevaluate their interventions. These natural channels were incapable of handling the increased commerce and passenger traffic, posing an intellectual and design challenge for engineers. Human interventions could not bypass natural constraints with a completely new intervention like a canal, design, and interventions had to be calibrated based on how nature—in this case, river channels—could be redesigned for greater efficiency. This is where the Corp's consistent use of Lake Survey maps came in handy. Whereas the British had mapped the coasts, the Corps had (and continued to) surveyed the lakes and their waterways' depth. This detailed mapping and data gave the Corps a decisive advantage: not only did it control the lake vessel traffic, but it also controlled accurate knowledge about how to navigate these inland seas. Knowing river and lake depths, however, did not necessarily mean the Corps had all the data it needed to create infrastructure. Exhaustive mapping helped the Corps identify current and potential problematic points of passage in relation to burgeoning lake traffic—not enough to identify the most suitable kinds of infrastructure though.

Identifying potential bottlenecks was the first step toward removing them. While engineers improved the Flats, the bottleneck of the St. Mary's River continued to restrict the size

[197] Even at the St. Mary's rapids, the challenge not a cascade of water dropping hundreds of feet. Portage was possible. Over almost 75 miles, the river loses 13 feet in elevation discharging 75,400 cu ft/s. Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*.

and tonnage that passed through them. By 1869, "one-third of all the iron and two-thirds of all the copper produced in the United States came from mines near the shores of Lake Superior."[198] All these minerals passed down to the lower lakes to manufacturing sites through the St. Mary's locks. Obsolete locks were a costly misadventure.[199] During a time with plentiful federal responsibility and funds, a national project like the St. Mary's Canal was easily funded—the only question being how. After many stops and starts—including operational issues—the new canal finally opened for traffic in 1873.[200] The work on the new St. Mary's Canal continued and eventually opened after the canal had finally transferred into federal hands in September 1881. Within a couple of months, however, the Corps recommended the construction of a new and duplicate lock to replace the old original ones. While the 1881 locks had been under construction, vessel traffic had grown five times as had tonnage. This meant that the locks already had proven obsolete the day they opened. In response, the Corps attempted to construct a new channel below the falls, as a means to catch up.[201] Meanwhile, work to deepen and widen the Flats to 16 feet continued at the same time, funded through congressional appropriations through the 1870s.[202] In the meantime, the Corps had shifted attention south, to the lower end of the Detroit River: the limekiln crossing.

Until 1874, the lower Detroit River basin remained untouched, even though it had been surveyed and mapped.[203] Engineers did not dredge, widen, or deepen the river, as its naturally U-shaped channel had long been used by cargo and people. Yet with bigger vessels and increasing

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[198] Larson, 111.
[199] The state of Michigan which owned the canal, transferred it to the U.S. federal government with hopes that the latter could help pay improvements that costed more than the state could afford. The final transfer did not take place until 1881. Larson, *Essaysons,* 118.
[200] Larson, *Essaysons,* 111–14.
[201] Larson*, Essaysons,* 118.
[202] Larson, 104–56.
[203] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1872" (Washington D.C.: Government Printing Press, 1872), 100.

tonnage, the limekiln crossing—with its varied river depth and rocky outcrops—fast emerged as another hazardous chokepoint. The limekiln area eventually became the origin of all subsequent interventions in the Detroit River. With every subsequent improvement, room and need for more always existed, necessitating further dredging and channel creation. As work on the Detroit River began, improvements on the Hay Lake channel continued near Saulte St. Marie.[204]

During and after Reconstruction, the Corps continued to act as the preeminent body supplying Congress with data about the economic impacts and importance of improvements. Congress usually agreed with the Corp's estimation. Even as the Corp balanced practical and ideological considerations in how and what projects they sought appropriations for, a growing desire existed for more permanent solutions.[205] In the St. Clair flats where Corp's engineer O.M. Poe unsuccessfully tried to stop a leak in muck dike with marsh sod mats from surrounding wetlands, commenting that "dike-filling adds greatly to the appearance of the work; indeed the dikes, with the growth of willows upon them, look beautifully," but at a "sacrifice" of continued erosion and maintenance.[206] Recommending greater depth and width "to enable vessels of heaviest draft to freely pass through," Poe believed in more long-term solutions.[207] Construction times and inevitable delays meant that locks, wider and deeper channels often grew obsolete or not as useful as originally envisioned by the time of completion. Combined with uncertainty about Congressional appropriations for such interventions meant that engineers had to design

[204] At the Saulte, there was increasing awareness and desire for a wider lock by the shipping lobby that culminated in a report that asked Congress for greater appropriations in 1880s. See "The Sault Ste. Marie Canal and Hay Lake Channel: Official Report of the Proceedings of the Waterways Convention Held at Sault Ste. Marie, Michigan, July 20th, 1887."
[205] Davis talks about the frustrations that engineers such as O.M. Poe were frustrated in his experiment to adapt to the constantly changing landscape by using a biotic solution. Poe grew increasingly disillusioned and sought a permanent solution, hinged on dredging. See Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape*, 282. , http://nrs.harvard.edu/urn-3:HUL.InstRepos:41129139..
[206] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1872," 223.
[207] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1872," 223.

with Congressional priorities in mind. Increased shipping tonnage and size coupled with ever-changing natural conditions meant that engineers faced an uphill task, prompting new sets of improvements meant to meet congressional expectations. This syncopated relationship meant that interventions had to be localized, incremental, and iterative.[208] In the Great Lakes, this troika played out in both ideology and design.

In developing a design lexicon in binational waters, the Corps relied on domestic and international policies and politics. In a world before railroads, bilateral institutions, and policies, the Corps relied on U.S. and Canadian politicians at all levels to facilitate infrastructure creation. In turn, these politicians relied on engineers in both nations to research and design these infrastructures through the evolution of a mutually beneficial and legible common language between the Corps and Congress that drew upon the other's vocabulary and acumen to justify infrastructural projects for both institutions. Whereas "Congressmen wrote of the size and capacity of watercourses; the engineers framed their projects in terms of economic benefits and political feasibility."[209] After the war, as the scales tipped, technical questions and expertise dominated discussions over the value of engineering projects. Legislators relied on "engineers to provide the bulk" of financial and economic justification for a project.[210] This practice came to govern how the Corps authored its annual reports and the way Congress funded improvements through River and Harbor Acts.

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[208] In testing their knowledge about water and landscapes through designing structures, engineers fabricated another feedback loop: iterative design. Looking at Reconstruction in the American South, architectural historian John Davis remarks that "combination of material inefficiency and reluctance of labor to contribute to an exercise that was always tedious and now increasingly futile caused the engineers to begin looking at their materials anew." Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape*, 282–283.
[209] Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape, 1865-1885*, 321.
[210] John Dean Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape, 1865-1885* (Cambridge MA: Doctoral dissertation, Harvard University, Graduate School of Arts & Sciences. Unpublished PhD Dissertation, 2018), 321, http://nrs.harvard.edu/urn-3:HUL.InstRepos:41129139.

Congress often wrote these bills like the annual reports which were project-specific calculations. Taken together, these projections, delimited as they were from one another, constituted footprints of a diffused U.S. federal state. Restricted by the limits of each project, these appropriations also spawned a project-specific vocabulary for both the Corps and Congress. This lexicon carried forward in space and time when both the Corps (and the Carriers, the preeminent shipping lobby in the Great Lakes region) spoke in the localized language of projects instead of watersheds or interconnectivity, especially in the face of Commission hearings in 1913. Engineers' actions on the Detroit River, and the Great Lakes in general, were directly proportional to Congressional allocations. Over time, this calculus also governed engineers' ambitions and design iterations. Yet, much like those mammoth annual reports, these appropriations were monumental and in compiling them, engineers acknowledged that they understood the effects on the watersheds.

So, what do we make of this seeming contradiction? Over the course of this dissertation, engineers continued to think in terms of projects instead of the entire watershed. This was not because they were blind to these system-wide effects but because they were acting in localized projects. The Corps' actions, as evidenced in annual reports, were a part of districts. There were different districts even in the same watershed as Chicago, Detroit, and Buffalo in the Great Lakes. Thus, two projects could be in the same watershed but in different districts like the Chicago Diversion and the Detroit River, and engineers in either district would be hesitant to comment on the other. [211]

[211] For instance, when pushed to comment on the Chicago diversion, the Detroit District engineer, Mason Patrick, during the 1912 hearings, very reluctantly agreed to the effects of the upstream transformation on water levels in the Detroit River. See International Joint Commission, "Testimony in Re the Livingstone Channel, on the Reference of the Governments of the United States and the Dominion of Canada, under Article IX of the Treaty of May 5" (Washington, D.C.: U.S. Government Printing Office, 1913), https://www.loc.gov/item/13035458/.

Narrative Arcs and Analytical Methods

The chapters that follow examine how and why engineers transformed the lower Detroit River the way it was. They track interconnected but dissimilar processes. By 1874, the Corps could easily and securely justify infrastructure creation through Congressional approval and had considerable experience working in the Great Lakes. Initially, they worked with the Detroit River, rendering it more legible and augmenting the natural/original channel. With each iteration though ambitions grew, as did congressional appropriations resulting in radical but unobtrusive creations. When engineers first decided to augment the river, they hoped to dredge away boulders in the riverbed. Clearance represented just the first step. Soon, as the shipping lobby began coalescing, the pressure to do more began mounting—and so began iteration as the first lesson of lake design. Channel width, designs, and even depths changed in the effort to find the golden mean between commerce and creativity, by the first avatar of techno-infrastructural diplomacy.

Even as engineers found common ground and cause across borders, the Corps—now working with the newly emerged shipping lobby—desired more than augmentation. The Corps sought creation by embedding an artificial waterway within the river. Instead of being hemmed by the original channel whose width could not be increased endlessly, the Corps suggested a second channel, the Livingstone, with partially walled, safe sides, separate from the natural deep-section- a canal within the river, training it. Yet what began as a panacea to the pains that shippers dealt with, became an open wound as local activism against the Livingstone Channel mounted, finally halting work. The nascent Commission brought in swiftly also exited leaving behind a power vacuum and some scaffolds of a way forward. Engineers instantly seized on this

opportunity, reestablishing their diplomatic channels. River training, on the other hand, created some nasty aftereffects.

The crosscurrent plaguing the new channel exposed the limitations of river training. It also forced the newly formed Commission to consider the importance of pollution more than infrastructure. Over the course of the compensatory dike hearings in 1912, the Commission created a framework for future cooperation while stepping away from questions of creation. Unlike the Commission, the crosscurrent was here to stay in the lower Detroit River, the question related to management rather than removal. Cooperation and compensation clicked; engineers worked together to forecast and suggest solutions to alleviate the current. A new avatar of techno-infrastructural diplomacy was born.

Fighting for survival in the face of infrastructures on control and compensation, the crosscurrent created a double bind. On one hand, it pushed engineers to continue cooperating and creating, now to compensate for these insolent waters. On the other, compensation envisioned creating a river surface and behavior akin to the primordial one. River training was no longer trying to control flow but counterweigh for it, trying to offer stasis where now there was enforced movement through channel wall. This evolving techno-infrastructural diplomacy reveals a great deal about the challenges that the twentieth-century Great Lakes compacts have addressed and their responses to current realities like climate change. Through all of this, the Great Lakes themselves became representations, blue behemoths on a map, that could be diverted from and diverted into. Cooperative creation and techno-infrastructural diplomacy resulted in the natural appearance of these heavily human-made waterscapes.

Analytical Methods

This dissertation operates at three levels of analysis. First, it analyzes how engineers, locals, and the evolving shipping lobby (such as the Carriers) interacted with the Detroit River and how each conceptualized the same. Tracing human-nature relations, it shows how the river made its presence felt, as a historical agent.[212] A persistent crosscurrent existed that supposedly spooked shipmasters—curiously mostly Americans—during the construction of the Livingstone Channel. This crosscurrent animates most of this dissertation, constant in its presence, impossible to eradicate, empowering engineers' proposals to create more incremental and iterative infrastructure. Compensatory dikes and dams became a part of the engineering lexicon, to combat the crosscurrent. By the 1930s, compensation also became creation when the Corps constructed Crystal Bay and Island.

In binational waters, this creation underscores the second level of analysis: the relationship between environmental management and the political border which took the form of the built environment. A study of this relationship contributes to a growing body of literature on a political border as a construction zone, by pointing our eyes to movement *along* a border river.[213] Dikes, dams, and even islands are, at their core, built environments. Contestations about the form, function, and design of these infrastructures did not just challenge their material reality but also the construction of the political border itself. As a construction site then, the political

[212] In "Can the Mosquito Speak?" Timothy Mitchell traces the effects and history of the gambiae mosquito in Egypt. Mitchell, *Rule of Experts*, 19–53.

[213] In *Border Land, Border Water*, C.J. Alvarez tells a history of the U.S.-Mexico border "through construction projects, the built world of the border region." Border infrastructure in the form of roads, bridges, and even border monuments were not just 'put' in place to mark a line, but instead with an intention to control both humans and nonhumans. Alvarez shows that the built environment increasingly came to be seen by border builders as having the immense capacity to control people, goods, and water. Alvarez offers a great starting point to thinking like this. While his work centers on infrastructures that cross the border, my work highlights infrastructure along. Alvarez and I both analyze how these infrastructure privilege (or not) movements of certain kinds. C. J. Alvarez, *Border Land, Border Water: A History of Construction on the US-Mexico Divide*, First edition (Austin: University of Texas Press, 2019). Emphasis added.

border is more than the line used to represent it on maps. In the Detroit River, these built environments run the waterway's entire length. By focusing on a limited area and using a case study of the Livingstone Channel—an artificial waterway within the lower Detroit River that handles only upbound traffic—this dissertation shows how the political border can and does become a place in and of itself. A comparative approach undergirds this dissertation, paying close attention to both Canadian and American voices as a North American instead of an American or Canadian approach is inherently more inclusive.

Third, using an envirotechnical analysis, I show how nature, technology, and the environment are not only historically interrelated and produced, but also that dredging constituted the handmaiden (and vice versa) of iterative and incremental infrastructure designed to be submerged and typified the Corps' piecemeal approach as well as keeping the cumulative impact of these developments almost invisible.[214] I reveal how environmental management hinged on the creation of hidden-in-plain-sight infinitesimal infrastructure and drove both commerce and knowledge creation. I reinforce the literature that challenges the nature-technology divide both discursively and materially.[215] Infrastructure creation was never meant to be hegemonic or monumental at first glance.[216] It never meant to beget more than a first glance. In each river and lake stood a motley group of submerged or above surface dikes, dams, locks, and islands. These infrastructures were imperceptible, covered by trees or sunken; these pragmatic, piecemeal structures were meant to nip and tuck the Detroit River into functioning as

[214] Pritchard, *Confluence*.
[215] Ashley Carse, "Nature as Infrastructure: Making and Managing the Panama Canal Watershed," *Social Studies of Science* 42, no. 4 (August 2012): 539–63, https://doi.org/10.1177/0306312712440166.
[216] Etienne Benson, "Generating Infrastructural Invisibility: Insulation, Interconnection, and Avian Excrement in the Southern California Power Grid," *Environmental Humanities* 6, no. 1 (2015): 103–30, https://doi.org/10.1215/22011919-3615916.

an efficient cargo corridor. Engineering and design impositions on the river are barely visible to the uninterested eye because all that has been built now appears as nature.

Chapter One

Raising Down the "Hell gate" of the Great Lakes: The Limekiln Projects in the Lower Detroit River, 1873-1900

In November 1873, the *Milwaukee Daily Sentinel* remarked that there was "not a more dangerous point to shipping between Chicago and Duluth" than the limekiln crossing. [1] In this unavoidable stretch, rocks on the river bottom caused an unexpectedly high amount of vessels to run aground. The *Milwaukee Daily Sentinel* called for something to "be done to improve" the river bottom here.[2] Even though this section laid "partly" in Canadian waters and "vessels sometimes" struck rocky spots in passing, the Corps thought "the difficulty might be obviated at small expense."[3] Soon to be christened the "Hell gate" of the Great Lakes, this chokepoint threatened to ground the growing industrial economy in the Midwest to a halt.[4] In 1873, three times as many vessels passed through the Detroit River as had in the port of New York in 1872. Over half of the Great Lakes commerce and nearly one-third of all waterborne traffic in the United States traversed this narrow and jagged-riverbed section of the river. The Corps believed that in 1873, more trips were "made on these lakes [Northern lakes, including Superior, Michigan and Huron] than in all the rest of the country."[5]

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[1] "Marine," *Milwaukee Daily Sentinel*, November 21, 1873, 6. Nineteenth Century U.S. Newspapers.
[2] "Marine," *Milwaukee Daily Sentinel*, November 21, 1873, 6. Nineteenth Century U.S. Newspapers.
[3] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts" (Washington D.C.: Government Printing Press, 1874), 589.
[4] "Marine. Port of Detroit, August 1. Wind and Weather.--Weather Cloudy and Threatening. Wind West.," *Detroit Free Press*, August 1, 1874, 4. ProQuest Historical Newspapers.
[5] In total, nearly forty percent of the total shipped tonnage in the United States passed through this section of the Detroit River in 1872. These figures were estimates based on July as the baseline average month in lake commerce during any summer. See Army Corps of Engineers, "Bridging the Channel Between Lakes Huron and Erie: Letter from the Secretary of War Transmitting A Report to the Board of Engineers Relative to the Practicability of Bridging the Channels Between Lake Huron and Lake Erie," House of Representatives Doc. No. 64, 43rd Congress, 1st session, document no. 64 (Washington, DC: US Government Print Office, 1874), 4-6.

The limekiln crossing constituted a problem for four reasons: depth, velocity, jurisdiction, and economics. Unlike the rest of the natural U-shaped deep-section within Detroit River, at a reliable twenty feet depth, at the limekiln crossing river depth was irregular and ranged from 12.5 to 15 feet. In addition to depth, a swift current in the area created hazardous conditions. If nature were not problematic enough, there were political borders and questions about where the boundary existed within the shipping channel.[6] Finally, there were financial ramifications. The United States controlled and dominated the shipping trade. Ships often transported American-origin raw materials to American or Canadian markets. Given this dominance, the U.S. federal government's interest and engagement in improving these waterways made fiscal sense. Yet, the uncertainty about the location of the political border concerned American shipping interests who were amalgamating into a lobby. The solution to these multiple problems became the first large dredging project in the lower Detroit River.

This dredging project embodied more than simply digging in the river bottom. Following this project, this chapter makes three broad arguments. First, dredging was a territorializing process. By spearheading dredging, the Corps reinforced U.S. economic and territorial control of the shipping channel. Often funded as an internal improvement by the U.S. Congress, dredging both acknowledged and furthered the predominantly U.S. interest in the process. As much of the commercial freight traversing the Midwest used the Great Lakes waterways and therefore was more prone to seasonal disruptions in the winter. Frozen rivers and lakes meant that cargo could not be shipped over water and railroad ferries were unusable. During the shipping season, uneven river bottoms and boulders as well as, variable water levels at chokepoints like the limekiln area

[6] John W. Larson, *A History of the Detroit District U.S. Army Corps of Engineers* (Detroit: US Army Corps of Engineers, 1995), 119.

posed an added setback. Interruptions due to frozen or sedimented protrusions immobilized the integration of commodity markets through emerging supply chains.

Second, in improving these binational channels, the Corps embedded American interest, and commercial prowess into the waterscape. Improving the shipping channel through U.S. Congressional funds essentially made the channel 'American' for both politicians and locals. The limekiln crossing area was firmly in Canadian territorial waters as per the 1814 Treaty of Ghent.[7] This realization caused much discomfort for American and Canadian politicians as well as newspapers. On both sides of the border, questions emerged about why the U.S. Congress was bankrolling work in waters outside American boundaries.[8] This territorializing project was hand-in-glove with entrenching incremental and iterative infrastructure into the waterscape. The limekiln crossing became the first step to apportion the Detroit River into a series of augmented and artificial channels and design projects. Engineers learned from each iteration, making small changes for the next round. Each time engineers also reinforced how explicitly local these projects were through the ways they sought appropriations.

Third, the limekiln crossing project laid the bedrock of techno-infrastructural diplomacy promoting cooperation between the U.S. and Canada before the Commission. Without the scaffolding of binational regulatory or diplomatic organization, the Corps acted as an interlocutor, defending U.S. territorial interests, expanding economic ambitions, and allaying Canadian as well as American anxieties about the political border. Until the Boundary Waters Treaty of 1909, there existed no overarching binational regulatory or policy framework for environmental diplomacy between the United States and Canada. While bankrolled by the U.S.

[7] Patrick Livingston, *Summer Dreams: The Story of Bob-Lo Island*, Great Lakes Books (Detroit, Mich: Wayne State University Press, 2008).
[8] "Whose Is It? Is Part of the Detroit River in Canada? And Has the United States Government Been Improving the British Channel and Neglecting Her Own?," *Cincinnati Enquirer*, September 5, 1888.

Congress, dredging in Canadian waters at the limekiln crossing required permissions from the Canadian Privy Council and the Governor-General. In so doing, engineers in both nations carved out a collaborative and cooperative construction regime.[9]

Infrastructure creation did not just entail an engineering desire though. Disparate U.S. interests who had begun to consolidate to form the Carriers in the 1890s—the preeminent lobby of its kind in the Great Lakes with no parallel in Canada at the time—controlled the growth of shipping.[10] Between the 1870s and 1890s, as railroads expanded, they often were at crosshairs with shipping interests that were yet to unite. Divided between the major lakes' ports interests in Buffalo, Cleveland, Detroit, and Duluth, disparate shipping interests realized early on that they needed to work together to be able to fight railroad lobbies and work more closely with the U.S. Congress. Railroad interests consistently called for the bridging of the Detroit River and these calls acted as a major catalyst in the creation of the Carriers in 1892. Shipping interests recognized that they would not be able to engage in multiple fights at numerous fronts—labor, safety, increasing cargo needs—if they could not fight these as one organization.[11]

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[9] Reciprocity and cooperation undergirded trade in the Great Lakes in the 19th and 20th century. Great Lakes crossings, especially the form of the Ambassador Bridge remain vital to North American trade and commerce. Scholars have studied the evolution of these cooperative regimes closely including Kehoe, *Cleaning up the Great Lakes*; Karamanski, *Mastering the Inland Seas*; Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*; Macfarlane and Clamen, *The First Century of the International Joint Commission*, 2020; Heasley and Macfarlane, *Border Flows*; Norman, Cohen, and Bakker, *Water without Borders?*

[10] The Dominion Marine Association, merging Canadian shipping interests was not formed until 1903.

[11] Labor unrests were characteristic in the late 19th and early 20th centuries. While instances like Pullman were generative, those on lake vessels are not well known. Like other capitalists of their age, private shipping interests like William Livingstone were avowedly opposed to unionizing and organized labor, fighting hard to ensure union activity was eschewed. They routinely fired strikers and union organizers. In his book on the Carriers, Ryan shows how labor questions were top on Livingstone's mind. The Carriers were also asked to weigh in on matters that the Commission dealt with, those relating to compensatory dikes as well as pollution. During the pollution related Commission hearings, the Carriers had to answer questions about the environmental impact of cargo vessels' ballasts being released into the Great Lakes. See George R. Ryan, *Lake Carriers' Association History 1880-2015* (Place of publication not identified: Xlibris, 2017); International Joint Commission, "Hearings of the International Joint Commission in Remedies for the Pollution of Boundary Waters between the United States and Canada" (Government Printing Office, 1915), Haathi Trust.

The Carriers became an umbrella organization that advocated for greater U.S. Congressional appropriations, monitored the safety of river channels, maintained data on crossings as well as accidents, and worked with crews at ports. The coming of this powerful shipping lobby, however, has not received much historical or historiographical attention. The shipping lobby was learned from (and in part, populated by) the railroad lobby. As the only body of its kind in the Great Lakes, it enjoyed a monopoly in binational issues, even after the coming of a Canadian shipping association. Both these historical currents meant that the Carriers were in a unique position, working closely with the Corps and able to wield significant political power and attention to improve Great Lakes connecting channels. By charting the evolution of the shipping lobby, this chapter addresses an important historical and historiographical lacuna in Great Lakes literature.[12]

In the Great Lakes, Corp's engineers also acted as diplomats.[13] Without binational or international structures and organizations to regulate the creation of infrastructure, the Corps was

[12] In *Railroaded*, Richard White argued that nineteenth century railroad construction imposed human order and rationality to large swathes of territory and space, reshaping them unevenly and chaotically. White advances earlier scholarship in describing the construction of complex but legible infrastructures and corporations in the quest for order. White in the book also notes the foundational work of Chandler and Wiebe. Scholars have also examined the mental image of a well-organized and ordered machine that guided capitalism in the Gilded Age. Commercial actors whether corporations or smaller ones as well as the state shared an unbridled enthusiasm for infrastructural networks that espoused order and legibility. In the case of the railroads (as well as dredging in the Great Lakes) these networks represented the convergence of expertise and capital, and were joint initiatives between public and private actors. White, *Railroaded*; Alfred Dupont Chandler, *The Visible Hand: The Managerial Revolution in American Business*, 16. print (Cambridge, Mass.: Belknap Press of Harvard Univ. Press, 2002); Robert H. Wiebe, *The Search for Order: 1877-1920*(New York: Hill and Wang, 2007); Alan Trachtenberg, *The Incorporation of America: Culture and Society in the Gilded Age*, 25th anniversary ed (New York: Hill and Wang, 2007); Scott, *Seeing like a State*; Summers, *Railroads, Reconstruction, and the Gospel of Prosperity - Aid under the Radical Republicans, 1865-1877*.

[13] In his new article, Daniel Macfarlane argues that "most social science scholarship on North American environmental diplomacy focuses on conservation and protection, ignoring policies, agreements, and patterns that involved exploiting or degrading environments. However, such a focus obscures many of the central aspects of Canada-U.S. diplomacy in the first century after Canadian Confederation." Specifically, he argues, "technological expertise required to negotiate hydropower projects that crossed or affected border waters meant that engineers and technocrats frequently became diplomatic actors, with their technical recommendations influenced by political factors." Daniel Macfarlane, "Hydro Diplomacy: Canada-U.S. Hydroelectricity Exports and Regulations Prior to the NEB," *American Review of Canadian Studies* 51, no. 4 (October 2, 2021), 508–32, https://doi.org/10.1080/02722011.2021.1997335.

pushed to pander, pacify, and proportionally respond to the multiple interests at hand. In the face of fearmongering protectionists in the United States and Canada alike, the Corps advocated collaboration and cooperation. This desire to work together made financial sense given the U.S. investment in dredging as well as the domination of the lake trade. It also made technical sense because the natural deep-water channel was amenable to augmentation in ways that an overtly all-American one would not be. Advising the U.S. Secretary of War and Congress against an all-American channel, the Corps supported a Canadian (couched as being binational) channel as both a show of strength as well as a fiscally sound idea. American dominance of the lake trade and bankrolling improvement had anyway stamped U.S. authority on the binational waters which, the Corps reasoned, would only be reinforced by further cooperation in expanding the limekiln crossing. An all-American channel instead would be expensive and antagonize the Canadians, destabilizing relations, and commercial agreements.[14] The limekiln crossing project became the launching pad for later interventions all of which would be distinct and divide the river course into a sum of schemes. These separate initiatives within the same river set the template for piecemeal rather than comprehensive infrastructural creation. These separate initiatives within the same river would set the template for piecemeal rather than comprehensive infrastructural creation. Based on their experiences at the limekiln crossing, Corp's engineers began to conceive of a completely artificial waterway within the Detroit River to correct for nature's limitations.

[14] "At Great Odds," *Boston Daily Globe,* July 31, 1892, 7.

River as Barrier

In the 1870s, there was increasing attention on the barrier the Detroit River posed to transcontinental commerce, especially U.S. railroads that were stuck at the banks, dependent on the weather and/or ferries to cross. The Corps in its 1874 report noted that at "Sarnia the Grand Trunk Railway crosses the St. Clair River at a point where the current is so rapid that the passage of ferry-boats is never obstructed by ice." [15] The report further surmised that "Grand Trunk Company apparently has no desire for a bridge at Sarnia." [16] The Corps also noted that it "seems probable that the crossing of freight by ferry is more economical than by any admissible bridge."[17] At Detroit, however, things were different. Three ferry boats carried over 800,000 tons of freight and over 218,000 passengers in 1872-1873 crossing between Detroit and Windsor.[18] Moving all this freight and people was easy enough during the navigation season (between late spring and fall) due to the short distance between the ports of Detroit and Windsor and the river's depth. In the winter, however, ice posed an obstacle. Especially in the winter of 1872-3 when the ice was so thick that it was almost impassable, leading to increasing crossing times and costs. In January 1873, ferry trips could take up to 290 minutes, one-way, although most trips took between twenty and thirty minutes.[19] Over a thousand cars were stuck on either bank of the Detroit River for up to a fortnight at a time.[20] In its 1873 report, the Michigan Central Railroad reported that "there were from two thousand to three thousand" stuck along the banks of the

[15] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 594.
[16] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 594.
[17] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 594.
[18] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 594.
[19] This distance was less than half a mile and would usually not take more than a few minutes.
[20] James F. Joy, Annual report of the directors of the Michigan Central Railroad Company to the stockholders together with the reports of the Treasurer, Superintendent, Auditor, and Trustees seeking Funds, (Boston: Wright & Potter, State Printers, 1873), 9, https://quod.lib.umich.edu/r/railroad/0862910.1872.001/11?page=root;size=100;view=pdf; "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 597.

Detroit River for almost a month, losing about half a million dollars in the bargain.[21] In January 1873, the Detroit Board of Trade called a special meeting to discuss the rising calls from railroad operators, merchants, and businessmen to do something about the stalled traffic and appointed a special committee to study the feasibility of a tunnel or a bridge.[22] However, there was a quick realization that a tunnel was many years away "if it were by possibility feasible at all."[23] To the Michigan Central Railroad at least, the only alternative was a bridge. Despite its first choice of a tunnel, the Detroit Board of Trade, reconciled with the idea of a bridge, because it believed a "rapid and sure means of transit" was fast becoming "more necessary."[24] The board earnestly petitioned the U.S. Congress to pass a bill authorizing a bridge across the Detroit River.

Through the summer of 1873, there were public hearings about the feasibility of a bridge. Shipping interests weighed in arguing against the bridge because such a structure "would be a serious hinderance [sic]" to their much "larger business" as compared to the railroads. After all, ships moved far more freight than railroads at much cheaper rates and could stop at ports of call. Suggesting that railroads continue using ferry boats, even in the winter, shipping interests quipped that when railroads could transport freight at cheap rates as compared to ships, "a proposal to build a bridge across our river, to the hinderance [sic] of navigation, would come with better grace than now."[25] In the fall of 1873, the Corps heard arguments for and against the bridge. Eventually, on Christmas Eve 1873, the Corps noted in its final report recommended a

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[21] James F. Joy, Annual report of the directors of the Michigan Central Railroad Company to the stockholders together with the reports of the Treasurer, Superintendent, Auditor, and Trustees seeking Funds, (Boston: Wright & Potter, State Printers, 1873), 15. https://quod.lib.umich.edu/r/railroad/0862910.1873.001/17?page=root;rgn=full+text;size=100;view=image

[22] Caitlin, *The Story of Detroit*.

[23] James F. Joy, Annual report of the directors of the Michigan Central Railroad Company to the stockholders together with the reports of the Treasurer, Superintendent, Auditor, and Trustees seeking Funds, (Boston: Wright & Potter, State Printers, 1873), 21.

[24] "Bridging Detroit River: The Board of Trade in Favor of the Project," *Detroit Free Press,* January 31, 1873, 1. ProQuest Historical Newspapers.

[25] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 617–18.

tunnel instead of a bridge, while noting the bridge or tunnel question was outside its scope of inquiry. A tunnel, according to the Corps was not "impracticable, at a cost not so great so as to debar its construction."[26] The fundamental problem with a bridge was that it would disrupt navigation. Any future bridges would need approval from the U.S. Secretary of War who could potentially stop running trains on the said bridge to safeguard American commerce and interests. The ability of the U.S. Secretary of War to regulate the creation of a railroad bridge in binational waters hints not only at the lack of a binational regulatory organization at the time, but also cemented American territorial ambitions on border waters. By controlling commerce, U.S. interests—whether military or commercial—controlled border waters.

The railroads had temporarily been stopped in their tracks, backing down from actively seeking a bridge across the Detroit River. Instead, they concentrated efforts on a bridge south of Detroit, connecting Trenton to Amherstburg. This plan, first created in 1872, proposed to join Trenton to Grosse Ile and thence to Stony Island. The final section of the bridge was supposed to cross the Detroit River at its widest to make landfall near Amherstburg.[27] The Canada Southern Railway had already "taken possession, entirely without authority of the United States" of about half of the waterway by "bridging, embankment, and piers" to and at Stony Island.[28] The problem with trying to bridge Stony Island to Amherstburg was not just of distance—at about 3280 feet—but also the river itself. The proposed bridge would make landfall near Amherstburg just a "short distance above one of the narrowest and worst places for heavy vessels in the river," the limekiln crossing, where the current was "curved, swifter than at Detroit, its velocity having

[26] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 603.
[27] Philip P. Mason, *The Ambassador Bridge: A Monument to Progress*, Great Lakes Books (Detroit: Wayne State University Press, 1987), 40.
[28] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 598.

been increased by the obstruction already placed in the river by the railway company."[29] A bridge at this point seemed especially egregious because even in a best-case scenario, it would only carry just over one million tons of freight as compared to the nine million tons that ships carried.[30]

Given the "most pressing want of the whole Northwest" was cheap transportation to the East, the Corps believed nothing including a bridge should "interfere with the main channel." For, even if the bridge would be "of an additional value," it would ultimately be of "minor importance to the country at large, and especially to the Northwest."[31] Freight needed to move more swiftly and efficiently than any passengers along any bridge. Instead, the Corps advocated dredging the limekiln crossing to address this serious obstruction in the Detroit River.

Fixing Nature

In December 1873, the U.S. House of Representatives called for an "approximate estimate" to deepen and widen "the navigable channels of the rivers and waters connecting Lake Huron with Lake Erie for practicable navigation for vessels drawing 20 feet of water."[32] In its report to the Congress, Corps engineers Majors Comstock and Weitzel noted that they only possessed incomplete information about the river bed and had therefore assumed that the excavation would have to be through solid rock. At the limekiln crossing, they remarked that although the channel would be "partly in Canadian waters," it was in fact "in the best position."[33] Much like their predecessors, Comstock and Weitzel noted that a wholly American channel was

[29] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 598.
[30] According to the report, whereas the current was about two and half miles an hour in the main channel, it was about five miles an hour near Canada Southern Railway's piers off Stony Island The Corps calculated that this bridge would handle 1/13th of the 9,000,000 tons of freight that ships carried. "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 599.
[31] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 600.
[32] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 48.
[33] "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874 in Two Parts," 213–14.

possible, it would be prohibitively expensive, costing nearly 60 percent more than its extant variant.[34]

In the summer of 1874, based on the Corp's recommendations, Congress appropriated $25,000 for the removal of "bowlders [sic] and rocks" in the lower Detroit River near the limekiln crossing.[35] The *Detroit Free Press* (henceforth referred to as the *Free Press*) noted that the government had started making "the necessary surveys and the carrying out of the plans for the removal of the boulders which obstruct navigation at this Hellgate, or more commonly known as the Lime Kiln crossing," as well as other points, as directed by the U.S. Congress.[36] The paper further noted that the Dominion had also spent funds on the projects, hoping that the work would be completed before "dangerous" weather set in in the fall.[37] Later that year, in the fall, *The Detroit Free Press,* reported another recurrent problem in the Detroit River, "insufficiency water at some at some of the landings" at Detroit which "should" be removed by dredging. [38] The *Free Press* hoped that water levels could be regulated through dredging. In so doing, the *Free Press* highlighted how already dredging was seen as a solution to fluctuating water levels in the Detroit River and the Great Lakes. Low and fluctuating water levels had long hurt shipping in the Detroit River, especially at its mouth where Lake Erie directly played a role.[39]

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[34] Comstock and Weitzel pointed that the All-American channel would cost nearly four million dollars. Army Corps of Engineers, "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874. In Two Parts. Part I," House of Representatives Ex. Doc, 1, pt. 2, vol. II, 43rd Congress 2nd session (Washington DC: Government Printing Office, 1874), 214.
[35] Army Corps of Engineers, "Annual Report of the Chief of Engineers to the Secretary of War for the Year 1874. In Two Parts. Part I," House of Representatives Ex. Doc, 1, pt. 2, vol. II, 43rd Congress 2nd session (Washington DC: Government Printing Office, 1874), 47.
[36] "Marine. Port of Detroit, August 1. Wind and Weather.--Weather Cloudy and Threatening. Wind West."
[37] "Marine. Port of Detroit, August 1. Wind and Weather.--Weather Cloudy and Threatening. Wind West.," *Detroit Free Press*, August 1, 1874, 4. ProQuest Historical Newspapers..
[38] "Marine. Port of Detroit October 20," *Detroit Free Press*, October 20, 1874, 4.
[39] In an exploration of the Great Lakes, John Disturnell describes the impact of lunar movements on the water levels of the Great Lakes, especially the connecting waterways. He describes how sudden and massive the fluctuations at the Saulte were. See "A Lunar Tidal Wave. In the North American Lakes. *Extract from a Paper read by* Lt.- Col.

Press coverage on the Detroit River was not just local, however. As one of the most important waterways in the world, regional papers like the *Chicago Daily Tribune* as well as national papers like *The New York Times* routinely covered dredging and shipping, especially using stories first carried by the *Free Press.* Bottlenecks in the Great Lakes waterways were national news because these stoppages affected the entire economy. Detroit was a growing industrial city and ship-building port.[40] Unsurprisingly then, in April 1875, the *Chicago Daily Tribune* quoted a story from the *Free Press* which reported on a three-point plan by American vessel and steamboat owners to the Dominion government "hoping that some action will ensue resulting in the early and complete removal of the obstruction" by dredging at the limekiln crossing.[41] The plan called for the creation of two four-person committees chosen by both the Canadian Parliament and vessel owners to decide on estimated costs of improvements as well as arbitrate on said costs. The signatories hoped for "every vessel-owner around the lakes" to sign this proposal given the "comparative insignificant cost" in comparison to "the benefits derived from it."[42]

Graham, *before the American Association for the Advancement of Science, August 1860,*" "Remarkable Phenomena," and "Rising and Falling of the Waters of Lake Michigan. [From the *Chicago Tribune,* May 28, 1861]" in Disturnell, *The Great Lakes, or, Inland Seas of America : Embracing a Full Description of Lakes Superior, Huron, Michigan, Erie, and Ontario; Rivers St. Mary, St. Clair, Detroit, Niagara, and St. Lawrence; Commerce of the Lakes ... : Together with a Guide to the Upper Mississippi River, Giving a Description of Cities, Towns, Etc. : Forming Altogether a Complete Guide for the Pleasure Traveler & Emigrant : With Maps and Embellishments.*

[40] Zunz studies how autonomous ethnic communities were seminal to the building of Detroit in a period of explosive growth between 1880 and 1920. During this time, Detroit experience unprecedented growth and therefore was an important hub for immigrants who came from already urbanized areas, the American South as well as Canada. See Olivier Zunz, *The Changing Face of Inequality: Urbanization, Industrial Development, and Immigrants in Detroit, 1880-1920*, Paperback edition (Chicago London: The University of Chicago Press, 1983); Thomas A. Klug, "Dry Dock Engine Works," Historic American Engineering Record (Detroit MI, August 2002).

[41] "Marine. Port of Chicago, April 20. Arrived. Cleared. Lake Freights. Chicago. Detroit. Toledo. The Limekiln Rocks. Lake Michigan. Chicago. Milwaukee. Grand Haven. Lake St. Clair. Detroit. Lake Erie. Buffalo. Cleveland. Erie, PA. Miscellaneous." *Chicago Daily Tribune* April 21, 1875, 6. ProQuest Historical Newspapers.

[42] "Marine. Port of Chicago, April 20. Arrived. Cleared. Lake Freights. Chicago. Detroit. Toledo. The Limekiln Rocks. Lake Michigan. Chicago. Milwaukee. Grand Haven. Lake St. Clair. Detroit. Lake Erie. Buffalo. Cleveland. Erie, PA. Miscellaneous." *Chicago Daily Tribune* April 21, 1875, 6. ProQuest Historical Newspapers.

Even as vessel owners hoped dredging would clear hitherto rocky paths, not everyone agreed. The next month, Ollie Lewis, a resident of St. Catharines near Niagara Falls, wrote to the Toronto-based liberal newspaper *The Globe,* with a "protectionist" view. In his letter, Lewis suggested that the Dominion government consider American vessel owners' three-point plan by asking two questions. The first was if Canadian shipping would experience "any loss or inconvenience from these obstructions." The second was if the limekiln crossing did not affect Canadian shipping, then how might the removal of these obstructions matter to Canadian shipping? Lewis claimed that he had made a "diligent enquiry of masters of Canadian vessels and propellers" with a lot of experience of the channel in contention about the first question and their "unanimous testimony" was that even waters were at their lowest, Canadian vessels "experienced no loss or inconvenience whatsoever" from the obstructions. Lewis pointed out that Canadian vessels, which were smaller than their American counterparts, needed lesser draft, and did not feel the obstructions as much. The larger U.S. vessels could carry the bulk of the grain trade, rendering the Canadians at a "disastrous disadvantage." The American vessel owners' plan was giving a "*coup de grace*" to Canadian shipping because it enabled the creation of an even deeper channel to accommodate and profit the ever-larger American vessels. Since Canadian ship drafts were governed by the Welland Canal and not the limekiln crossing, thus "every inch of drought in the deep water channel of the Detroit River" over that standard would profit U.S. shipping interests while injuring Canadian ones. The proposed improvements were in, as Lewis reminded readers, "providentially" Canadian property. Thus, he argued that the Welland Canal needed to be deepened first before removing any obstructions in the Detroit River. Lewis also

reminded the Canadian government that it was their duty was the "promotion of Canadian interests and not American."[43]

Lewis's arguments against deepening the limekiln crossing were emblematic of the economic pinch Canadians were feeling. After the railway scandal drove the Macdonald government out, federal elections in Canada in 1873 brought the Liberal Party to power. In Windsor, William McGregor, ran for Parliament on a platform of free trade with the U.S. After the Panic of 1873, Windsor was especially feeling the squeeze, following Detroit feeling the effects of the depression.[44] By 1875, Windsor and its residents were experiencing hard times and increasingly resentful of their neighbors. In 1878, the Conservatives were back in power at the federal level in Canada. At the provincial level though, Windsor and its surrounding areas (through Essex North and Essex South ridings) had already elected Conservative politicians in the provincial elections of 1875.[45] Lewis's comments then, evocatively captured the anxiety, resentment, and frustration that many Windsorites and Essex County residents felt at the time. The inability to extricate themselves from Detroit's economic upheavals amplified Windsorites resentment toward the burgeoning American commerce and control of the Detroit River, animating relations between the U.S. and Canada in this region throughout the late nineteenth and early twentieth centuries. At a time when Canadians were increasingly questioning their place in the British Empire, the discomfort with the Corp's leading dredging reveals these larger existential anxieties.[46]

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[43] Ollie S. Lewis, "A Protectionist View," *The Globe and Mail*, May 6, 1875, 2. ProQuest Historical Newspapers.
[44] Patrick Brode, *The River and the Land*, First edition (Windsor, Ontario: Biblioasis, 2014), 82.
[45] Ridings are broadly equivalent to electoral districts. See George Neil Emery, *Principles and Gerrymanders: Parliamentary Redistribution of Ridings in Ontario, 1840-1954* (Montreal ; Kingston ; London ; Chicago: McGill-Queen's University Press, 2016).
[46] Haynes, "The Reciprocity Treaty with Canada of 1854"; L. Ethan Ellis, *Reciprocity, 1911: A Study in Canadian-American Relations*, The Relations of Canada and the United States: A Series of Studies Prepared under the Direction of the Carnegie Endowment for International Peace, Division of Economics and History. (New Haven: Yale University Press, 1941).

In the fall of 1875, *The Globe* disdainfully reported that Canadian attempts at dredging the lower Detroit River had been without "much apparent headway" until September, when thanks to a newly hired submarine driver, progress was "very satisfactory."[47] More digging brought more problems to the surface. By the end of 1875, the Corps noted there were four shoals at the mouth of the Detroit River, of which only one-half of one was in American waters while the rest were in Canadian waters. These shoals were "composed of very hard material" and removing them would cost about half on the American side of what it would cost in Canadian waters. Although work in Canadian waters could be cheaper because of the lower-cost materials and labor, the Corps thought it was only "just" that the U.S. federal government (contingent on Canadians permitting the same) should be bankrolling the work because nine-tenths of the commerce requiring this "improvement" was American.[48]

The Corps did applaud the dredging the Canadians had already conducted in the summer and fall of 1875 "with a very small appropriation, and, consequently, with very crude appliances, and in the face of a great many difficulties," working in American waters and "benefited commerce considerably thereby." Since the U.S. Congress had already appropriated funds for the same project, there were some unofficial conversations within the Corps that the U.S. repay Canada one-half of the latter's costs, but these were eventually dismissed as the Dominion seemed "perfectly willing" to do the work in addition to rebuffing the Corp's requests for permission to "go into" Canadian waters.[49]

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[47] "At the 'Crossover,' Blasting Operations of Chief Engineer Kingsford and Party--Progress and Estimates in the Canada Southern Tunnel Project," *The Globe (1844-1936)*, October 1, 1875.
[48] Weitzel estimated that it would cost about $190,000 for the work in American waters and over $390,000 for the work in Canadian waters. G. Weitzel, "Improvement of the Detroit River, Michigan," Letter to A.A. Humphreys in William W. Belknap, "Improvement of Detroit River. Letter from the Secretary of War, Relative to the Improvement of the Detroit River, and Inviting Attention to the Suggestion of the Chief of Engineers, That an Appropriation Be Made for the Improvement of the Same at the 'Limekilns.'" (Government Printing Office, Washington DC, December 31, 1875), 2-3, H.exdoc. 39 Serial Vol. 1687, sessional vol. 10.
[49] G. Weitzel, "Improvement of the Detroit River, Michigan,"3.

Meanwhile, the Corps made cost estimates for channel depths of 18 and 20 feet respectively, along three alignments: an all-American one and binational ones. Based on the estimates, it was clear that a deeper all-American channel would cost about forty percent more than its binational variant. The cost of dredging was also higher at the limekiln crossing than at the mouth of the river. Compared to the hard rock riverbed, deep waters, and swift current at the limekiln crossing area, the river's mouth was sand and mud. To reduce costs, the Corps suggested that the U.S. Congress fund the project in "more than two parts" as that would "justify a contractor," who in turn could work for cheaper and faster.[50] In so doing, the Corps acknowledged its interlocutory role: seeking funding for projects that it would eventually contract out to private dredging companies.

The need for ever-increasing commerce remained the underlying argument in favor of these improvements ensuring safer, more efficient navigation. The Detroit River was a "greater highway" than the East River in New York.[51] *The Globe* repeatedly hoped that the U.S. Government would have "no hesitation" in making the requisite appropriations even though the work would be in Canadian waters whose "growing commerce" would also benefit. Newspapers were optimistic that the Dominion "would readily give its consent to deepening the channel." *The Globe* commented that the Canadians had already spent "large sums" on canals and therefore

[50] The Corps believed that a contractor would use "coffer-dams and modern labor-saving appliances, and thus enable him to do, the work cheaper, and, probably, in winter, during which time he would neither interrupt nor be interrupted by navigation. "In the same report, Major Comstock noted that dredging at the mouth of the Detroit River would cost fifty cents per cubic yard "on account of winds and seas," since the cut to be made was "through sand and mud." Slightly upstream, at the Limekiln Crossing area, however, the depth of water and swift current pushed costs up to $30 per cubic yard. Based on these assumptions, the cost of the dredging would be $2,790,907 (about $6 billion today) for a channel 14 feet deep and about 300 feet wide. A channel 20 feet deep would require added expenditure. Further, Comstock noted that the extant channel was in the "best position" but partly in Canadian waters. However, if there was an objection to it being in Canadian waters, the channel could be "thrown wholly into American waters, but its cost would be increased sixty percent, costing a total of $3,930,901" G. Weitzel, "Improvement of the Detroit River, Michigan," 3..

[51] "Improving Navigation," *The Globe (1844-1936)*, May 3, 1876, 2. ProQuest Historical Newspapers..

would not want to spend "any more money in Detroit River for years to come." There were so many places in the growing Dominion that needed connectivity that they "would doubtless be pleased" to have the U.S. "assume the expense" of the "important improvement" at the limekiln crossing. [52]

Navigational promotion did more than aid the movement of ships along the border. It also thwarted the movement of railroads across the border. Whereas the Canada Southern had first envisioned a bridge connecting Stony Island to Amherstburg, it had acquiesced to a tunnel instead.[53] Much of this modification had to do with the pressure shipping interests put on any bridge proposals advocating instead for a tunnel as the "only feasible plan by which the interests of railways and the requirements of commerce would be ultimately benefited." [54] Due to a construction accident, this tunnel remained unfinished pushing railroad cars back on ferries and pitting the roads against the shippers.[55] For now, dredging remained paramount.

Driven by technological innovations, dredging was not a static process but rather, innovative. Steam-powered dredges could work for longer hours and were more powerful than humans, but that was not always enough. Depending on the location, dredging could be done in

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[52] "Improving Navigation," 2.

[53] "An Act to extend time to complete the D.R. Tunnel," in *Detroit River Tunnel Company - For an act to extend time to complete the Detroit River tunnel* in Department of the Secretary of State of Canada fonds RG 6-A-1 Vol 36 File 745, 3. Library and Archives of Canada.

[54] In 1876 the Buffalo Board of Trade and "citizens on 'Change'" presented a resolution which was passed unanimously, protesting the possibility of a bridge because "extensive marine interests would be seriously affected by detention, damage, and other causes which would necessarily follow the obstructing of this great natural channel-way at an point where there is an average of one craft every six minutes demanding safe passage." Furthermore, there was an added resolution which was also accepted unanimously "that the United States Government be respectfully asked to offer $25,000 to the Canadian Government for the removal of the lime-kiln crossing, if that amount of appropriation for improving this portion of the Detroit River was lying idle in the [U.S.] treasury." See "Special Dispatch to The Detroit Free Press. The Detroit Bridge. Action of the Buffalo Board of Trade Deprecating the Project. The Lime-Kilns Crossing Appropriation.," *Detroit Free Press*, March 4, 1876, 1. ProQuest Historical Newspapers.

[55] This tunnel was never completed after a construction accident. Until the Michigan Central Railroad tunnel was inaugurated in 1910, railroad ferries made the crossing between Amherstburg and Stony Island. Mason, *The Ambassador Bridge*.

the water itself, as a dredging vessel anchored over a spot scooping up sediment, depositing it on deck, and then dumping it at a designated spot away from the dredged area. Without sonar technology at hand, dredging in the wet could run into the issue of underestimating the persistence of sedimentary processes, such as boulders. A solution around this was to send divers to the river bottom who would plant explosives to blast the dogged rocks out. Dredging could also be in the dry: building low dams in the river to enclose specific sections, pumping out water from the encircled area, and blasting rocks out without fear of inundation or currents. These low dams—called cofferdams were temporary structures that were meant to be deconstructed when dredging was complete—allowing contractors to use human and mechanical labor more efficiently.[56] Cofferdams were especially preferred in later years as engineers created artificial waterways within the lower Detroit River.

These waterways within the river—whether augmentations of the natural channel or artificial—were not without their naysayers like Lewis. Although Lewis' letter is a singular instance of such an impassioned appeal against the American shippers' plan at this time, it does reveal water's central place in Canadian natural and collective identity as well as its part in nation-building.[57] Canadian apprehensions about the how, why, where, and when dredging was taking place would continue to surface especially as the Corps changed gears from merely augmenting the limekiln crossing to creating an artificial waterway

[56] "At the 'Crossover.' Blasting Operations of Chief Engineer Kingsford and Party--Progress and Estimates in the Canada Southern Tunnel Project"; G. Weitzel, "Improvement of the Detroit River, Michigan," Letter to A.A. Humphreys in William W. Belknap, "Improvement of Detroit River. Letter from the Secretary of War, Relative to the Improvement of the Detroit River, and Inviting Attention to the Suggestion of the Chief of Engineers, That an Appropriation Be Made for the Improvement of the Same at the 'Limekilns.'" (Government Printing Office, Washington DC, December 31, 1875), 3.

[57] In *Negotiating a River* Daniel Macfarlane argues that the St. Lawrence Seaway "served as a lightning rod for many expressions of Canadian nationalism: geographic, environmental, technological, political, and economic." He attributes the significance of the St. Lawrence Seaway Project to the "role that water and rivers in general have played in fostering Canadian nationalism and mythology." See Daniel Macfarlane, *Negotiating a River: Canada, the US, and the Creation of the St. Lawrence Seaway*, Nature, History, Society (Vancouver: UBC Press, 2014), 229.

(Re-)Designing the River

Initial iterations of channel design followed the natural curvature and width of the U-shaped deep-water section in the limekiln crossing. Design iterations from a curved to a straight channel were the first set of moves towards moving past nature's limitations. In *An Organic Machine*, Richard White argued that in the twentieth century, the creation of large dams along the Columbia River rendered a working waterscape that was as much natural as it was machine-like. As an organic machine, the Columbia River for engineers and improvement enthusiasts was no longer its whole self but instead a sum of multiple parts. In so doing, this hybrid co-created waterscape, became more than natural, with each part disengaged from one another in the minds of the users and/or improvers altering it.[58] The quest to alter the channel design at the limekiln crossing was an instance of such a hybridization.

From 1874 to 1882, the U.S. Congress appropriated over $270,000 towards removing obstacles in the limekiln crossing area.[59] In 1881, the Corps vastly improved the channel by removing two large hummocks—low mounds that often appear in groups—near the lower end of the Canada Southern railroad slips.[60] Until the hummocks were removed, ships that drew less than fifteen feet of water could easily use the shipping channel if they followed their assigned course closely. If they veered too close to the railroad slips, they could strike rocks.[61] Improving the limekiln crossing was not, as both the Corps and the U.S. Congress were realizing, was not a

[58] Richard White, *The Organic Machine: The Remaking of the Columbia River*, 6. printing (New York: Hill and Wang, 2001).
[59] According to the 1883 Corps Annual Report, the U.S. federal government had spent $273, 983.73 on improve the area from 1874 to 1882. United States Army Corps of Engineers, "Annual Report of the Chief of Engineers, United States Army, to the Secretary of War, for the Year 1883; Appendixes to the Report of the Chief of Engineers, United States Army," Annual Report (Washington D.C.: United States Army Corps of Engineers, 1883), 305, https://usace.contentdm.oclc.org/digital/collection/p16021coll6/id/1330.
[60] Thierry Feuillet, "Earth Hummock," in *Encyclopedia of Planetary Landforms*, ed. Henrik Hargitai and Ákos Kereszturi (New York, NY: Springer New York, 2015), 685–86, https://doi.org/10.1007/978-1-4614-3134-3_133.
[61]"Map of the Lime-Kiln Crossing: Showing the Work Done and the Course to Be Taken by Ships," *Detroit Free Press*, May 29, 1881, 7. ProQuest Historical Newspapers.

limited and time-bound affair. In 1883, the Corps sought additional funds, without which the work would "soon be stopped" because "the importance of the work" demanded them, however, efficient dredging technologies lowered the cost estimates for the projects, and therefore the additional funds.[62] While seeking additional funds, the Corps also sought to realign the shipping channel from a curved to a straight one. Such a channel would be safer for the burgeoning American commerce. The extant curved channel with its "rocky, jagged edges" was almost impossible to light at night for navigation and could easily sink a vessel. A straight channel instead could be easily lit and would conform "very nearly" to the direction of river current and could easily be lit by "range lights placed just below on the Canada shore." [63] Ultimately, the realignment made financial sense, because without it, safeguarding American commerce would be difficult.

Realignment and better dredging technology also paved the way to augment the natural channel's dimensions. In 1886, the channel at the limekiln crossing was "increased to 400 feet by removing an additional 100 feet from the western (American) side."[64] Ambitions to expand the limekiln crossing's dimensions were soon reined in by cost considerations.[65] Thus, the additional

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[62] In his 1883 report, Major Weitzel noted that during the previous year, dredging "was as favorable as the amount appropriated would permit." But if the U.S. Congress made an added appropriation for the fiscal year ending in 1883, the work would "soon be stopped." Weitzel acknowledged that the original estimate for this work was "$1,166,500, but in consequence of the recent vast improvement in the methods and means for submarine work of this character, it will probably not cost more than $475,000." United States Army Corps of Engineers, "Annual Report of the Chief of Engineers, United States Army, to the Secretary of War, for the Year 1883; Appendixes to the Report of the Chief of Engineers, United States Army," 2275–76.

[63] F. U. Farquhar, Major of Engineers, "Letter from the Secretary of War in relation to the improvement of the Detroit River at Lime-Kiln Crossing, February 19, 1883" (Washington, DC: US Government Print Office, 1883), 2.

[64] United States Army Corps of Engineers, "Annual Report of the Chief of Engineers, United States Army, to the Secretary of War, for the Year 1889; Appendixes to the Report of the Chief of Engineers, United States Army," Annual Report (Washington D.C.: Army Corps of Engineers, 1889), 318, https://usace.contentdm.oclc.org/digital/collection/p16021coll6/id/1913.

[65] Lt. Col. O. M. Poe of the Corps reported to the US Senate (via the Office of the Chief of Engineers) that creating an 800-foot wide, 20-foot-deep channel from Grosse Pointe in Lake St. Clair to the entrance of the Detroit River would cost $690,800, whereas a channel of the same width but 19.5 feet deep would save money and be "nearly as good." *Senate Documents*, Senate Documents, v. 7; v. 390, 1888, 2, https://books.google.com/books?id=em3MoS2kYcsC.

and recurring costs of dredging became a factor in deciding the depth and width of the channel and its utility for shipping. Concerns about costs also went hand-in-glove with a jurisdictional interrogation about where the political border lay.

Towards this end, Congress asked Secretary of War William C. Endicott in 1888 to submit a report investigating the location of the political border in the Flats. The Illinois Senator who had called for the inquiry, Shelby M. Cullom, had reason to believe that the shipping channel in the Flats, the lower Detroit River near Amherstburg, as well as at Saulte Ste. Marie, were all partly in Canadian waters, as reported by the *Cincinnati Enquirer*. If this were true, it had an "important incidental bearing upon the matter of retaliation."[66] A letter that Cullom supplied to the newspaper pointed out that "[W]e have spent hundreds of thousands of dollars to improve the British channel and neglected our own." The letter cautioned that retaliation may be costly, since "Canada may sink this costly channel full of stone-laden barges and stop all navigation of the Detroit River to vessels, loaded deeper than nine or ten feet of water," thus ending by stating "Senator, there is no fool like the American fool."[67]

The New York Times further surmised from the U.S. War Department report "that for a considerable distance the principal channel of the Detroit River runs wholly on the Canada side of the boundary line."[68] This fact ensured that retaliation could only be partial at best, especially since the bulk of the commercial traffic along the Detroit River belonged to the United States.[69]

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[66] "Whose Is it? Is Part of the Detroit River in Canada? And Has the United States Government Been Improving the British Channel and Neglecting Her Own?" *Cincinnati Enquirer*, September 5, 1888, 1. ProQuest Historical Newspapers.
[67] "Whose Is it? Is Part of the Detroit River in Canada?
[68] "Detroit River Channel," *New York Times*, October 27,1888, 4. ProQuest Historical Newspapers.
[69] In 1885, the US Senate abrogated the fisheries article of the Treaty of Washington (1871), which allowed Canadian fishers to export fish duty free to the United States in reciprocation for American fishers (especially from New England) fishing in Canadian inland waters. New England protectionist Republicans led the repeal calls. In retaliation, the Canadian government began seizing any American vessels in Canadian waters, in effect violating the abridged treaty. In 1887, the US Congress further worsened the conflict by passing the Retaliation Act, which empowered the President to prohibit Canadian goods and ships from entering American ports in the face of

Although possible, an all-American channel would be variable and have unreliable depth as well as unsuitable for the larger vessels that carried the bulk of lake commerce. Creating this new channel would not only be expensive, difficult, and time-consuming, but it would also render the extant channel "temporarily useless." [70] In other words, it nullified all the money the U.S. federal government had already spent on the binational waterway. When improvements were first undertaken, most of the commercial traffic on the river was American, and the mutual use of canals by both countries was permitted as there was no fear of retaliation. Thus, "the money proposed was voted by Congress without any foreboding of the trouble that now exists."[71] Though the U.S. government never did retaliate, these debates nevertheless show just how vulnerable American shipping interests felt about control of the shipping channel. The need for efficient shipping only further increased calls for a deeper, wider channel throughout the Great Lakes to meet the demands of faster, bigger ships that needed deeper channels.

The Detroit River was another important instance of a river being transformed, incrementally, to remove what engineers and the emerging shipping lobby considered imperfections and inadequacies in nature getting in the way of the river's most efficient utilization. A straight channel worked better for shipping than a natural curved one. This act of augmentation did not alter the course of the river but definitively put a human stamp on it.[72] The

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continued harassment of American fishers. The fisheries question gathered momentum. In July 1887, a six-member joint commission produced the Bayard-Chamberlain Treaty, signed on February 15, 1888, which established a joint commission to decide which Canadian waters would be open to American fishers; it classified inlets over six-miles wide defined as open waters. Furthermore, it allowed American fishers to dock in Canadian waters to purchase supplies and transfer their catch to the US after buying a license. See "Cleveland's Retaliation Policy," *Chicago Tribune*, September, 19, 1888, 4; "Retaliation in Earnest," *New York Tribune*, 27 January 1887, cited in Governor General of Canada, *Correspondence Relative To The Fisheries Question, 1885-87: Presented To Parliament By Command Of His Excellency The Governor General, 3rd May 1887* (Colonial Office, Great Britain, 1887), 226.

[70] "Detroit River Channel," 4.

[71] "Detroit River Channel," 4.

[72] In *The Control of Nature,* McPhee speaks persuasively and poetically about the Herculean fight between the Corps and the Mississippi river as the river want to jump from its original channel that passes through the port of New Orleans to the shorter distributary to the ocean, the Atchafalaya. When rivers find/create quicker routes to the

body of water remained the 'Detroit River,' as it would through many subsequent modifications to its flow. Over the course of the nineteenth and twentieth centuries, dredging contracts for discrete channels within the Detroit River became the norm. Congress also appropriated funds for these channels separately. From being a waterway with a deep-water section that allowed commercial traffic, the Detroit River in the twentieth century transitioned into a sum of distinct but interconnected channels whose primary function was commercial navigation. The precursors of this process began in the limekiln crossing when the Corps argued that a straight channel instead of the natural curved one made would be more efficient, safe, and commercially viable. By altering natural channels, the Corps was imposing human form and function on the waterscape. In time, the river would be transformed into the sum of its channels.

The Corp's moves remake the river for commercial cargo, operated within the project-specific Congressional funding patterns, and was undergirded by the creation of a consolidated shipping lobby—the Carriers. Metamorphosing the river into a hydraulic highway one project at a time, the Corps viewed each intervention as discrete from the others. This was especially true of projects that were far apart from one another such as the limekiln crossing and the Chicago diversion. Despite not having enough data to prove if and how the diversion and the lower Detroit River might affect one another or not, the Corps continued to insist that changing channel directions, widths, depths, and shapes, could not affect upstream or downstream areas.[73] At the same time, however, there were calls for compensatory dikes—low, often submerged dikes that raise water levels in a small area to counteract low water conditions—in the 1890s in Lake Erie

ocean, they can and do jump from their old channels. John McPhee, *The Control of Nature*, 1st ed (New York: Farrar, Straus, Giroux, 1989).

[73] Stanley A. Changnon and Joyce M. Changnon, "History of the Chicago Diversion and Future Implications," *Journal of Great Lakes Research* 22, no. 1 (January 1996): 100–118, https://doi.org/10.1016/S0380-1330(96)70940-1.

to stabilize water levels in the Detroit River.[74] Such structures although local in creation were in the service of the system-wide effects felt by diversions like the Chicago. In embracing and employing a regime of compensatory structures, the Corps sought to rectify variability and interconnectivity through explicitly local developments.

New lobbies, old borders

In the 1870s, when there was a real possibility of bridging or tunneling under the Detroit River, shipping interests were, unlike the organized railroad interests, not yet an effective lobby. Formed in 1880, the Cleveland Vessel Owners' Association (CVOA) was an early attempt by vessel owners to band together to "further their navigation interests" and obtain crews. Even though the CVOA was only formally registered in 1887, there was by 1885, another organization, the Carriers which consisted of shipowners from Buffalo, Erie, Cleveland, Toledo, Detroit, Bay City, Chicago, Duluth, and Milwaukee. The Carriers' primary purpose was to "concentrate influence in encouraging national legislation and appropriations in the interest of lake navigation."[75] In 1884, over 19 million tons of cargo went down the Detroit River representing over five times the combined tonnage of the Ohio and Mississippi rivers. Yet, as the Carriers pointed out, between 1873-and1884, the U.S. Congress had appropriated over $25 million to improve the Mississippi River system and only about $9 million for the Great Lakes.[76]

[74] "Canada Objects!" *Detroit Free Press,* 24 December 1899, 1. ProQuest Historical Newspapers; US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, p. 1-4.
[75] Franklin J. Firth, who had both shipping and railroad interests, drafted the first constitution of the Carriers. He envisioned an umbrella organization for all competing lake lines. Firth reportedly wrote up the Carriers' by-laws during a train ride and secured their adoption subsequently. Ryan, *Lake Carriers' Association History 1880-2015*, 362 of 7403.
[76] Ryan, 358–74 of 7408.

From 1885 to 1891, the Carriers dealt with a variety of issues such as the Canadian Wrecking Laws, Saulte Canal construction, the Treaty of Washington, grain shortages, as well as a school for ship captains and mates. The Carriers worked hard to ensure any bridging of binational Great Lakes connecting waters such as those on the St. Mary's River were under the authority of the U.S. Secretary of War. In 1888, the Carriers successfully lobbied to ensure tunnels were the preferable solution to bridging the Detroit River, as well as the creation of a 16-foot wide and 200 feet wide canal in the Flats under the Corp's control. After lobbying to improve the Flats, the Carriers were soon calling for the improvement of the lower Detroit River. As soon as it had improved the Flats, the Corps soon wanted to improve the Detroit River. The Carriers were quickly becoming the preeminent regional shipping lobby, with operations all over the lakes, including a committee of two members who worked exclusively with the Corps in Detroit.[77]

By 1889, just as William Livingstone took over the presidency of the Carriers, the Detroit River became the organization's primary issue. Livingstone had been the Detroit Collector of Customs, a shipowner, and manager of the Michigan Navigation Company and had stakes in banking. Livingstone became the primary spokesperson for shipping interests on all Detroit River concerns and championed the multiple concerns of local shipping interests from channels to safety, as well as lighthouses and lights.[78] In 1889, the Carriers and CVOA came together over

[77] Canadian Wrecking laws as well as the Treaty of Washington were issues of reciprocity. In the former, American vessels could be towed back to U.S. territorial waters from Canadian waters and vice versa. There were some issues about how contiguous waters would be treated as well as the U.S. desire to take salvage actions in the Welland Canal. The Treaty of Washington allowed Canadian vessels to carry American origin cargo to an American port, if part of the route was through a rail line in Canada. This exception was to expire in July 1885. The Canadians wanted this exception to be renewed but the Carriers did not because the latter alleged that the former's subterfuge was ensuring the Canadians were not paying import duties at the border. The Carriers were successful in ensuring the exception ended. The Carriers also thought it important to train ship captains and mates because sailing the lakes is vastly different from sailing the seas. Ryan, 378–435 of 7403.
[78] Ryan, 445–90 of 7403.

matters of "mutual interest" for all lake navigation interests.[79] Livingstone continued to fight the possibility of a railroad bridge and actively lobbied for greater navigation-related Congressional appropriations. The Carriers' main argument against a bridge remained that its span would obstruct ever-larger lake vessels.[80] Under Livingstone's leadership, the Carriers gave major support to the Corp's plans for a 20-foot-deep shipping channel through the connecting waters of the Great Lakes, projected to cost $3.3 million at the time. In preparation to champion this project as well as others, the Carriers wrestled "with the need for a permanent counsel in Washington; they tried in vain to enlist the financial aid of the shipping interests on the Atlantic coast and the western rivers, but to no avail."[81]

While the Carriers continued to configure their lobbying abilities and ambitions, Livingstone published a pamphlet in support of the 20-foot-deep shipping channel in 1891. Remarking that the lake transportation had led to "marvelous internal growth," the most important of which was the burgeoning Great Lakes shipping industry costing only a fraction of rail travel, shipping had bridged geographical distances, bringing "the farmer of Minnesota and Illinois in closer proximity to New York than the farmer of southern Ohio."[82] The shallow rivers of the Great Lakes, however, "compelled" commercial cargo vessels to lower their carrying capacity to pass through these waters, thus increasing costs per ton. A 20-foot channel would maintain profitability in addition to creating a continuous and consistent depth from Chicago to Buffalo. There was no other improvement, according to Livingstone, with so many far-reaching consequences that would enable cheap transportation "at such a comparatively insignificant

[79] "Marine Men Up in Arms," *Detroit Free Press*, 24 January 1889, 2.
[80] At the time, the proposed bridging options were unviable. The bridge spans would either be too low to accommodate for any future increase in the height of ship masts or cause delay because they were drawbridges. When it was finally constructed, the Ambassador Bridge's central span rose hundreds of feet higher than the ship masts of the time allowing enough room for clearance then and now. Mason, *The Ambassador Bridge*.
[81] *Lake Carriers' Association History*, location 480-490 of 7403.
[82] William Livingstone, *The Great Lakes Problem or The Twenty Foot Channel* (Detroit, 1891), 1.

cost." Livingstone predicted that the channel would pay for itself many times over in savings and that it was inevitable that the entire Midwest would soon demand the construction of the channel.[83]

In the meantime, the Corp's proposal for a deep-water channel in the Great Lakes connecting rivers gained traction as a "deep waterway convention" led by a "representative body of vessel and business men" met in 1891 to ask the U.S. Congress to take "immediate steps so as to increase the depth of water in our lakes and harbors as to meet the demands of an immense and constantly increasing traffic."[84] At the convention, Detroit's *Evening News* reported that, in addition to vessel owners, commercial interests were also in favor of a deeper, and thus more productive, navigation channel. Unlike previous similar conventions which had "invariably come to a naught" the meeting in Detroit was different because of the scale and number of interests involved.[85] Livingstone continued to extol the virtues of a twenty-foot channel, and his pamphlet "The Twenty Foot Channel" was printed in parts by the *Detroit Free Press* as data about the importance of the deep channel at the convention.[86] Livingstone claimed that shipping saved millions of dollars, despite the costs of improvements.[87]

The *Evening News* also covered the event, differing, however, in its reportage on the proceedings. Founded by James Scripps, the "little *Evening News* challenged the elites who had long escaped scrutiny."[88] Pointing out that not all vessel men agreed about the need for the

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[83] William Livingstone, *The Great Lakes Problem or The Twenty Foot Channel* (Detroit, 1891), 3.
[84] "Deeper Waterways," *Detroit Free Press,* 15 December 1891, 4.
[85] "Deep Waterways: A Matter of Great Importance to Vessel Men," *The Evening News* (Detroit), December 18, 1891, 1. ProQuest Historical Newspapers.
[86] "The Water Route Saves Money," *Detroit Free Press,* December 29, 1891, 8.
[87] Livingstone, *Great Lakes Problem*, 6; "The Water Route Saves Money," 8.
[88] According to Baldasty, the *Evening News* "reflected a new style of journalism that had taken root in the 1870s." The paper was independent in politics, cheaper than its competitors, "half the size of the other newspapers, and – unlike virtually all newspapers of that era—aimed at the working class." Gerald J. Baldasty, *E.W. Scripps and the Business of Newspapers*, The History of Communication (Urbana: University of Illinois Press, 1999), 10.

channel, the *Evening News* wondered why Livingstone had chosen to steer clear of low water conditions that had affected these very same interests during the previous season while talking about the need for navigational improvements. Confident that the damages from low water conditions grounding ships ran into the millions, the paper was surprised that vessel men were "loth [sic]" to refer to low water conditions while tug owners profited from saving stranded vessels in like Grosse Pointe, Bar Point, and the Limekiln Crossing.[89] In questioning the practical need for this deep-water channel as well as highlighting persistent low water conditions that were ignored by shipping interests, the *Evening News* showed that not everyone was aboard on the need for dredging.[90]

In addition to external problems, there were internal struggles between the Carriers and the CVOA. The differences within shipping interests stemmed from the inherent tension between the Carriers and the CVOA. The Carriers were more focused on a "broader Great Lakes identity" while the CVOA was committed to a narrower focus, including establishing shipping offices in Ohio ports as well as protecting crews in port. While both organizations often collaborated on major bills and lobbying, they often worked at cross-purposes, jeopardizing congressional action. As a result, the two groups joined in April 1892, after conferences between the two organizations in Detroit, Chicago, Buffalo, and Cleveland, and the Carriers, and become the foremost lobbying body in the Great Lakes region.[91]

When the Corps had first considered dredging, it had been full of praise for Canadian efforts for the same. Now, however, there were increasing comments about the Canadian

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[89] "Deep Waterways: A Matter of Great Importance to Vessel Men," *The Evening News* (Detroit), December 18, 1891, 8.
[90] "A Deep Sea Channel. The Dispute to the Waterways Commission. Buffalo strongly objected. The Resolution Was Unanimously" Adopted, However, Before Adjournment," *The Evening News* (Detroit), December 18, 1891, 6.
[91] According to Ryan, while "CVOA members wanted additional shipping offices and because of the increased activity of union organization, and occasional violence, members of both associations wanted improved protection for the crews while in port." See Ryan, *Lake Carriers' Association History*, location 509-527 of 7403.

lackadaisical attitude that necessitated American interest as well as leadership in dredging to maintain navigability and avoid low water conditions, even in a binational channel. Fluctuating lake levels were related not just to dredging but also to the U.S. taking control over the process. However, there remained questions about why and how the United States should do this. Coinciding with larger processes like the Panic of 1893, there were calls from Americans and Canadians alike to rein in binational developments. In summer 1892, the *Boston Daily Globe* reported a Canadian scheme connecting Lake Ontario to the Georgian Bay in Lake Huron, a retaliatory measure in response to President Benjamin Harrison's move to levy taxes on Canadian vessels using the Sault Ste. Marie Canal. The resultant channel would lower water levels in the Georgian Bay by fifty to seventy feet, and more importantly, make the Detroit River channel "practically unnavigable and a part of Lake Erie would be drained," cutting water supply to the Niagara Falls, especially the American falls—which "would be rendered nearly dry."[92] The article expressed apprehensions about the possibility that this supposed scheme, the future Trent-Severn Waterway, would give the Canadians full access to inland waterways and thus cripple American lake cities and shipping.[93] The Trent-Severn waterway never bore the apocalyptic visions that the *Boston Daily Globe* had feared because it was realistically unserviceable when it was finally completed. Across the border as well, there were fears and palpable action. In an 1892 memorandum, W. G. Thompson—an engineer in the Canadian Department of Railways and Canals—contended that "the maps of the Commissioners place the improved channel at the Lime Kiln Crossing, leading to the deepest natural channel, exclusively in

[92] "At Great Odds," *Boston Daily Globe*, July 31, 1892, 7.
[93] James Angus in his account of the Trent-Severn Waterway shows how, by 1887, the waterway was increasingly being seen as useless, especially in comparison to the expansion of navigation along the St. Lawrence. See Angus, *A Respectable Ditch: A History of the Trent-Severn Waterway 1833-1920* (Montreal: McGill-Queen's University Press, 1988).

Canadian waters."[94] This claim had long been refuted by the U.S. which instead stated that the "channel opened by the United States at the Lime Kiln Crossing is in American waters" except for the entrance to and exit from the channel.[95]

The border was disputed again the following year when the Customs Collector at Amherstburg stopped dredging at the mouth of the Detroit River (since the dredged channel was in Canadian waters) and proclaimed "an intention to seize all dredges undertaking to operate in the disputed section."[96] Without referencing this incident, O. M. Poe, the Detroit district engineer, wrote a letter to U.S. Secretary of War, Daniel S. Lamont indicating that the Canadian Customs Collector at Amherstburg would "under his present instructions, seize any American [dredging] plant working in Canadian waters."[97] Asking for "something" to be done "as an agreement" between the U.S. and Canada to resolve the situation, Poe acknowledged that it "was well known on both sides of the line that some portions of the improvements were probably in Canadian waters, but the progress of the work was not interfered with by the Canadian authorities, probably because they recognized its importance, as well as the fact that, in proportion to its volume, their commerce would share the benefit to be derived from the improvements."[98]

Poe never explicitly requested permission. Nevertheless, as the letter made its way to the Committee of the Privy Council (henceforth referred to as the Privy Council) in Canada through the U.S. Secretary of State and Lord Arthur Stanley, Governor General of Canada, it became a

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[94] John J. McGee, Clerk of the Privy Council, "Certified Copy of a Report of a Committee of the Honourable the Privy Council . . . , approved by His Excellency the GOVERNOR GENERAL IN COUNCIL, on the 8th August, 1893," 4 in *Waterways - General - River St. Clair, Lake St. Clair and Detroit River - Improvement of Channel* Department of Transport fonds RG 12 Vol 3658 File part 2 1893-1943, File no 4800-3, Library and Archives of Canada."
[95] "Report of the Chief of Engineers," in Senate Ex-Doc, No. 52 of 1889, cited in McGee, "Certified Copy of a Report," 4
[96] "Canada Stops the Dredging," *New York Times*, July 17, 1893, 2.
[97] Letter from O.M. Poe to Brig. General Th. H. Casey, May 8, 1893, in *Waterways - General - River St. Clair, Lake St. Clair and Detroit River - Improvement of Channel* Department of Transport fonds RG 12 Vol 3658 File part 2 1893-1943, File no 4800-3, Library and Archives of Canada.
[98] Letter from O.M. Poe to Brig. General Th. H. Casey, May 8, 1893.

"request" for permission. The Privy Council considered the request "favorably" and passed an order allowing supplies shipped by the private contracts to "be admitted free of Customs duties."[99] While the Canadians acquiesced to construction realities and purported requests, they were unwilling to improve waters themselves, leaving the United States no other option but to take up the dredge. In 1896, there were reports that the Canadians, despite making promises to the contrary, had not dredged and improved the channel between Amherstburg and the lower end of Bois Blanc Island, thus impeding traffic flow by reducing depth. Unless the Canadian government stepped in to take "full advantage of other improvements," it seemed imperative that the United States would need "to take the necessary steps for the removal of these obstructions."[100]

Through all this, the Carriers remained steadfast allies of the Corps agreeing with each move. The Carriers bolstered the Corp's ambitions to lead dredging operations, further cementing their status as the preeminent shipping lobby. In 1897, the Carriers investigated improvements on the Detroit, St. Clair, and St. Mary's rivers, calling the attention of Secretary of War Russell A. Alger for "still better navigation channels." The Carriers recommended widening the limekiln crossing channel to 600 feet as well as deepening and widening the Ballards Reef section upstream of the limekiln area.[101] The same year, the U.S. Congress reestablished the Lake Survey as a separate Corps of Engineers function.[102] The restoration of the Lake Survey also led to

[99] McGee, "Certified Copy of a Report," 7.
[100] These other improvements included the completion of a channel between Ballard's Reef and Limekiln Crossing on the eastern side. *Marine Review* (Cleveland, OH), Vol. XIII No. 6, February 6, 1896.
[101] John Larson W., *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers* (U.S. Army Corps of Engineers Detroit District, 1995), 139; see also United States Army Corps of Engineers, "1897 Chief's Annual Report]; Annual Reports of the War Department for the Fiscal Year Ended June 30, 1897: Report of the Chief of Engineers; Annual Report of the Chief of Engineers, United States Army; Appendixes to the Report of the Chief of Engineers, United States Army," Annual (Washington D.C.: Government Printing Press, 1897), 2961.
[102] According to historian John Larson, the stranding of a vessel due to an inaccurate nautical chart prompted Congress to re-establish the Lake Survey. While the Lake Survey had begun in earnest in 1841 in Buffalo and continued until

the Rivers and Harbors Act of 1899 (passed on May 3), authorizing a Corp's survey to "secure a safe and convenient channel 21 ft. (6.4 m) deep" from Detroit to Lake Erie.[103] In this survey, the Corps acknowledged that periodic and annual variations in lake levels had "not yet been satisfactorily accounted for."[104] The Corps engineer in charge of writing up this report, Lieutenant Colonel Lydecker, noted that "the problem of local improvement will be very much modified" if both the Corps and U.S. Congress determined the regulation of variable water levels through dams at the mouth of the Detroit River.[105] Therefore, this engineer, Lieutenant Colonel Lydecker concluded that it "would therefore appear judicious to await a determination of the question of lake-level regulation before the final adoption of any local project that is independent of such regulation." [106] Lydecker also noted that improvements had "been made under successive projects that were designed to meet the most immediate requirements of commerce; and to do this it was necessary to direct operations to meet the pressing emergencies in the shortest time possible, instead of following a comprehensive plan of improvement that would bring about the best final results."[107] This meant that, as much as the Carriers chose to not highlight the variable and low water levels when lobbying for improvements, there were dissident voices in the Corps asking to consider the impacts of these local projects. These voices, however, would soon die down, when projects like the Livingstone Channel worsened variable lake levels.

1882, charts were made for a 12-foot navigational channel, inadequate for the 20-foot navigation channel that existed in the 1880s and 1890s. Larson, *Essaysons*, 141.

[103] US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 2. Bowling Green State University, Lake Carriers' Association Collection, Institute for Great Lakes Research.

[104] US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 3.

[105] US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 4.

[106] US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 4.

[107] US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 3.

Naysayers within the Corps were not the only problems for the Carriers' desire for more deeper, wider channels along the length of the Detroit River without regard for variable water levels. In 1899, Michigan Congressman John Corliss introduced a bill in Congress to construct a new dam at the lower end of Lake Erie to increase lake levels by two feet. The bill was met with stiff resistance in Ontario "especially among the Canadians that reside on the border of Lake Erie, and on the Detroit river [sic] and Lake St. Clair."[108] According to the *Free Press*, M. K. Cowan, the South Essex representative in the Canadian Parliament, was emphatic about Canadian sovereignty over boundary waters, asserting that the Canadians were not "anxious" to give "our American cousins a chance to improve their lake shipping at our expense."[109] Variable lake levels thus were not just technological or economic conditions, but also territorial ones.

Complementing this fearmongering were renewed calls for an all-American channel, this time from U.S.-based industries that ostensibly needed these sovereign waterways for their survival. Specifically, they asked for a channel from Ecorse to Gibraltar in U.S. territorial waters, underscoring the fragility of peaceful relations between the United States and Canada, especially because the shipping channel was in Canadian waters. According to the *Marine Record*, Michigan Congressman H. C. Smith stated that the "Canadian channel is hard rock, and while much money has been spent there, I think it is generally known that this was a mistake, and it would be cheaper now to use the American channel and give Americans the benefit." Moreover, "in case of war with Great Britain, her forces would be in control of this channel, which our [U.S. federal] money has built. Nothing of this kind is now in sight, but it is not bad policy to prepare for war in times of peace."[110]

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[108] "Canada Objects!" *Detroit Free Press,* December 24, 1899, 1.
[109] "Canada Objects!" *Detroit Free Press,* December 24, 1899, 1.
[110] Statement by Congressman H. C. Smith of Michigan in "Channel the American Side," *Marine Record* XXII (47), Cleveland/Chicago, November 23, 1899, 1.

The Corps did not agree with this assessment. Much like its previous considerations, the Corps asserted that an all-American channel "would be longer and more crooked" than the other two channels iterations under consideration, "and would be an inconvenient one for commerce."[111] The only reason that this all-American channel was back in deliberation was "because of local interests along the Wyandotte-Trenton Channel" and the ability to continuously enlarge waterways was seminal to meeting ever-increasing demands.[112] The Corps argued that the binational channel reinforced American magnanimity and cooperation in ways that a territorially bound waterway would not. Instead of provoking the Canadians by pursuing an all-American waterway, the Corps recommended cooperation instead of conflict. Acknowledging the jurisdictional irregularities of the binational channel, the Corps championed a collaborative approach, even if it meant, in the short term, seeking permission for dredging activities.

In arguing for cooperation and collaboration, the Corps revealed just how imperative the incremental and iterative infrastructures of control were to the maturing techno-infrastructural diplomacy. Before the creation of binational bodies like the Commission, power and economic asymmetries between the United States and Canada were more pronounced, and this techno-infrastructural diplomacy allowed experts on both sides to speak with one another as equals, with a common purpose of improving waterways for commerce. Built on the foundation of Canadian acquiescence, the Corps was able to intervene because it had successfully asserted technological

[111] US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 4.

[112] From the 1840s, when it was first proposed, all the way into the late twentieth century, the all-American channel was a recurrent idea. For the Carriers and Trenton based industrialist, the idea of a territorially bound waterway was safe and secure. The Corps, however, considered this new channel an unnecessary and extravagant expense which could nullify all the work it had already put into the limekiln crossing area as well as antagonize the Canadians. The binational channel, despite being so, was an agreed upon waterway that worked for everyone, the Corps reasoned, and especially for the U.S. government that already led dredging efforts. Most of all this shared waterway could be expanded and augmented in ways that an all-American one could not. "Preliminary Report on Survey of the Detroit River," 4.

leadership in service to US economic interests. This evolving model of techno-infrastructural diplomacy briefly made way for the Commission as well as the eventual collapse of cooperative pragmatism in the late twentieth century.[113]

Conclusion

The limekiln crossing project—iterations and design alteration included—was foundational in multiple ways. The limekiln crossing project created a deep channel for better trade, primarily for the US, and simultaneously provided a testing ground for techno-infrastructural diplomacy. Dredging using explosives, divers, and scows to create a new channel within a river were all innovative technologies. Steam-powered dredges liberated technology from the bounds of human power, instead, making nature subject to almost boundless human ambition. As technological fixes became a routine part of dealing with nature's imperfections and limitations—such as rocky riverbeds and curved channels—in the Great Lakes, there were changes in channel design. Although premised in cost efficiencies, commerce, and binational relations, these design iterations were also the first instance of reimagining the Detroit River into distinct straight channels each of which could be worked on by a different contractor if need be. Efficient dredging and ease of commerce were dependent on a river that could be easily broken into several projects and channels. These channels then were individual components. Because the shipping channel near the Limekiln crossing lay in Canadian waters, its creation and management presented a diplomatic issue. However, it was also the basis of diplomacy.

[113] In *Cleaning up the Great Lakes*, Kehoe shows how fundamentally the cooperative frameworks for environmental regulation shattered in the Great Lakes leading to a new system of regulation in the U.S. in the 1960s and 1970s. See Kehoe, *Cleaning up the Great Lakes*.

Following the limekiln crossing project then allows us to see how the Corps was learning in the river, as they were designing waterways and channels. Transcending the river as a barrier by hollowing out its bottom, the Corps learned from it. With each blast and year of dredging, Corp's engineers realized that, there was a need to push the curvy natural U-shaped channel to a straighter one. Such a channel would be more legible even if a little more expensive. By slowly expanding the scope, scale, and result of their interventions, Corp's engineers were embedding an iterative and incremental method in their interactions with the river. As they learned from the river, so did the waterway. Knowledge transfer, as the next chapter will show, was both ways. Through small-scale changes, engineers were trying to train the river, without going outside natural limits. Congressional approval patterns not only cemented the iterative, incremental, and most urgent projects while leaving behind any investigations of comprehensive planning. The urgency at the time was for dredging to keep pace with the juggernaut of increasing commercial tonnage. In the absence of a binational regulatory framework, serving commerce also served one nation more than the other.

Without forgetting the power or financial asymmetries between the two nations at play, engineers in both the United States and Canada began talking with one other. They may not have always agreed, as we saw in the interaction between W.G. Thompson and O. M. Poe, but they did find a way to cooperate, for the greater cause of commerce. Without a binational regulatory framework, these engineers were relying on each other's data and a common settler improvement ethic premised on transforming nature to help it achieve its greatest potential. In so doing, these engineers lay the foundations of the techno-infrastructural diplomacy that would characterize infrastructure creation in the lower Detroit River. Jurisdiction, infrastructure, and diplomacy all went hand in hand in the Great Lakes.

Chapter Two

Of Giant Cofferdams and Eyesores:

Removing Barriers and Unearthing the lower Detroit River in the Livingstone Channel Construction, 1900-1912

In March 1909, the *Detroit Free Press* remarked positively on the swift progress of Livingstone Channel's dry-cut excavations. It had been "only four months" since the "last of the water disappeared from the giant cofferdam" gouging out "a hole one thousand feet long, 300 feet wide and averaging twelve feet in depth" out of the solid rock at the river bottom.[1] In July, the paper excitedly reported that the progress made on the Livingstone Channel had been "little short of marvelous," commenting that the rocky barrier "where once was clear water" west of the limekiln crossing was indeed impressive.[2] The rock detritus from construction collected onto a spoil bank that rose 50 to 60 feet "and when completed will forever cut off any view of the Canadian shore."[3] However, this eyesore was no issue for vessel interests or contractors since neither were concerned with aesthetics. Recalling that it was just a few years ago that a "fifteen-foot channel was considered adequate," the article remarked that it was inevitable that the dry-cut would need expansion because as much as the 22-feet deep waterway was an improvement, vessel men were already wondering why the Corps had not dug deeper to make a channel "sufficient for all time."[4]

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[1] "Progress on the Livingstone Channel," *Detroit Free Press (1858-1922),* Mar 7, 1909, C. 4. ProQuest Historical Newspapers.

[2] The newspaper reported that 'dry work' of the channel involved drillers, dynamiters, and shovel men "gouging a course through the solid Niagara limestone forming the river bed" over an eventual distance "of nearly three thousand feet." According to the newspaper, a twenty-four-workday in excavating the channel involved blasting rock, shoveling that rock into manageable quantities which were then transported by a skip over a cableway to be dumped, so that the rock would "no longer constitute a menace to navigation." "Rocky Barriers are Disappearing: Work on the Great Gash in the Lower Detroit River That Will Form a Portion of Livingstone Channel is Progressing Rapidly," *Detroit Free Press*, July 11, 1909*,* C.1. ProQuest Historical Newspapers.

[3] "Progress on the Livingstone Channel," C. 4.

[4] "Rocky Barriers are Disappearing*,"* C.1.

However, scarcely six months later, in September 1909, H.M. Oliver, an Amherstburg attorney wrote to L.P. Brodeur, the Canadian federal fisheries minister, complaining about channel excavation and blasting. Oliver began by commenting that the Canadian government was likely to grant permission to the Corps "for further improvements in the river channel here [in Amherstburg] and at the Lime Kiln Crossing." He requested the Dominion Government to "place some restrictions on the number of blasts and amount of the charges fired at one time," that had already damaged local buildings, instead of leaving property owners "at the mercy of irresponsible contractors."[5] Oliver was not the lone voice of dissent. Other dissidents voiced their concern during the forty months of channel construction and after. This chapter chronicles how the Livingstone Channel's dry cut spawned a wave of local activism from downriver residents on both sides of the border which paused construction and eventually invoked the nascent International Joint Commission. Locals' discontent over the dry cut was premised on blasting and the consequent creation of a high spoil bank to house all the excavated material.

I argue that first, the prescribed infrastructure fix, the dry cut as well as the related need for a compensatory dam to offset changes in water levels, were extreme and demonstrated a feature of adaptive river training in action. Both the Corps and Carriers thought this new artificial waterway within the Detroit River would be safe, effective, and efficient because of the dry-cut's walled sides as well as subdivided sections. Not factoring for the limitations that the river imposed through its reactions to and in the dry cut was an indication of human endeavors intersecting with geological time and processes. The river responded to dry cut with a crosscurrent which was pure fluid dynamics and not maleficence. It was not antagonistic nor was

[5] H.M. Oliver Esq., letter to Hon L. P. Brodeur, Minister of M. &F., Ottawa, September 22, 1909, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,"* Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

it symbiotic. It was merely a proportionate response to the imposition of deep walls where the river knew to slow down and just be. Engineers' response to stasis was movement which begot more velocity, in the form of a crosscurrent. In response to this current, the Corps created more infrastructure. The river's new and unforeseen insolent behavior needed to be tamed through incremental and iterative infrastructure. Without adequate river flow data to estimate river behavior, engineers based infrastructure creation on how they thought the river should behave. Compensatory structures were already a part of the hydraulic engineering repertoire and the most obvious solution to balance the river's response to human changes in a way that fostered its use as a commercial waterway.

Secondly, I argue that dredging continued to further the techno-infrastructural diplomacy sustained by Corps and Canadian engineers. Throughout this period, regional newspapers like the *Free Press* labeled the new channel as 'American.' In addition to being factually incorrect, this assertion ran contrary to the Corps and Carriers' embrace of the channel's binational nature. Newspapers' classification of the new channel as being American was premised on Congress bankrolling dredging. Identifying the channel as American instead of binational also brought to the surface long-standing Canadian anxieties about environmental transformations as well as the more public presence of techno-infrastructural diplomacy. In the Progressive Era, the rise of conservation was tied to expertise that created winners and losers.[6] As the experts, engineer-diplomats were teaching nature to behave, pitting humans against infrastructure.[7]

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[6] Samuel P. Hays, *Conservation and the Gospel of Efficiency; the Progressive Conservation Movement, 1890-1920*, Harvard Historical Monographs (Cambridge: Harvard University Press, 1959); Karl Jacoby, *Crimes Against Nature: Squatters, Poachers, Thieves, and the Hidden History of American Conservation* (Berkeley: University of California Press, 2001).

[7] David Whorley, "From IWC to BWT: Canada-US Institution Building, 1902-1909," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen (Calgary: University of Alberta Press, 2020), 35–70.

Third, this set off a wave of powerful local activism based in Amherstburg; the resulting complaints were consistent, current, and powerful. They forced the Corps to pause construction, in turn exposing cleavages between Windsor and Amherstburg. Between 1908 and 1917 Amherstburg and Windsor differed in electoral ridings and political affiliations. In federal elections, as part of the Essex North riding, Windsor elected a Conservative Member of Parliament while Amherstburg elected a Liberal.[8] When it came to provincial elections though, Windsor elected Conservative politicians starting in 1902 and Amherstburg in 1908.[9]

As the Livingstone Channel underwent construction, Canada's electoral landscape also changed fundamentally. In 1911, after the Conservatives won the federal election, installing Robert Borden as Prime Minister, they took over from Liberal Wilfred Laurier whose party had been in power since 1896. With U.S. President Theodore Roosevelt and Canadian Prime Minister Wilfred Laurier in charge, there had been a warmer climate for reclaiming reciprocity.[10] Borden's rise to power quashed immediate hopes of reciprocity. Both materially and ideologically reciprocity was important along the Detroit River. As Windsor was more enmeshed in Detroit's economy, adverse trade tariffs across the border river disrupted these processes of integration. Downriver dissent to dredging centered in Amherstburg. offers a lens to study the machinations between the Corps, Carriers, and local voices on both sides of the border.

[8] Canadian electoral districts are called ridings. The Canadian Library of Parliament has published results from all elections since 1867 showing which parties won seats when. See "Ridings," https://lop.parl.ca/sites/ParlInfo/default/en_CA/ElectionsRidings/Ridings/Profile?OrganizationId=2889 Last accessed February 1, 2022.

[9] In electing a Conservative leader to the provincial legislative assembly, Amherstburg residents elected out John Auld, a Liberal and co-founder of the *Amherstburg Echo* along with William Balfour. Provincial electoral results are available from 1867 at Elections Ontario. https://results.elections.on.ca/en/data-explorer?fromYear=1902&toYear=1917&partyNames=Conservative&edIds=-8_17&edIds=2_27&edIds=-9_17&levelOfDetail=candidate; "The Amherstburg Echo," *INK-ODW Newspaper Collection*. http://ink.ourontario.ca/echo Last accessed February 18, 2022.

[10] Ellis, *Reciprocity, 1911: A Study in Canadian-American Relations*.

Successive infrastructural advances enabled more efficient shipping; they also prompted new opposition from Amherstburg. While much of this may have been silenced by national interest, tracking these local complaints reveals, yet again, how the cooperative framework came at the cost of silenced voices who were most immediately affected by this infrastructure creation. This is a story that has had many parallels across the world.[11] By unraveling the myriad reasons behind Amherstburg residents' opposition to the channel's adverse impacts, this chapter tracks the asymmetrical power levels between the two nations. Though Amherstburg and Malden's residents despised the dry cut construction, they were not opposed to the channel itself. This belief in improving nature but differing over when, where, and why came to define the uneven cooperative framework that evolved in environmental regulation between the two nations.[12]

The forty-odd months of construction from 1908 to 1912 were contemporaneous with the signing of the Waters treaty and the creation of the Commission. Even before it was fully functional, the Commission was already being invoked in binational communication about the Livingstone Channel, especially the thorny issues construction and expansion opened. This was an early invocation of the accommodation—derived from precedent and national interest—that has since undergirded relations between the United States and Canada. The Commission was a shining example of this. Born out of common purpose, the Commission has been extolled for a long time as an exemplary binational institution, which it is to this day. However, it is not just that. The Commission, an outgrowth of the 1909 Boundary Waters Treaty, was "a modest and

[11] Dams have displaced millions of people. And so many of the local voices of dissent against these dams has been repeated across the world. This is not an extensive list but merely a small number of books that I have read. Patrick McCully, *Silenced Rivers: The Ecology and Politics of Large Dams*, Enlarged updated ed (London; New York: Zed Books, 2001); Amita Baviskar, *In the Belly of the River: Tribal Conflicts over Development in the Narmada Valley*, 2nd ed, Studies in Social Ecology and Environmental History (Delhi; New York: Oxford University Press, 2004); Dilip D'Souza, *The Narmada Dammed: An Inquiry into the Politics of Development* (New Delhi ; New York, NY: Penguin Books, 2002).

[12] Kurkpatrick Dorsey, *The Dawn of Conservation Diplomacy: U.S.-Canadian Wildlife Protection Treaties in the Progressive Era*, Weyerhaeuser Environmental Books (Seattle: University of Washington Press, 1998).

limited arrangement, much more conservative in its approach," than usually understood.[13] This diffident approach also influenced the evolution of the language and ideology of accommodation.

I also pay close attention to local newspaper coverage of channel construction because it helps track the continuation of long-term border anxieties as well as the power of the outpouring against the dry cut. I trace how Canadian newspapers differed in their coverage of the Amherstburg protests. The political border acted as the dividing line between American and Canadian newspapers' perspectives on the dry cut. And lastly, the persistent claim by US newspapers that the Livingstone Channel was American shows how internalized and popular that idea was. Belittling Canadian efforts and concerns, these newspapers sought to further propagate the Carriers' and Corp's ambitions for the Detroit River. These were the vestiges of the press's "covert bias."[14] Given the changes in the newspaper business itself and the overall move towards objectivity the *Free Press,* also covered stories of Grosse Ile-based dissent against the dry cut and dumping.

New scholarship such as geographer Phillip Gordon Mackintosh's *Newspaper City* has analyzed the effects of newspapers' politics governing their reportage and has studied the impact and reception of the zealous campaigning by Canadian liberal newspapers, the *Toronto Globe* and *Toronto Daily Star*, to bring surface infrastructure to the growing city as an expression of modernity and capitalism.[15] *Newspaper City* is especially instructive when thinking about Amherstburg and Windsor-based newspaper reportage about dredging and the dry cut. These

[13] Nandor Alexander Fred Dreisziger, "The International Joint Commission of the United States and Canada: A Study in Canadian-American Relations" (PhD Thesis, Toronto, University of Toronto, 1974), 6–7.
[14] Kaplan argues that after the election of 1896, Detroit newspapers, like the rest of the country shed their partisan biases, embracing reform and objectivity. Richard L Kaplan, *Politics and the American Press: The Rise of Objectivity, 1865-1920* (Cambridge, U.K.; New York: Cambridge University Press, 2001), 147..
[15] Phillip Gordon Mackintosh, *Newspaper City: Toronto's Street Surfaces and the Liberal Press, 1860-1935* (Toronto: University of Toronto Press, 2017).

differences are instructive in considering the strong feelings that Amherstburg residents had towards the dry cut. For the first thirty years of the twentieth century, Ontario consistently elected Conservatives to the provincial parliament. Between 1907 and 1912, as much as Ontario was very much Tory, at the federal level Liberal politicians and politics were on the rise, promoting greater feelings of cross border commerce and comity. After the 1902 provincial election, Essex South elected Conservative politicians as the provincial legislators. Though Canadian and American newspapers did not see eye to eye, they were ultimately bound by political borders to support their respective nations' positions.

Plan B

The antecedents of the Livingstone Channel came from the 1890s when William Livingstone, the then president of the Carriers lobbied the U.S. Congress to widen the limekiln crossing— the "hell gate of the lakes"— because vessels often ran aground due "to narrowness of the cut."[16] The Carriers' demand for wider waterways that could handle all the traffic pushed Congress to authorize a survey to consider various options. In his 1900 survey, Corps engineer Lydecker examined three plans for providing a 21-foot channel in the lower Detroit River. Plan A "contemplated the deepening of the Amherstburg Channel, and plan B the excavation of a channel approximately on the site of the present Livingstone Channel," and a Plan C an all-American Channel. However, before the final report could be published, the U.S. Congress adopted plan A, deepening the Amherstburg channel.[17]

[16] "Marine: To Widen the Channels, Lake Carriers Asking Secretary Carlisle for it," *Detroit Free Press;* October 16, 1895, 3. ProQuest Historical Newspapers.
[17] William M. Ingraham, "Livingstone Channel, Detroit River, Mich. Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich. with a View to Securing Increased Width," August 4, 1917, 6.

In 1905 and 1906, Congress asked the Corps to, yet again, report on the possibility of a 22-feet deep channel between Duluth, Chicago, and Buffalo. In his report, Corps engineer, C.E.L.B. Davis decided to not "recommend" deepening to a 22 or 25-feet deep channel throughout the Great Lakes "at present" and left the matter for "further consideration."[18] However, Davis "strongly recommend[ed]" Plan B because a 22-feet deep channel was "now needed at the mouth of the Detroit River and will be very much needed" to support the burgeoning lake trade.[19] This Plan B "provided for a straight channel from Ballards Reef to the Detroit River Lighthouse," in Lake Erie. This new waterway was to be 300 feet wide in the lower Detroit River and expand to 800 feet in Lake Erie. It needed to be narrower since only downbound vessels would use this waterway while upbound vessels used the Amherstburg channel. Both the old and new channels were restricted by nature in how much they could individually expand, so neither could handle bidirectional traffic simultaneously. Instead, Corp's engineers and the Carriers believed separate lanes in the lower Detroit River were safer and more efficient. Adopting the plan in 1907, Congress christened it the Livingstone Channel, named after the Carriers leader.[20] William Livingstone had long championed a deep waterway within the Detroit River at every avenue possible, working closely with the Corps to ensure ships could negotiate the lower Detroit River more efficiently and safely. That a binational shipping channel was named after a lobbyist and shipowner further underscored the closeness of the Carriers and Corps.

[18] William M. Ingraham, "Livingstone Channel, Detroit River, Mich. Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich. with a View to Securing Increased Width," August 4, 1917, 6.
[19] William M. Ingraham, "Livingstone Channel, Detroit River, Mich. Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich. with a View to Securing Increased Width," August 4, 1917, 6.
[20]William M. Ingraham, 6.

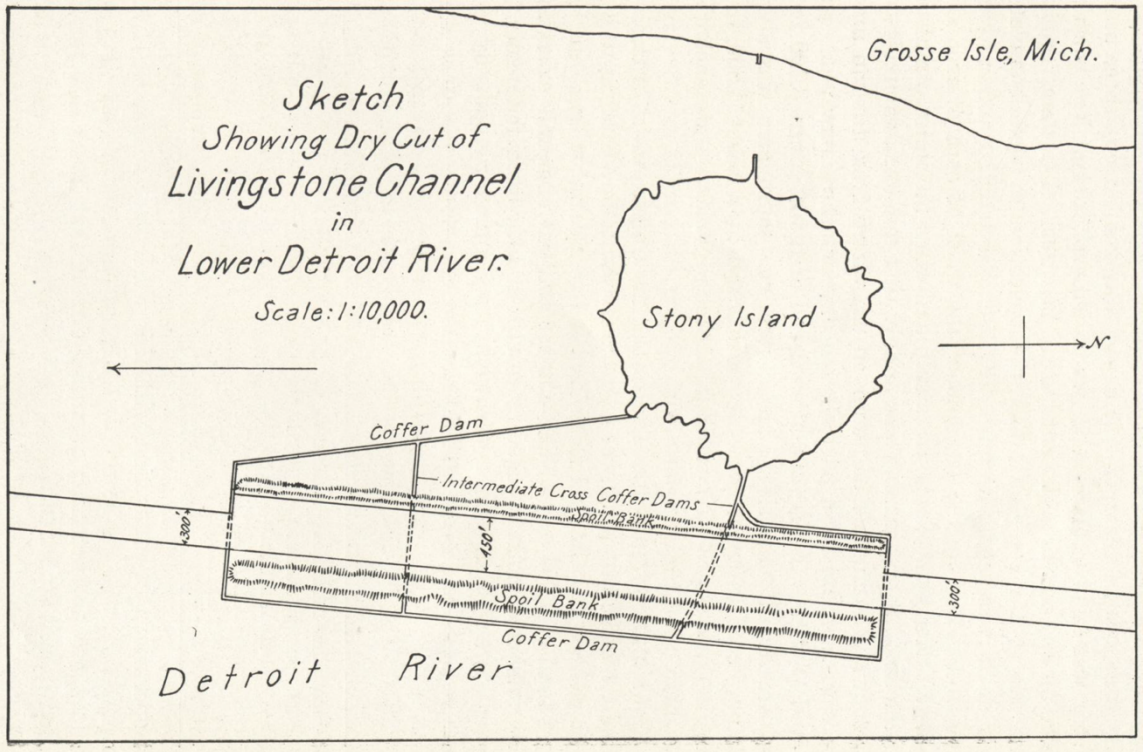

Figure 2.1: Sketch of the dry excavation of the Livingstone Channel. Source: C.Y. Dixon, "Improvement of Livingstone Channel, Detroit River, Dry Excavation," Professional Memoirs, Corps of Engineers, United States Army, and Engineer Department at Large 8, no. 42 (December 1916): 763

The Livingstone Channel was subdivided into four sections, each contracted out separately to ensure swift and efficient construction—at least in theory. Each of these sections varied in width and length with a uniform depth of 22 feet. The 300-foot-wide section was to be about six miles long and the 800-foot-wide section about five miles, with a cumulative length of 11 miles ending in Lake Erie. The subsections were divided based "on the character of the material to be removed." In the lower Detroit River, for the first six smiles of the Livingstone Channel, the riverbed was "mainly rock, in places overlaid with earth and boulders to the depth of several feet," whereas in the latter five miles, it was "clay, sand, silt and some hardpan." For the most part, the channel was dredged by the "usual subaqueous method," i.e., dredging in the

wet.[21] It was only for the length of about one mile, near Stony Island, where technological innovation met social resistance and therefore is the centerpiece of this chapter.

In this short section, which was mostly rock, earthen dams enclosed the dredged section and river water was pumped out. Because the rock that had to be cut varied in depth from 12 to 18 feet, open excavation was a more efficient method. Private contractors (Grant, Smith & Co., and Locher) worked in "an unusually expeditious manner" over forty months from April 1908 to December 1911 to complete that work. In 1908, the *Free Press* reported that even though the one-mile dry-cut was "only a fraction" of the entire channel, it was "by far the most interesting because of the methods employed."[22] As figure 2.1 shows two intermediate coffer dams were created along with the enclosing ones, to subdivide this section into three subsections, each of which was dewatered separately. Dams surrounded about 5800 feet of channel length and the enclosed area was about 160 acres in area. Contractors began building the dams in April 1908, completing them in a staggered manner ending in September 1909. As soon as dam construction was complete, the encircled area was dewatered. In figure 2.1 we see that these dams began at Stony Island, which was leased by the contractors to house workers as well as an air compressor

[21] One of the Corp's engineers who had worked on the Detroit field offer wrote about the dry cut excavation shortly after it was complete. See C.Y. Dixon, "Improvement of Livingstone Channel, Detroit River, Dry Excavation," *Professional Memoirs, Corps of Engineers, United States Army, and Engineer Department at Large* 8, no. 42 (December 1916): 760–61.

[22] The paper examined the developments afoot showing how a cofferdam was constructed "encircling the central portion of the job" about 2800 feet long and 1600 feet wide. Pumps had cleared the area of water working around the clock, "until a stretch of the river bed more than one-half mile long and approximately one-third of a mile in width was laid bare." This cofferdam was only one part of the section though, there were two more—one upstream and another downstream—totaling about 6000 feet in length. The plan for each cofferdam was relatively simple: drilling holes crosswise to the edge of the course, followed by channelers mechanically cutting grooves along the length of the channel, followed by dynamiting and shovels clearing the mass of rock. This would transform relatively shallow waters into a channel 22-25 feet deep "under normal conditions." "Conquering the Lime Kiln Crossing: New Livingstone Channel, the Most Remarkable Engineering Feat on the Great Lakes, Has Given Added Activity to the Lower Detroit River, and Converted Stony Island From a Wilderness Into a Bustling Village," *Detroit Free Press (1858-1922),* October 18, 1908, C. 1. ProQuest Historical Newspapers.

plant and warehouses.[23] Between the use of efficient technologies and twenty-four-hour workdays, the dry-cut excavation cost about $600,000 lesser than the "usual subaqueous method," and was completed in 75 percent of the time than "would otherwise have been required."[24]

The rationale for separate up and downbound channels, as Livingstone later recalled during his testimony to the Commission, was "not danger from storms" but "the danger of collisions," especially given the "enormous tonnage."[25] Freight movement was very time-sensitive, and any blockage would be catastrophic. According to Livingstone, "[N]o expenditure" had "ever been made by the [U.S.] government" that had "yielded such dividends as the money invested to improve the channels of the great lakes" which were "the lines of least resistance, but in a state of nature" they were not "always available."[26] The lakes' "economic possibilities were inestimable when not obstructed."[27] Keeping in mind future growth, the Carriers, from the outset, had asked for the dry-cut section to 600-feet, but the U.S. government had "reported against," this width.[28] The US government was concerned about "compensating" for "the possible disturbances to the levels of Lakes Huron, Erie, and Michigan.[29]

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[23] The island housed workers and their families including school buildings and churches. "Exit Locherville: Unique Village on Stony Island Is Already Being Wrecked, Owing to the Completion of the Livingstone Channel in the Lower Detroit River," *Detroit Free Press*, December 17, 1911.
[24] There was also a small locomotive and tracks over one-and-a half miles to carry supplies in addition to numerous drills, steam shovels, and cableway conveyors to carry away excavated rock. Dixon describes in great detail the use of the various technologies as well as their impact on construction times and efficiencies. See Dixon, "Improvement of Livingstone Channel, Detroit River, Dry Excavation."
[25] According to Livingstone, that the Detroit River "furnished 45 per cent or more of the accidents" that had occurred in the Lakes, in 1908 or thereabouts. International Joint Commission, "Testimony of William Livingstone," in *Testimony in Re The Livingstone Channel on the Reference of the Governments of the United States and the Dominion of Canada Under Title IX of the Treaty of May 5, 1910* (Washington DC: Government Printing Press, 1913), 69- 70, https://www.loc.gov/item/13035458/.
[26] "Economic Side of Lake Navigation: Livingstone Presents Startling Figures and Challenges Contradiction," *Detroit Free Press* January 13, 1907, 22. ProQuest Historical Newspapers.
[27] "Economic Side of Lake Navigation: Livingstone Presents Startling Figures and Challenges Contradiction," *Detroit Free Press* January 13, 1907, 22. ProQuest Historical Newspapers.
[28] Testimony of William Livingstone," 72.
[29] "Testimony of William Livingstone," 72.

Thus, Congress's initial appropriation allowed for a 300-feet wide dry cut in the one-mile section. While the entire length of the Livingstone Channel was to be crisscrossed by the political border, there continued to be "quite a sentiment on the part of some" for an all-American (Trenton) channel in U.S. territorial waters. However, such a channel would be prohibitively more expensive—costing nearly two and a half million dollars more—in addition to having "several bends."[30] Unlike the straight Livingstone Channel, the all-American would continue to be too costly and "crooked."[31]

Following the Corp's lead, Livingstone reinforced the need for a binational channel especially given the "fraternal" relations between the two nations, "the sentiment about whether it was in American waters or Canadian waters did not count for much."[32] Friendly relations did not obscure the end goal of a wider dry cut than initially approved once compensatory questions were answered. Livingstone had successfully lobbied Congress to expand the dry-cut width while construction was ongoing because "widening while the cofferdam was still in place as dry work was cheaper than 'wet' work and the latter "would be a great hindrance to navigation."[33] Thus, in 1909, Congress authorized an expansion to 450 feet before construction as complete.[34] The Carriers, however, thought this new width "really of no advantage" and hoped the 600-feet breadth could soon be achieved if there was "no prohibition."[35] According to the Carriers, a 450

[30] "Testimony of William Livingstone," 72.
[31] In his 1900 report, Lydecker mentioned that an American channel would "be longer and more crooked" and be overall "inconvenient" for commerce. See US House of Representatives, "Preliminary Report on Survey of the Detroit River from Detroit, Mich., to Lake Erie . . ." U.S. Congress, 56th, 1st session, House Document No. 712, 1900, 4.
[32] "Testimony of William Livingstone," 73.
[33] "Testimony of William Livingstone," 73.
[34] H. Burgess, Lieutenant Colonel, Corps of Engineers, "Preliminary Examination of Livingstone Channel, Mich," in *Letter from the Secretary of War transmitting, with a letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich., with a view to securing increased width*, House of Representative 65th Congress, 1st Session. Document No. 322, March 1, 1917, 7; Dixon, "Improvement of Livingstone Channel, Detroit River, Dry Excavation," 761.
[35] "Testimony of William Livingstone," 73.

feet wide dry-cut was not significantly wider than originally approved and therefore would not provide significantly more room for vessels to ensure safety.

Irregularities: Borders and Dumping

In August 1907, the *Detroit Free Press* reported that work was "in progress on the new all-American channel in the lower Detroit River." This new channel was "of great importance to lake vessel interests," which would "do away with the congestion at the Lime Kiln Crossing."[36] Curiously, *Free Press*' assumption that the new waterway was in U.S. territorial waters reinforced the pervasive possessiveness that came with the U.S. government bankrolling both the traffic and channel. The article also remarked that the new channel would be complete in "two or more years."[37] Within those two years, however, trouble began brewing again in Canada.

In April 1909, G.J. Desbarats, the Acting Canadian Deputy Minister of Marine and Fisheries, instructed Col. W.P. Anderson, the Fog Alarm Engineer at Niagara-on-the-Lake, to investigate a complaint that "material dredged from Livingstone Channel [had been] dumped in Canadian waters."[38] A month later, Desbarats wrote to the Secretary of the Department of Public Works (henceforth Public Works) inquiring if any personnel were "officially aware" of the Livingstone Channel work "being done in Canadian waters and if any authority was obtained through your Department for this work." Desbarats acknowledged that the Canadian Public Works resident Engineer, H.J. Lamb, had "made some arrangement with the American Engineers

[36] "Marine News: Dredging New Channel: Work in Lower Detroit River Is Being Pushed, Second Channel Will Lie Wholly in American Waters, and Will Stop Congestion at Lime Kilns—May Be Ready in Two Years," *Detroit Free Press*, August 17, 1907, ProQuest Historical Newspapers.
[37] "Marine News: Dredging New Channel: Work in Lower Detroit River Is Being Pushed, Second Channel Will Lie Wholly in American Waters, and Will Stop Congestion at Lime Kilns—May Be Ready in Two Years."
[38] G.J. Desbarats, April 23, 1909, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

for the use of certain locations in Canadian waters as dumping ground for materials dredged from the Lime Kiln Crossing cut and other dredging east of Bois Blanc Island." However, this "would not necessarily involve any consideration of the larger question of opening another international channel."[39]

Public Works acknowledged Desbarats' letter would "have due attention."[40] Yet, Desbarats had to remind the Public Works in June 1909.[41] When Public Works engineer H.J. Lamb finally responded in a report, he claimed he had supposedly done his best since June 1905 to keep "closely in touch" and was "thoroughly familiar with every step taken by the U.S. Government in the locality mentioned [i.e. west of Bois Blanc Island]." Lamb claimed he was unaware of "any actual communications between the two Governments" granting the U.S. government permission to dredge Canadian waters. However, given the immense and important benefits of channel construction, Lamb thought it inconceivable that the Canadian government would object to the channel itself provided dumping of this dredged material was not "prove a detriment in any way to the safe navigation" of the Detroit River." Dumping was a "necessity" to reduce the "cross-sectional areas" of some sections of the river to "compensate for the increased waterway" that dredging created.[42]

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[39] G.J. Desbarats, letter to Secretary of Department of Public Works, May 3, 1909, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.
[40] Nap. Tessier, Secretary of Public Works, letter to the Deputy Minister of Marine and Fisheries, May 7, 1909, in *International Waterways- Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, RG 25 Vol 1095 File 1909-183, Library and Archives of Canada.
[41] G.J. Desbarats, June 14, 1909, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.
[42] H.J. Lamb, "Subj.—Bois Blanc Island, Detroit River, Ont.," May 21, 1909, 1 in *International Waterways- Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183

Reporting that practically "no material" from the Livingstone Channel had been dumped since the fall of 1908, Lamb commented that the large amount of material mentioned in Desbarats' letter "possibly" referred to a portion of a cofferdam "being excavated as dry work," slated for removal once channel construction was complete. The cofferdam led to a rise in the lake levels of Lake St. Clair by three-tenths of a foot, Lamb remarked, based on the Corp's information, and he also noted that the Carriers had asked the one-mile section to be widened to 600 feet. The Corps had assured Lamb that the Corp's engagement with channel expansion to 600 feet as well as the consideration of leaving the cofferdam in place would be based on "the joint approval of both governments," emphasizing that "no definite action" would be taken without both governments' consent.[43] Joint approval acknowledged and accommodated Canadian territorial sovereignty without downplaying US control of commerce and dredging. The Corps placated its friends across the border.

Assuaging dumping induced anxieties, the Corps also paid heed to the fact that the Boundary Waters Treaty of 1909 and the Commission both recognized the doctrine of equality of states.[44] Recognizing equality did not undo the power and economic disparities between the nations but did, however, allow for the airing of anxieties, especially by the Canadians, more vocally and directly. Underlying this exchange was the rise of conservatism and conservation in

[43] "Subj.—Bois Blanc Island, Detroit River, Ont.," May 21, 1909, 1-2. Emphasis original.
[44] The exact location of the international boundary, especially in reference to dumping was not a new issue. In fact, in 1893, the Collector of Customs at Amherstburg had seized an American plant in charge of the works working in Canadian waters had led to the USACE asking for permission. In its 1893 minute, the council had invoked the Treaty of Ghent to assert the boundary to avoid any confusion or misunderstanding later by the U.S. Government that improving the river in Canadian waters somehow forsook Canadian possession of said waters. In particular, the 1893 minute sought to avoid any "assumption by the United States government of any particular right to the water ways by virtue of the steps which it may now take to improve these [lower Detroit River] channels." Rodolphe Boudreau, "Certified copy of a Report of the Committee of the Privy Council approved by His Excellency the Administrator on the 8th August 1893, 4, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

both countries.[45] Relations between the two nations were at times uneven. There was broad agreement about the need for waterways' development and that the Corps would be spearheading it. Though both countries disagreed over how to go about this in ways that allowed some parity and joint approvals. Protectionist politics were still relevant during this era so both countries contested the details of cooperation and the roles of powerful lobbies. Along the border, American and Canadian newspapers differed on how beneficial and/or territorially they thought of the channel. Recall the *Free Press* christening the channel as "all-American," in 1907.[46] Through construction and beyond, the binational channel was often territorially bound to the United States, at least in the eyes of some American newspapers. Canadian newspapers were divided amongst themselves in their reportage on the dry cut.

As work continued over the summer of 1909, the *Free Press* pointed out that excavating in the dry was "unique," because it allowed quick and efficient work. [47] Unlike dredging in the wet—in the dry cut the river was an externality, physically and metaphorically, that had to be dammed behind the cofferdam's retaining walls. Originally, the use of a giant cofferdam had been met, according to the *Free Press*, with skepticism from veteran marine men. Yet, the success of the cofferdam and the dry work had "forced them to revise their estimate of the plan"

[45] Conservation and conservatism are deeply tied together. The desire to save nature did not stem from the desire to allow more access but instead keep nature accessible to the right kind of people. So much of the binational policy mechanisms and regulatory frameworks between the two nations were an outcome of the intertwined nature of conservation and conservatism. See Hays, *Conservation and the Gospel of Efficiency ; the Progressive Conservation Movement, 1890-1920*; Jacoby, *Crimes against Nature*; Neil Stevens Forkey, *Canadians and the Natural Environment to the Twenty-First Century*, Themes in Canadian History 10 (Toronto: University of Toronto Press, 2012); Ian R. Tyrrell, *Crisis of the Wasteful Nation: Empire and Conservation in Theodore Roosevelt's America* (Chicago: The University of Chicago Press, 2015); Claire Elizabeth Campbell, ed., *A Century of Parks Canada, 1911-2011*, Canadian History and Environment Series 1 (Calgary: University of Calgary Press, 2011); Gabriel Kolko, *The Triumph of Conservatism: A Reinterpretation of American History, 1900 - 1916*, 1., paperback ed (New York: The Free Press, 1977).

[46] "Marine News: Dredging New Channel: Work in Lower Detroit River Is Being Pushed, Second Channel Will Lie Wholly in American Waters, and Will Stop Congestion at Lime Kilns—May Be Ready in Two Years."

[47] "Progress on the Livingstone Channel." *Detroit Free Press (1858-1922),* Mar 07, 1909, C. 4. ProQuest Historical Newspapers.

as well as the Corps who had designed it. The cofferdam which held off the rest of the river from flooding the dry work had been battered by ice in the 1908 winter but had survived and "all doubt as to its strength disappeared."[48]

As construction continued, dredging, and dumping at the border came back into focus. In August 1909, the Canadian deputy external affairs minister, James Hunter, wrote to the under-secretary for external affairs about the U.S. government seeking permission for dredging the Livingstone Channel from their Canadian counterparts, via the British ambassador in Washington D.C. In his letter, Hunter outlined Lamb's observations about the benefits of dredging and possible dumping, acknowledging that the granting of the permission was more performative and not in any serious jeopardy of being denied. Hunter brought up an 1893 communication and provision permitting dumping in Canadian "at least in so far as the location of the actual excavation" was based on Public Works suggestion, advising that "some reservation" be "included" in the present order. Specifically, it suggested that in allowing the Corps to dredge the Livingstone Channel; Hunter claimed that Canadian authority "be expressly understood as being given without prejudice to the possessory rights of Canada" as defined by the Treaty of Ghent. Such a reservation, Hunter believed, "would obviate all possibility of any mis-understanding hereafter arising leading to the assumption by the United States of any

[48] The paper commented that the superintendent in charge, G.P. Locher had "shattered tradition and increased the efficiency of his drillers several fold by substituting drills that had always been regarded as impracticable for work of this nature" by dynamiting rock loose thus keeping "the steam shovels busy with less than half the drillers formerly employed." Having first quarried the "crest of the rock which formed an impassable barrier, and over which in spots not more than three feet of water flowed" the hope was that the rest of the channel excavation would be smoother and swift. Further, the article also marveled at the novelty in being able to walk "along the river bottom twenty-three feet or so below the level of the flood but a few hundred feet distant" as well as the "courage of the men who undertook such a task." One of the reasons channel excavations had moved so quickly was the use of steam shovels and drills. "Rocky Barriers are Disappearing: Work on the Great Gash in the Lower Detroit River That Will Form a Portion of Livingstone Channel is Progressing Rapidly," *Detroit Free Press,* July 11, 1909, C.1. ProQuest Historical Newspapers.

particular right to this channel in virtue of the steps it [the U.S. Government] is now taking to improve same."[49]

Granting permission for excavation and construction led to economic asymmetries and negated Canadian sovereignty. It was difficult to balance the historically unequal economic and political relations; however, the Canadians continued the attempt. All was not lost; by adding a qualification for the permission, Canadian politicians and engineers attempted to support cooperation between engineers and assuage the protectionist fears over the nation's sovereignty. Formal permission made this possible, so the Canadians readily accepted. Dictated and delimited by precedent, this formality also posed an opportunity to reinforce the doctrine of equality of states. Granting this permission was not capitulation. Asking the Public Works to work closely with the Corps to ensure that dumping would "not prove…a detriment to the safe navigation of the Detroit River" even if this position was only reinforced in Canadian waters.[50] The Privy Council and the Deputy Governor-General of Canada echoed these reservations after granting the Corps dredging permission. The Privy Council and the Deputy Governor-General also confirmed that the Corps had selected dumping grounds only after receiving approval from the district Public Works.[51]

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[49] James Blake Hunter, Deputy Minister of Public Works, letter to The Under Secretary for External Affairs, August 27, 1909, in *International Waterways-Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* 3-4, Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

[50] K. Fitzpatrick, letter to James Bryce, Privy Council, September 9, 1909, in *International Waterways- Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

[51] Rodolphe Boudreau, Clerk of the Privy Council, "Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Deputy Governor General on the 3rd September 1909," 2, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

The Privy Council based its recommendations on a dispatch from the Secretary of State for External Affairs, Charles Murphy. Permission initially became an issue in August 1909 when John Scofield, Assistant and Chief Clerk for the U.S. Secretary of War, in a letter to the U.S. Secretary of State, remarked that in a report the U.S. Engineer at Detroit had stated that the international boundary line was unclear and that the Livingstone Channel occupied a location where it was "difficult to state what portion is in American and what in Canadian waters."[52] Scofield's letter had made its way from the British Embassy in Washington D.C. to Sir Charles Fitzpatrick, the Chief Justice of Canada. These letters were not an attempt to relitigate the political border; instead, the correspondence reinforced the doctrine of equality and acknowledged the political border.

Transforming the river along the political border revealed nature and the border disproportionately. On the one hand, the scale and depth of environmental transformation derived their legitimacy from both science and commerce. On the other hand, dredging revealed the political border in material ways, calling into question the power of either nation to unilaterally work across the boundary line. The political border also acted as the organizing course along which Canadian politicians and residents alike voiced their anxieties and discomforts about their neighbors. Questioning how and where the boundary line was drawn, did

[52] The matter had been referred to the International Waterways Commission which had surmised that the Corp's channel improvements in the Detroit River were of "great benefit" to navigation interests in both countries. However, channel excavations as well as dumping grounds were partially in Canada and an "application should be made without delay" by the U.S. to Canada for "formal permission" to excavate the channel. Further, once such an application was received by the Canadian government, it "should be granted" with a "provision" that dumping grounds would be located under direction of the Minister of Public Works of Canada." Scofield's letter had made its way from the British Embassy in Washington D.C. to Sir Charles Fitzpatrick, the Chief Justice of Canada and the Administrator of the Dominion. See John Scofield, Assistant and Chief Clerk for the Secretary of War in absence, letter to the Secretary of State, August 9, 1909, 1. And N. Kennard, "From Mr. Bryce to Lord Grey," August 18, 1909 in *International Waterways- Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

not mean questioning the precedent, but instead gave the Canadians space to air anxieties over the one-sided nature of the Corps-led dry cut. The Canadians believed that the Americans were working in their waters without regard for the border.

Spectacular and Unsettling

Channel construction was so spectacular that two hundred members of a (presumably American) transportation club took a special boat ride to view the blasting and excavation.[53] Stunning as these blasts were, they were strikingly unpopular in Amherstburg. In September 1909, H.M. Oliver wrote to the federal fisheries minister seeking relief from the blasting. Oliver hoped that at the very least, the Canadian government would "kindly point out" how residents could protect themselves and discover who was responsible for the "already considerable damage." Oliver suggested that "most of the inhabitants" were "more or less dependent on the work done in the channels" and thus they were "unwilling or afraid to make a complaint" and attached a newspaper clipping with his complaint.[54]

Less than a week later, Ottawa responded, seemingly unconvinced, and sought clarifications as well as particularities "as to the nature and extent of damage done." Pointing out that since the Livingstone Channel was "so far from the town of Amherstburg" the assistant deputy minister was "somewhat at a loss to understand how any blasts, even though excessive" could do any damage.[55] Oliver's response was to quip: "if the 'Natives' and the Canadian

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[53] "See Big Channel Blast: Transportation Club Members Visit Livingstone Channel Waterway," *Detroit Free Press,* September 19, 1909, 10. ProQuest Historical Newspapers.

[54] Oliver added that the "use of excessive charges of dynamite and the large number of 'holes' exploded at a time" were more than frequent. H.M. Oliver Esq., letter to Hon L. P. Brodeur, Minister of M. &F., Ottawa, September 22, 1909, in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,"* Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

[55] C. Stanton, letter to H.M. Oliver Esq., September 25, 1909, in *International Waterways-Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

Government can stand it [the blasting] I ought to" while attaching yet another newspaper clipping from the *Amherstburg Echo* about the blasting's effects.[56]

The federal ministry responded speedily by questioning the media coverage, suggesting that it was perhaps an inaccurate indicator of the situation, even as they forwarded said clippings to Amherstburg's harbormaster, M. Barrett, asking him to "examine into this matter."[57] After a reminder requesting "immediate action," Barrett finally responded, commenting that the matter was "a serious one." [58] Even though blasting had only begun in December 1908, work proceeded at great speed, with over half mostly already complete. Warning about a rumor that the channel might already be widened by an additional two-three hundred feet, Barrett argued that the blasts were "very severe" and "very annoying" and had "shook down" chimneys; windows that rattled "almost hourly," and that plaster was being loosened and falling. Reporting damages to various buildings, Barrett cautioned that these would only worsen and therefore "something should be done to regulate" the blasts and asked the ministry to send someone "to investigate the matter."[59] By the end of the month, matters had reached a head when Desbarats, the Deputy Minister of Marine and Fisheries, forwarded all the Livingstone Channel correspondence to the Under Secretary of State for External Affairs asking him to take the "necessary steps" to notify the

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[56] H.M. Oliver Esq., letter to C. Stanton Esq., October 25, 1909, in *International Waterways-Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.
[57] C. Stanton, letter to M. Barrett, Harbour Master, Amherstburg, October 29, 1909, in *International Waterways- Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.
[58] C. Stanton, Assistant Deputy Minister, Department of Marine and Fisheries, November 17, 1909, in *International Waterways-Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.
[59] M. Barrett, "Re: File No. 27840 of 29th October and 17th November," November 19, 1909, 2. in *International Waterways. Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

United States government of the damage caused by blasting to "property and shipping."[60] Sensitive Canadian ears and buildings went unnoticed to the ever-burgeoning march of the Livingstone Channel.

Whereas the cofferdam had withstood the 1908 winter river lashing, the following year, things were different. Two months after the Canadians asked their neighbors to monitor blasting, for "thirty days and night[s]" there was an "extreme danger of an inundation of the dry work of the Livingstone channel" during "the great ice jam in the Detroit River." Leaks in the cofferdam had "secretly let streams of water" where machines and men "had been at work" thus threatening to derail the project which had until then been ahead of schedule. Water had backed up to "an extreme height" and "the pressure had caused a dozen or more leaks to open up in the huge dam." Workers worked through "three to four feet of ice" to isolate these difficult-to-find leaks.[61]

For Congress, however, this near disaster was not a disincentive to further widening the channel to 450 feet as per the Corp's recommendations.[62] To the Carriers, this expansion was pointless because it would not serve shipping purposes. William Livingstone had personally held "several conferences" with various members of the rivers and harbors committee.[63] He had even submitted a letter on the Carriers' behalf asking for a 600-foot wide channel enclosed by a

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[60] G.J. Desbarats, Deputy Minister of Marine and Fisheries, November 25, 1909, in *International Waterways- Ask a permission of Canadian Government Re Excavation by United States Government in Livingstone Channel Detroit River,* Department of External Affairs fonds, Library and Archives of Canada RG 25 Vol 1095 File 1909-183.

[61] The *Free Press* reported with great awe the find for the last leak "which was large enough for a man to crawl through" posed a considerable threat to the dam, threatening to sweep it away if left unchecked. One of the workers, an "Italian of intelligence" had found the leak and immediately stemmed it. "Marine News: Ice Jam nearly causes disaster, Great Leaks Bore Way Through the Dam Above the New Livingstone Cut. Desperate Work of the Men Averts Flood." *Detroit Free Press,* January 25, 1910, 8. ProQuest Historical Newspapers.

[62] "Marine News: Favors Widening Part of Channel. Engineers' Report Opposes 600 Feet Plan for Livingstone Cut; Advocates Dyke. Rivers and Harbors of State Well Provided For. Appropriation Bill Carries $33,000,000 and $11,000,000 is to Be Put in Sundry Civil Bill," *Detroit Free Press* February 10, 1910, 10. ProQuest Historical Newspapers.

[63] To hurry "the report of Maj. Keller to congress in time for its consideration before the river and harbors bill" was reported, Livingstone even testified in person. See "Marine: Livingstone to Talk Tomorrow. Will Appear Before Board of Engineers to Speak for Keller Report.," *Detroit Free Press* February 6, 1910, 23. ProQuest Historical Newspapers. See also "Marine News: Favors Widening Part of Channel."

cofferdam in 1909.[64] The Corps had decided against the wider channel because even at its present width, there was already a considerable "oblique current" that flowed between the cofferdam and Bois Blanc Island.[65] When seeking the expansion to 450 feet, the Corps suggested another dam between the extant one and Bois Blanc Island, to "thus compensate for the increased discharge" and "consequent lowering of the lakes above. " The Corps acknowledged that about three-fourths of the work would be in Canadian waters and therefore need the Dominion's permission.[66]

While the Canadian government, at all levels, examined the compensatory dam question, American steamer companies like the White Star Line, were leery about this proposal as well. They suspected the proposed dam would cut off access to important steamer stops like Sugar Island and were therefore interested in the dam question.[67] The *Free Press* argued that it would be challenging to operate a passenger boat because of both the proposed dam and the Livingstone Channel's transit rules.[68] The Corp's response to White Star Line was to assure that "for a time at least after completion of the dam, a passageway 300 feet wide" would be "left in the wall for the use of upbound vessels of light draught." If this plan proved "practicable" then the passageway would "become a permanent feature of the work."[69]

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[64] William Livingstone, "Letter of Lake Carriers Association," February 4, 1909. in *Livingstone Channel, Detroit River, Michigan* 61st Congress (2nd session), H.R. Document no. 676, February 9, 1910, 7-8.
[65] W.L. Fisk et.al., "Preliminary Examination of Livingstone Channel, Detroit River, Michigan," in *Livingstone Channel, Detroit River, Michigan* 61st Congress (2nd session), H.R. Document no. 676, February 9, 1910, 6.
[66] Col. Townsend, letter to the Chief of Engineers, July 5, 1910, in *Construction of a dam in connection with improvement of Livingstone Channel of the Detroit River,* in Library and Archives Canada, RG 25 1105, File no 1910-715.
[67] About halfway between Grosse Ile and Bois Blanc Island, Sugar Island housed dance pavilions which was used by the White Star Line on their excursion cruises. Patrick Livingston, "Good Times and Hard Times, 1913-1939," in *Summer Dreams: The Story of Bob-Lo Island*, Great Lakes Books Series (Detroit: Wayne State University Press, 2008), 47–68.
[68] Even though the channel was unidirectional, traffic was still governed by rules about the frequency and size of ships allowed.
[69] White Star Line, which operated excursion steams between Sugar Island and Detroit "apparently" was "somewhat alarmed at the prospect of the dam" and therefore had written to the Corps asking, "what provision if any" was to be made "for the company's steamers on the return trip from the island." "River Dam Will Have Passage Way:

Irksome Blasting and Irate Residents

Blasting caused further problems on both sides of the border for months. In April 1910, the *Free Press* reported that wrath was "blazing high among residents of Grosse Ile, and Bois Blanc islands and along the Canadian shore." Residents had registered "protests and forceful kicks against the big dynamite charges."[70] It was "not so much the detonation" but rather the heavy charges that shook up "things all along the islands and shore," which truly irked residents.[71] Even though the Corps had instructed the contractors to "be more careful," it seemed to "have had little result."[72] In asking residents to seek redress from the contractors directly, the Corps shirked away responsibility.[73] Yet by the summer of 1910, both the *Detroit Free Press* and *The Christian Science Monitor* reported that the Corps would indeed build the compensatory dam to "prevent a possible reduction of levels in the upper lakes and rivers" due to channel construction.[74] This dam though was stillborn because as soon as there was a proposal to

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Government Will Leave Opening For Boats Returning From Down River Islands." *Detroit Free Press (1858-1922)*, Jul 10, 1910, 11. ProQuest Historical Newspapers.

[70] The paper also reported that one of the aggrieved residents complained about the plaster coming off their walls. "Marine News: Heavy Blasts Arouse Wrath. Residents Near Livingstone Channel Kick on Firing of Heavy Dynamite Charges. Plaster Is Shaken down in Houses on Grosse Ile. Col. Townsend Announces Those Sustaining Loss May Recover From Contractors at Fault," *Detroit Free Press*, May 14, 1910, 9. ProQuest Historical Newspapers.

[71] "Marine News: Heavy Blasts Arouse Wrath. Residents Near Livingstone Channel Kick on Firing of Heavy Dynamite Charges. Plaster Is Shaken down in Houses on Grosse Ile. Col. Townsend Announces Those Sustaining Loss May Recover From Contractors at Fault," 9.

[72] "Marine News: Heavy Blasts Arouse Wrath. Residents Near Livingstone Channel Kick on Firing of Heavy Dynamite Charges. Plaster Is Shaken down in Houses on Grosse Ile. Col. Townsend Announces Those Sustaining Loss May Recover From Contractors at Fault," *Detroit Free Press*, May 14, 1910,9. ProQuest Historical Newspapers.

[73] The Corps also thought it "might be advisable to announce that any who suffer property damage in consequence of the blasting may recoup their loss through legal proceedings against those responsible for the damage done" because the U.S. government's agreement with the contractors made the latter responsible "for any damage to property owners by reason of their work." Marine News: Heavy Blasts Arouse Wrath. Residents Near Livingstone Channel Kick on Firing of Heavy Dynamite Charges. Plaster is shaken down in houses on Grosse Ile. Col. Townsend Announces Those Sustaining Loss May Recover From Contractors at Fault." See "Marine News: Heavy Blasts Arouse Wrath. Residents Near Livingstone Channel Kick on Firing of Heavy Dynamite Charges. Plaster Is Shaken down in Houses on Grosse Ile. Col. Townsend Announces Those Sustaining Loss May Recover From Contractors at Fault."

[74] "Dam A Mile Long to Retard Lakes," *The Christian Science Monitor* July 9, 1910, 8. ProQuest Historical Newspapers; the *Free Press* quoted the Corp's engineer-in-charge Col. Townsend as justifying the dam due to the "steep slope of the stream where the channel work" was in progress. Townsend also hinted that the Canadians had

construct, there was a dispatch from Amherstburg asking the Canadian government to withhold permission for the dam.[75]

In September 1910, Dr. Pugsley, the Canadian Public Works Minister arrived in Windsor to interview Amherstburg residents and investigate their misgivings about the proposed dam. According to *The Amherstburg Echo*, during his visit, Pugsley was informed of the "strong protests" from American property owners across the border as well. Townspeople also informed Pugsley that the proposed dam "would ruin the property at the mouth of the river," in addition to cutting off "the entire west side of Bois Blanc Island." Residents were both concerned about pollution and increasing river volume and ice flows. And they suggested instead a dam "on west side of Grosse Île" which was not used by commercial vessels, would relieve Amherstburg.[76] Pugsley assured residents that their questions would be carefully considered and asked that any memoranda be sent to him. A couple of weeks later, Corps engineer, Col. Townsend reached out to Canadian Public Works Engineer Lamb to explain "the reasons for selecting the proposed site" especially outlining "why none of the sites suggested at other points in the channel, would serve the purpose as well."[77] Lamb, on the other hand, informed Townsend about the protests in Amherstburg and "brought influence to bear to prevent the dam being built at the point selected."[78]

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been asked for permission; one that would eventually be referred to the newly formed International Joint Commission. Instead of using cement to construct the dam, rock "taken from the bed of the stream" would be "piled together to make the restraining wall." "Marine: Dam will offset river deepening," *Detroit Free Press,* July 6, 1910, 10. ProQuest Historical Newspapers.

[75] John W. Gibb, Mayor, "The Memorial of the Municipal Council of the Town of Amherstburg" to the Governor General of Canada, in *Construction of a dam in connection with improvement of Livingstone Channel of the Detroit River,* in Library and Archives Canada, RG 25 1105, File no 1910-715.

[76] "Interviews Hon. Dr. Pugsley," *The Amherstburg Echo* September 2, 1910, 4. INK-ODW Newspaper Collection and *$10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, The Marsh Historical Collection (Amherstburg ON, 2013), 38-9.

[77] "Marine News: Engineers Confer Over River Work. Col. Townsend Tells Canadian Official Why Site Chosen Is Best for Proposed Dam," *Detroit Free Press*, September 17, 1910, ProQuest Historical Newspapers.

[78] "Marine News: Engineers Confer Over River Work. Col. Townsend Tells Canadian Official Why Site Chosen Is Best for Proposed Dam."

The Amherstburg town council communicated their reservations about the dam through a memorandum to the Governor-General in which they outlined their primary concerns for opposing the dam. The first concern was how sewage from the Canard River would now flow past Amherstburg "thereby greatly endangering the health of the whole population" instead of mostly flowing past the western side of Bois Blanc Island as it had earlier. Second, they believed that opening the cofferdam "would create sufficient current to counteract the cross current" and that "the navigation of the new channel would not be "rendered dangerous." Lastly, and perhaps most interestingly, they believed that widening the Livingstone Channel to 450 feet would "not cause the lowering of the water [as] claimed" because despite extensive dredging and excavations since 1872 there had "not been any apparent lowering of the water level." However, the petitioners went on to add that when Livingstone Channel excavations began the previous year, "water levels were higher than they had been for several years prior to that."[79] A week later, on October 7, the town of Malden, Ontario adopted a similar, almost verbatim, memorandum against the dam and sent it to the Governor-General of Canada.[80]

Appealing to the Governor-General, instead of the Prime Minister was a strategic choice and one that evolved over time. In the early twentieth century, even though Canada was still a dominion, it was slowly carving out its independence from the British Crown. After Confederation, the Governor-General's office was empowered to govern in accordance with the Prime Minister's wishes on all internal issues. Until the Great War, in keeping with British policy, the Governor-General's office was still obliged to follow British policy in external

[79] "Amherstburg Opposes Dam," *The Amherstburg Echo* September 30, 1910, 4. INK-ODW Newspaper Collection; John W. Gibb, Mayor, "The Memorial of the Municipal Council of the Town of Amherstburg" to the Governor General of Canada, in *Construction of a dam in connection with improvement of Livingstone Channel of the Detroit River,* in Library and Archives Canada, RG 25 1105, File no 1910-715.
[80] "Malden Council," *The Amherstburg Echo* October 7, 1910, 7. INK-ODW Newspaper Collection.

relations. In 1931, after the Statute of Westminster, the Governor-General became the Crown's personal representative. In the first three decades of the twentieth century, the Governor-General's and Prime Minister's offices grew complementary to one another, reinforcing Canadian independence from the British Crown.[81] The Governor-General's office, in dealing with an internal issue was reinforcing its unique place in the Canadian government, acceding to Canadians' concerns and not those of the Crown. An early instance of this independence being recognized was the Boundary Waters treaty and the Commission which "removed the British middleman."[82] Invoking the Commission, "when appointed" signaled just how seriously the Canadians took the binational body and the possibilities it represented.[83] Thus, Canada would not just be independent of Britain—both in politics and policy—but also be treated as an equal to the United States through the doctrine of equality.[84]

On the same day, while Malden residents sent their memorandum to the Governor-General, *The Amherstburg Echo* reported that the Corps had decided to move the headquarters for the Livingstone Channel work back across the border to Wyandotte. According to the newspaper, Detroit presses had "been advertising Amherstburg's annihilation" because the latter had "the temerity to object to the destruction of their harbor and waterfront and the pollution of their water supply" due to the compensatory dam. The *Echo* recalled that "before this work was undertaken at all Amherstburg got along fairly well in its own way." While construction did

[81] D. Michael Jackson, Philippe Lagassé, and Queen's University (Kingston, Ont.), eds., *Canada and the Crown: Essays on Constitutional Monarchy*, Queen's Policy Studies Series (Kingston, Ontario: Montreal: Institute of Intergovernmental Relations, School of Policy Studies, Queen's University; McGill-Queen's University Press, 2013); Barbara Jane Messamore, *Canada's Governors General, 1847-1878: Biography and Constitutional Evolution* (Toronto; Buffalo: University of Toronto Press, 2006).
[82] Murray Clamen and Daniel Macfarlane, "Introduction," in *The First Century of the International Joint Commission*, ed. Murray Clamen and Daniel Macfarlane (Calgary: University of Alberta Press, 2020), 15.
[83] Lord Grey to James Bryce, January 13, 1911, in in *Construction of a dam in connection with improvement of Livingstone Channel of the Detroit River,* in Library and Archives Canada, RG 25 1105, File no 1910-715.
[84] Whorley, "From IWC to BWT: Canada-US Institution Building, 1902-1909."

employ Amherstburg residents, the *Echo* did not "anticipate that these men will starve to death if the Engineers' office be moved to Wyandotte." Furthermore, the paper pointed out that if the price of keeping the Corps in Amherstburg was "to submit to the injustice of this dam for all time to come, an injustice" one which the Corps was "very careful not to impose on their own citizens on Grosse Île or the Trenton channel" then "the game" was "not worth the candle." The *Echo* reprimanded the Corps engineer in charge, Col. Townsend, for his small-mindedness and reminded him that Canada had done "more than…her share in the improvements to international deep waterways." Both nations opposed the dam; according to the *Echo*, most of the threatened riverfront belonged to the Americans "who one and all" were a unit "in opposing, with all the means at their command" the compensatory dike.[85]

A Temporary Pause in Construction

As a result of the "strenuous" protests, and construction ground to a halt the Corps decided to delay further operations in the channel "until some definite decision" was reached. The Corps suspended the dry cut's expansion to 450 feet, much to the contractors' chagrin. Contractors had begun excavations "in their anxiety to keep men and equipment employed," immediately "after learning their bid had been approved by the [U.S] war department, and before the contract with the government [had] been signed." The U.S. Government now owed these contractors about $38,000 which the former should receive in time.[86] However, "one sixth of a

[85] "Col. Townsend's "Big Stick," *The Amherstburg Echo* October 7, 1910, 4. INK-ODW Newspaper Collection, and *$10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*," The Marsh Historical Collection (Amherstburg ON, 2013), 39-41
[86] Marine News: Earn Cash That They Can't Get. Livingstone Channel Contractors Start Widening Early; The Contracts Withheld. Controversy Over Dam Site Cause of Hitch. Work Amounting to $38,000 Done in Channel Extension, Before Excavation is Suspended," *Detroit Free Press* October 20, 1910, 14. ProQuest Historical Newspapers.

mile" of the widening project had been completed before the "preemptory order came from Washington ordering them to discontinue the work until further notice."[87]

This pause took many by surprise. The *Free Press* expressed the fears of a "prominent clubman" that Corps engineer Townsend's trip to Washington D.C was to "get the federal officials to force the dominion of Canada" to allow compensatory dike construction. The Corps refuted this—in the *Free Press*—adding that, while Townsend's trip was not "not to declare war against Canada," the engineer did not want any additional excavation to proceed "until" the compensatory dike had been approved.[88]

During the hiatus, speculation continued. If anything, newspaper coverage, which drew succor from any changes in dredging—halting new projects and disagreements—further reinforced political borders. Whether it was the possibility of an all-Canadian canal in the 1890s, or fears about a conflict about the Livingstone Channel, the political border was never far from local issues. In halting construction, local activism had won the battle even if they had no chance of winning the war. That the memorandum did not question dredging or expansion but instead focused its attention on the compensatory dam shows that locals acknowledged how pervasive dredging and improvements projects were. This was the refraction of local and international politics. Local dissidence about the dry cut on both sides of the boundary was structured by national interests, even as the border was a place of construction and cooperation.[89]

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[87] Newspaper report from February 10, 1911, $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 52.

[88]The paper reported that, considering the Amherstburg protests, Sproggs had "constituted himself a committee to give voice to his sentiments and those of some of his fellow-townsmen" but had become "excited, however, and got mixed up in his facts" even if he meant well. "Hank Mixed In His Facts. Col. C. McD. Townsend Declares Reports of His Absence Are Greatly Exaggerated, Like Some More Things. Rumor of War with Canada Unconfirmed. One Bit of Truth is That Some Engineers Were Ordered to Go to Wyandotte; but That Was Printed in the Free Press Long Ago.," *Detroit Free Press* October 29, 1910, 1. ProQuest Historical Newspapers.

[89] In *Border Land, Border Water* Alvarez talks about how the political border became a place of construction. Alvarez, *Border Land, Border Water*.

The interruption in construction did not stall newspaper coverage, even if the reportage was split between Windsor and Amherstburg newspapers. In October 1910, *The Echo* accused the *Windsor Record* of irresponsible reportage "by handing out" an unknown navigator's "rattled-headed" views on the dam. Beginning with his false claim that the Livingstone Channel was in American waters, the *Echo* was irked by the *Windsor Record's* characterization of the U.S. government as "munificent" and the Canadian Government as "niggardly." Pointing out that the Canadian government had spent its share in improving Great Lakes waterways, *The Echo* thought the "worst of it" was the *Windsor Record*'s suggestion that Amherstburg should reconsider its protest considering the effect on commerce in the entire continent.[90]

The *Echo* wondered if Amherstburg's citizens were to "sit down and allow all the filth from Detroit and Windsor" to be dumped on their shores and pollute their potable water. If this dam was so necessary— "to meet the whim of a United States engineer" to keep up water levels in Lake St. Clair—the newspaper wondered why it could not be built elsewhere, especially in the unnavigable (for cargo vessels) Wyandotte Channel in American waters. According to the *Echo* Corps engineer, Townsend claimed that this Wyandotte channel was "held by capitalists for manufacturing purposes" and added that the possibility of a dam there might lead to a rebellion. To keep away domestic discord, the Corps was instead proposing a dam in Canadian waters "damage or no damage, rebellion or no rebellion," and had already moved their personnel from Amherstburg to Wyandotte. Surely, the *Echo* thought, Amherstburg, Malden, and Anderdon residents had "some rights" much like American neighbors. The "strongest" argument against this dam was that the 600-feet wide channel at the limekilns had not lowered lake levels

[90] *The Echo* questioned the authenticity and authority of this navigator, a Captain Leonard. "That Bois Blanc Dam," *The Amherstburg Echo* November 4, 1910, 4. INK-ODW Newspaper Collection and *$10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*," The Marsh Historical Collection (Amherstburg ON, 2013), 43-5.

upstream, so a 450-feet wide dry cut in the Livingstone channel could not possibly hurt more. Further, the crosscurrent could easily be alleviated if the Corps would just clean the spoil piles that were "50 or 60 feet high, for a mile." This would have brought the river back "to its natural condition," thereby obviating the current. The trouble, according to the *Echo* was that Canadian officials were often "carried away" when they were wined and dined by "festive American engineers" and did not work in national interests. The paper was relying on Public Works engineer Lamb's assertion that there would be "no Bois Blanc dam."[91]

The *Echo*'s reporting on the dam ignored that both the limekiln and Livingstone channels were draining the Great Lakes at the same time and therefore would have effects on the entire system. Amherstburg residents' disagreements were not about shipping needs but rather the inordinate costs that they had to shoulder as compared to their neighbors across the border. Just because they found no friends in Windsor did not mean Amherstburg residents were backing down. In November 1910, *The Globe* reported that A.H. Clarke, the local member of Parliament was in Amherstburg "making a study" to report to the Canadian Parliament, by speaking with those "whose interests would be most vitality affected" if the dam were allowed. Speaking to the newspaper, Clarke reportedly said that the "only people" who seemed "anxious to put the dam through" were the Carriers whose views Clarke knew through Livingstone himself.[92]

Later that month, the Corps was reportedly "afraid" that the Canadian stalling of the project meant that the suspension of the channel extension would need to be "until next spring"

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[91] The *Echo* questioned the authenticity and authority of this navigator, a Captain Leonard. In its reply, *The Windsor Record* justified Capt. Leonard's credentials, further accusing *The Echo* of irresponsible reportage. See "That Bois Blanc Dam," *The Amherstburg Echo* November 4, 1910, 4. INK-ODW Newspaper Collection and *$10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*," The Marsh Historical Collection (Amherstburg ON, 2013), 43-5 and "The Bois Blanc Dam," *The Windsor Evening Record* November 5, 1910, 4. INK-ODW Newspaper Collection.

[92] Bois Blanc dam: much opposition manifested to the proposal Mr. A. H. Clarke, M.P., has been investigating, and finds that the Lake Carriers are about the only people who want the dam," Special Despatch to The Globe, *The Globe (1844-1936)*, Nov 05, 1910., 12. ProQuest Historical Newspapers.

[1911]. Unless the Canadian government announced its "approval" in time for contractors "to lay in the supplies of coal, provisions and other things necessary for continuance of work through the winter," work would have to "stop for lack of these essentials." Suspension of work over the winter would "mean a delay of about one year in the ultimate completion of the channel," with ripple costs to the economy.[93]

Some cross border support: consider, construct, and reconsider

The Public Works Department, in the meantime, sent their engineers to ascertain river discharge volumes, "in connection with the dam proposal."[94] Amherstburg residents found support across the border when James Keena, "one of Detroit's Most Eminent Attorneys," wrote a letter to the *Detroit Journal* (via *The Amherstburg Echo*) compelled by a "duty as a matter of simple justice" to the Canadians. Keena was against the *Detroit Journal*'s "rather flippant ridicule" of the Amherstburg protests as an "opera bouffe." The objections were not "social vagaries but practical and serious" because residents believed that "the effect of the dyke [sic] will be to deflect ALL of the marsh and germ-bearing waters of the muddy Canard River" into the Amherstburg Channel thus sullying the town's water supply. According to Keena, the town was well within its right to secure its drinking water supply and thus suggested pursuing other options. Keena acknowledged that with or without the Canadian government's consent for the proposed dam, the dry cut would be widened, and could not understand why the expansion had been halted in the first place. Expansion and compensation needed to be disentangled he suggested. Keena thought the Canadians should decide if they wanted a dam. He believed officials needed to approach the possibility of obstructing "this natural waterway and change its

[93] "Marine: Canada's Delay Retards Channel. Slow Action on Dam Project May Set Back Opening of Livingstone Route a Year., "*Detroit Free Press* November 19, 1910, 12. ProQuest Historical Newspapers.
[94] Article in the *Amherstburg Echo* November 18, 1910. In *$10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 45.

course for all of time" with "dignity and circumspection." Keena assumed that if the "health and property" of even "a small" number of Canadians were being endangered, then "the privilege" to construct the compensatory dam "should not be granted" to the Corps. Keena went so far as to argue that if Canadians were apprehensive or were to be inconvenienced by the proposed dam, it should not be constructed if there were other ways in which the "same result" could be accomplished by one in U.S. territorial waters.[95]

The Public Works Minister, Dr. Pugsley, echoed this suggestion to move forward with construction, stating "the Livingstone Channel [must] be completed and opened to see what currents, cross or otherwise" might develop before "any further steps" were taken towards "the construction of the dam to which so much objection was taken by Amherstburg residents."[96] In the meantime, Washington became "impatient" with the Canadian government's delay and considered requesting "the [U.S] Secretary of State to call the attention of Canada," about the matter.[97] However, as the *Echo* pointed out, the Canadian government had agreed to channel construction—beginning with the understanding that the compensatory dike question would eventually be revisited if a crosscurrent appeared, so U.S. impatience may have been

[95] Amherstburg's apprehensions were about the Canard's "normal conditions" but its carriage of sewage during "heavy rains and overflows." Keena remarked that the 300 feet wide opening in the dike was "not in consideration" for Amherstburg "but to accommodate the steamers going to and from Sugar Island." At the end of his rather long letter, Keena did confess that his interest was not "entirely free from selfishness" since he had enjoyed a summer home in Amherstburg for decades with easy access to the water. The Livingstone Channel would make it "necessary" for Keena to build a wall to protect his property apart from possibly causing "dead or slack" water that would fill up with marsh grasses, hitherto unheard of on the island. The slack water could also "affect or destroy the fishing privileges now exercised by the Canadian Government on the west side of the island." Had the protests come from the other side of the border, Keena remarked, they might have been "classed as the old spirit of '76 asserting its natural rights to have things continued in the same condition that the Almighty constructed and intended them" but on the Canadian side, they were "opera bouffe." See "The Bois Blanc Dam. Letter from Mr. James T. Keena, one of Detroit's Most Eminent Attorneys," *The Amherstburg Echo* December 2, 1910, 6 and in *$10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 45-50. Emphasis original.

[96] Newspaper report from December 23, 1910, $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 50.

[97] Newspaper report from January 13, 1911, $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 51.

misplaced.[98] Less than two weeks later, Oliver Wilcox, the Member of Parliament from Essex North brought up the Amherstburg protests in the Canadian parliament, submitting that the 'dam question' was "worthy of consideration."[99] Sir Wilfrid Laurier told Wilcox that the query had had already been answered and "the reply sent to Washington," via the Governor-General.[100]

Bearing in mind the groundswell against the dam Lord Grey, the Governor-General wrote to the British Ambassador to the United States, James Bryce, that the Canadian government could not permit the dam given the "strong opposition" in Amherstburg and surrounding areas. A "further investigation" about the dam or the "question left in abeyance until completion of the channel" could determine if there was a need in addition to a suggestion "that probably the whole question could be dealt with better by the International Joint Commission when appointed."[101] The note finally made its way to the Americans (via the British Embassy).[102]

This disapproval could not have come at a worse time. Shortly after, in February 1911, the *Echo* reported that the contractors of the conflict-ridden section of dry cut had notified the Corps about their plan "to withdraw their entire plant and remove it to New York, thus delaying the completion of the channel for perhaps another year" unless the U.S. government issued an

[98] Newspaper report from January 13, 1911, $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 51.
[99] "Proposed Dam at Bois Blanc Island," *Amherstburg Echo* January 27, 1911, 6 and $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 51-2.
[100] "Proposed Dam at Bois Blanc Island," *Amherstburg Echo* January 27, 1911, 6 and $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 51-2.
[101] Lord Grey to James Bryce, January 13, 1911, in *Construction of a dam in connection with improvement of Livingstone Channel of the Detroit River,* in Library and Archives Canada, RG 25 1105, File no 1910-715.
[102] This note was in response to the U.S. government sending a note to the Canadian government via the British Embassy on June 29, 1910, "requesting that the consent of the Canadian Government be obtained to proceed with the work of constructing this [compensatory] dike in accordance with the plans of this [U.S.] Government." See Note from P. Knox, Department of State, U.S. Government to Mr. Alfred Mitchell Innes, Charge d'Affaires of Great Britain, May 17, 1912, 1-2. Library and Archives Canada RG 24 Vol 5667 File no 77-1-15.

order to continue work before March 1.[103] A week later, the *Echo* reported on a dispatch from Washington D.C. which blamed the Canadian government for refusing to permit the dam. Not only did the denial give sustenance to Amherstburg's protests but would also probably hold up channel construction in toto until the case was adjudicated by the Commission. Given that the Canadian advice had consistently been to "complete the work, open the channel and see how the currents act," the paper thought there would be "no objections to steps being taken to check cross-currents."[104]

After Townsend recommended the work continue without the compensatory dam, the *Echo* argued it construed a "retreat" that Townsend had been "compelled to make." The paper argued that the "gallant" engineer had proved himself "adept at shooting in hot air, but his last attempt, as usual, overshot the mark." The *Echo* claimed to have known "for some time" that "Amherstburg's grievance" had been "quietly brought to the attention" of the US government who had promised to thoroughly investigate the matter.[105] By early March, Townsend received the order to continue work on widening the channel.[106]

Even if the pause in construction was brief, it was brought to light the power of local activism. Amherstburg was not and is not a large town.[107] Yet, this small town had temporarily

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[103] Newspaper report from February 10, 1911, $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 52.
[104] Newspaper report, *Amherstburg Echo* February 17, 1911, 8 and $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 53.
[105] Newspaper report, *Amherstburg Echo* February 24, 1911, 4 and $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 53-4.
[106] Newspaper report from the *Amherstburg Echo* March 2, 1911, 4 and $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 54.
[107] Amherstburg was important in the War of 1812 because the ship Cuyahoga was captured off its waterfront on eve of the war and gave the British the decisive edge. William Wood, "Select British Documents of the Canadian War of 1812, Volume 3 Part 2" (SWODA: Windsor & Region Publications. 36., 1928), https://scholar.uwindsor.ca/swoda-windsor-region/36.

stopped the Corps and the Carriers in their tracks. Since this came at the point of the Commission's founding, it reveals the intersection of the ideology and politics of accommodation with the longstanding debate and discontent over American boorishness and impositions. Most importantly, these disruptions were an early but solid grounding for local action, one that both Windsor and Amherstburg have inherited and continued to draw upon.[108] Through the course of the 20th century, Amherstburg and Windsor grew closer together in interrogating their relationship to the Detroit River. Their convergence often met with silence from their American neighbors but that did not stop the calls for preventing the development of infrastructure that would change the course and nature of the river.

After a drawn-out process with the Commission's involvement, the compensatory dam was eventually constructed. Amherstburg residents convincing their government and bringing Commission in their favor was a masterstroke for this small, sleepy town. Even though the Waters Treaty and the Commission were meant to cement a binational framework, they were not blind or deaf to local interests. This close reading of local voices underscores how close to the ground the Commission needed to be, especially as it found its footing.

By that summer, the Corps was hit with more protests. *The Echo* claimed to have uncovered Corps engineer Townsend confessing that his "benevolent" reason for "trying to force an obnoxious dam" was "to provide a dumping ground for the immense spoil bank" at the dry work, the removal of which was not a part of the original dredging contracts.[109] *The Detroit*

[108] Windsor (Windsor West) and Amherstburg (Essex) today are still in different ridings. In the 1960s and 1970s, the Corps sought to develop Crystal Bay as a Confined Disposal Facility (CDF) on the island. Amherstburg residents banded together and forced the Corps to relocate their proposed CDF to Pointe Mouillee. This local activism continues to power environmental consciousness even today. Jarvis, "Jarvis: The Day That Was the Turning Point for Ojibway."

[109] "Spoil Bank" is an eyesore," *Amherstburg Echo* June 9, 1911, 6 and $*10 Million Ditch: Building the Livingstone Channel A Timeline of the construction of the Livingstone Channel 1908-1912* as reported in the *Amherstburg Echo*, 55.

News reported that "Uncle Sam" had "a huge "spoil bank" on his hands," a great "bank of rock and earth" that was becoming "an international problem" and apart from "also an eyesore to citizens of Grosse Ile and Amherstburg." This pile, which was reportedly "over two miles long and 40 feet high," was a byproduct of channel excavation.[110] According to *The News*, "from a legal viewpoint" the bank was "there to stay indefinitely." Downriver residents had declared "that the great bank" had "ruined the scenic beauty of the district to a degree that more than offsets any benefit which the general public may derive from the channel deepening" and therefore were "somewhat agitated over the matter."[111]

Townsend told the paper that he "thought" he had solved the problem in light of the first set of protests in 1910 but in light of the "new" protests, the Commission would have to step in and deal with them. Townsend's solution was to use the stone and earth to "build the dike to prevent cross currents" in the river between the southern end of the spoil bank and Bois Blank Island. However, protests had thwarted that plan. If the Commission did not think a compensatory dam was necessary, then the spoil bank i.e., the very sides of the Livingstone Channel dry cut "must be removed in some way." Without the compensatory dam, the crosscurrent was inevitable. Without the dry cut walls, the crosscurrent was impossible to prevent as was the safe and efficient waterway that the Livingstone Channel was supposed to be. Most of all, there were funds to get rid of the spoil bank. Townsend thought a "good way" to dispose of the bank was to level and cover it with earth and grass. There was "no question" that the spoil bank cut off residents' views but there was no provision for disposal in the original

[110] "Spoil Bank in River An Eye Sore. No Provisions Made in Contracts for Its Removal. Officials are Puzzled. Seek Relief in Dike. Congress May Have to Make Special Appropriation to Take Care of Rock and Earth.," *The Detroit News* June 2, 1911, 1. America's Historical Newspapers.
[111] "Spoil Bank in River An Eye Sore. No Provisions Made in Contracts for Its Removal. Officials are Puzzled. Seek Relief in Dike. Congress May Have to Make Special Appropriation to Take Care of Rock and Earth.," *The Detroit News* June 2, 1911, 1. America's Historical Newspapers.

contract because, according to Townsend, "these things take care of themselves." The spoil bank in the Detroit River, Townsend confidently asserted would "be used up" and eroded by the waterbody.[112]

Concurrently, a committee was formed on Grosse Ile to collaborate with local congressmen to communicate to Washington objections to the spoil bank at a "mass meeting" of property owners at a country club on Grosse Ile. Island residents who were "wrought up over the possibility of the big pile of dirt being left to shut off their view of the river and the Canadian shore" attended the meeting. They all wanted the U.S. government to "expedite" the "means of having the 'spoil bank' done away with."[113] As trouble brewed on Grosse Ile over the summer, construction continued, and *The Echo* reported in September that the dry work at the channel was "nearly all completed" and the channel ready to open sometime the following year.[114]

By the end of 1911, however, protests resumed. According to *The Detroit News Tribune,* these protests appeared "to be based on the assumption" that the spoil bank would "always remain a precipitous and barren waste of limestone rock." The paper, preempting Corps engineer Townsend's subsequent recommendations, suggested that the material could be used for "grading operations."[115] A few days later the same paper reported that Townsend had received a query from Congressman Frank Doremus seeking congressional funding to remove the bank. Townsend reportedly did not recommend such an appropriation since the plan was to remove

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[112] Recalling that there had been a similar bank in the Neebish channel in Saulte Ste. Marie, Townsend remarked that that was "now rapidly being taken away to build a breakwater at Mackinac," arguing that the erosion of the spoil bank in the Detroit River was inevitable.

[113] "'Spoil Bank is Cause of Protest. Grosse Ile Property Owners Take up Matter at Mass Meeting. Committee Named to Carry Objections of Residents to Washington.," *The Detroit News Tribune* June 4, 1911, 30. America's Historical Newspapers.

[114] Newspaper report, *Amherstburg Echo* September 19, 1911, 7. INK-ODW Newspaper Collection.

[115] The paper claimed that the spoil bank housed "enough good building material for the erection of a small city," and "also" served "a useful purpose in obstructing the flow of the river so as to least temporarily compensate for the deepened channel." See "The Livingstone Dyke," *The Detroit News Tribune* December 24, 1911, 4. America's Historical Newspapers.

most of the pile anyway once the channel was complete by transporting parts of the pile to Detroit where it would be used for street work. The rock from the spoil bank had an additional compensatory purpose. Commenting that between the Chicago diversion and the indiscriminate extraction of gravel from the St. Clair River had lowered water levels of the upper lakes by at least six inches, Townsend thought it inevitable that the rock from the Livingstone Channel would be used to construct dams to stabilize water levels.[116]

While Townsend worked on these plans and recommendations, the dry cut ended. Instead of dynamiting the retaining wall allowing the river to rush through, the latter slowly seeped in, like in a ship lock. After water filled the walled section, dredges removed the last of the cofferdams and retaining walls. In its 1911 annual report, the Carriers predicted, that the channel would be "thrown open to navigation about July 1st, 1912." According to the Carriers, "[I]n no other work undertaken by the United States government on the great lakes" had "so much been accomplished in the same length of time as on the Livingstone Channel," as the amount of work done, especially in the dry section, which had "broken all records." This was true despite protests causing "nearly a year of enforced idleness" and Congress increasing channel width within the cofferdam from 300 to 450 feet.[117]

The Livingstone Channel finally opened for navigation in October 1912. Even before this point, there were rumors about a crosscurrent that was more dangerous than first predicted. The *Free Press* reported that vessel operators wanted to wait and see how the big steamers negotiated the walled section of this new waterway. Instead of speculating on the "perilous navigation," the

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[116]"Spoil Bank' Is to Thwart Big Danger on Lakes. United States Official Says Gravel Dealers and Contractors Shall Use It. Orders That Suckers Do No More Work at Mouth of St. Clair. Col. Townsend Declares Government Will Soon Have to Dam Upper Straits to Hold Huron's Level," *The Detroit News Tribune*, December 28, 1911, America's Historical Newspapers.

[117] "Annual Report of the Lake Carriers Association 1911" (Detroit: P.N. Bland Ptg Co., 1912), 41–44, The Haathi Trust, https://hdl.handle.net/2027/mdp.39015010732553.

Free Press thought it inevitable that the Corps would ask for further channel widening because the narrow channel presented a potential risk for the big steamers using it.[118] Shortly before it was declared navigable, the *Free* Press's editorial claimed (again) that the Livingstone Channel was "an American project" much like the "every improvement of any consequence" in the Great Lakes.[119] Poking fun at the Canadians, the editorial said "[O]ur friends in Canada are fond of talking of this vast inland route as international" and insisted on equal rights using it "as freely as Americans themselves."[120] Yet, it was the US government that had bankrolled "the excavations and other expensive improvements."[121] The editorial lauded US expenditure and the continued "use of the results of American capital and energy and instead suggested that the Canadians might want to "moderate their somewhat irritating references to their own contribution."[122]

The next day, the Windsor-based *Evening Record* accused the *Free Press* editorial of being not only "boastful" but also perhaps inaccurate. Without denying American leadership in and paying for improvements, the paper thought Canada's contributions were apt as the "much smaller country." Anyway, "the big percentage of benefit from any expense on our [Canadian] part would have gone to Uncle Sam." Most importantly, American tonnage far exceeded Canadian tonnage, and new channels were needed to accommodate the larger American ships. In the past the Canadians had spent an "immense amount" on the Welland Canal—a fact

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[118] "Lake Marine News. Channel Critics are Premature. Use of Livingstone Route is Best Test if Supposed Perils, Says Vesselman," *Detroit Free Press* September 13, 1912, 8. ProQuest Historical Newspapers. The first instance of the Livingstone Channel being claimed as being American was in 1907. See "Marine News: Dredging New Channel: Work in Lower Detroit River Is Being Pushed, Second Channel Will Lie Wholly in American Waters, and Will Stop Congestion at Lime Kilns—May Be Ready in Two Years."

[119] "Improving the "International" Waterway," *Detroit Free Press* October 6, 1912, D6. ProQuest Historical Newspapers.

[120] "Improving the "International" Waterway," *Detroit Free Press* October 6, 1912, D6. ProQuest Historical Newspapers.

[121] "Improving the "International" Waterway," *Detroit Free Press* October 6, 1912, D6. ProQuest Historical Newspapers.

[122] The editorial commented that the only real piece of infrastructure the Canadians had supposedly built was one lock at the Soo. "Improving the "International" Waterway," *Detroit Free Press* October 6, 1912, D6. ProQuest Historical Newspapers.

overlooked by the *Free Press* according to *The Evening Record.*[123] As Lewis pointed out in the previous chapter, Canadian shipping traffic was tied to Welland Canal's locks which could not easily be modified.[124]

Conclusion

Today, the Livingstone Channel—in width, length, and design (including compensatory dikes)—would make William Livingstone proud as it is exactly what he wanted. When it was first completed, however, the channel was anything but the "pleasant" gesture of "fruition of one's work" that Livingstone claimed it was.[125] The forty months of construction reveal a vantage point to study how Corps and Canadian engineers continued their diplomatic mission, allaying border-induced fears. Before the Commission was invoked, Corps and Canadian engineers were the sole authority on these developments. In working together, these engineers allayed politicians' concerns due to the Amherstburg protests. Most of all, they controlled information flows in both the channels of government and the media. The doctrine of equality in international law ensured equality of status, if not of treatment. Though Amherstburg's protests were important, they merely paused construction which resumed as soon as both federal governments intervened. Canadian anxieties had to be assuaged for the sake of both policy and profit. Without the Corps graciously spearheading both dredging and diplomacy, U.S. domination of both traffic and technology would be impossible. Dispelling Canadian fears about

[123] "International Waterways." *The Evening Record* October 7, 1912, 4. INK-ODW Newspaper Collection.
[124] Macfarlane talks about how being tied to the Welland meant the St. Lawrence Seaway was essentially obsolete the day it was inaugurated. Ollie S Lewis, "A Protectionist View," *The Globe and Mail*, May 6, 1875, 2. ProQuest Historical Newspapers. Macfarlane, *Negotiating a River*, 2014.
[125] "Livingstone Channel Opened. Saturday a Gala Day on the Lower Detroit River—Gunboat Morrell Fires Salute of 21 Guns—Parade of Big Freighters Follows the Str. Livingstone—All Sorts of Craft Take Part in the Ceremony—Veteran Lake Carriers' President Prophesies that Channel Will Be Made Double the Width.," *The Amherstburg Echo* October 25, 1912, 7. INK-ODW Newspaper Collection.

being shortchanged also brought the Corps and Canadian engineers closer. Together these engineer-diplomats worked on balancing politics and people. This equilibrium though was hard to find let alone maintain.

Local activism, centered in Amherstburg grew both in strength and volume, highlighting issues, clearly and consistently. These continued to be the same during the Commission hearings that would follow in 1913. These protests and protestors had laid bare their feelings of being uncared for by the federal government that seemed to leave constituents at the mercy of the Corps and the surreal, spectacular blasting. Progress at what cost, these protestors seemed to ask? Was it worth it if the channel came at the cost of Canadians' sanity and sovereignty? The rise of local opposition did not die down.

Lastly, this ambitious form of river training—a completely human-made canal within the Detroit River—was meant to expand and adapt. The original channel designs were not absolute for a reason, which was not just economics. Designing, building, and realizing artificial waterways were an ongoing experiment, one that used these very projects as the live models. The Detroit River was the model in action, just as the Suez or Panama Canals. Design changes were not just dictated by economics but by fluid dynamics, the predicting of which was difficult without adequate information. Ultimately, engineers were designing in the dark. By building in the room and assuming expansion, they hoped to balance their lack of knowledge with caution. While they were theoretically prepared for a crosscurrent, they were unprepared for its velocity and vitriol of the crosscurrent. Spooking engineers and ship captains alike, the crosscurrent was pure hydraulics. Fluid dynamics is as much a reflection of movement as it is of stasis. Where it used to slow down, the river was now running through the dry cut. Ships in the dry cut sliced the water further, giving it more velocity. The result was the crosscurrent. Thrown to go through a

walled-up channel and then pushed by ships within this new canal, this new body of water moved faster. When this moving body of water hit an obstacle like Bois Blanc Island, it bounced right back as the crosscurrent. Incremental and iterative infrastructure in the form of a compensatory dam—to both lift water levels and thwart the current—to achieve stability again by lulling the river into believing inertia had been achieved. However, the river could not be fooled. As Commission hearings seemed inevitable, binational cooperation was, as the next chapter shows, a lot of bilateral bickering.

Chapter Three

Narrow but Relatively Powerful: The International Joint Commission and the politics of infrastructure in the Detroit River 1912-1917

In October 1912, as figure 3.1 shows, a flotilla of twenty vessels "[p]roudly" passed down the new Livingstone Channel "with flags and pennants fluttering in the breezes, and bearing men representative of various branches of commerce and industry."[1] This convoy, according to *The Globe*, ushered in the "formal opening of one of Uncle Sam's proudest engineering feats and an epoch in American maritime history."[2] Celebratory as this moment was, in the seemingly calm waters in the photo ran a crosscurrent that had already bedeviled ship captains. Despite this vexing current, the Corps claimed that the channel could be "could be made sufficiently safe for navigation" by constructing compensatory dikes that would thwart this current.[3]

Before the inauguration of the channel, both the United States and Canada made a joint reference to the newly created International Joint Commission.[4] In the reference, the Commission was asked to consider two issues. The first was to evaluate if the compensatory dike near Bois Blanc Island was "necessary or desirable" to make the Livingstone Channel safer.[5]

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[1] "Livingstone Channel is formally opened. Epoch in the History of Lake Navigation. Procession of Vessels. Led by Big Freighter After and Piloted by Wm. Livingstone, President of the Lake Carriers Association," *The Globe* October 21, 1912, 13. ProQuest Historical Newspapers.
[2] "Livingstone Channel is formally opened. Epoch in the History of Lake Navigation...."
[3] H. Burgess, Lieutenant Colonel, Corps of Engineers, "Preliminary Examination of Livingstone Channel, Mich," in *Letter from the Secretary of War transmitting, with a letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich., with a view to securing increased width*, House of Representative 65th Congress, 1st Session. Document No. 322, March 1, 1917, 11.
[4] According to the International Joint Commission, a "reference" is defined as "the document by which a question or matter of difference is referred to the Commission pursuant to Article IX of the Treaty." International Joint Commission, "Rules of Procedure of the International Joint Commission," https://www.ijc.org/en/who/mission/principles/rules-of-procedure, accessed March 1, 2022.
[5] "Letter of Reference," in International Joint Commission, "Report on the Livingstone Channel, April 8, 1913. Recommendations in Reply to Questions Submitted by the Governments of the United States and Canada, October 16, 1912. Treaty of May 5, 1910.," 3.

This did not necessarily mean that a dike had to be constructed. The Commission was being asked to evaluate if, in principle, a compensatory dike was needed. If indeed such a dike were necessary, then the second related question was to evaluate existent infrastructure and advise if and where additional works would be needed.[6] Depending on how the Commission adjudicated the matter, there may or may not have been a need for the dike. Since Canada was already examining various channels of the boundary waters system and investigations were incomplete, the Dominion in November 1912 asked the Commission "to refrain" from reporting on the

Figure 3.1: Str. William Livingstone in Livingstone Channel opening day, Oct. 19, 1912.
Source: Library of Congress Prints and Photographs Division Washington, D.C. LC-D4-22739.

[6] Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*, 273.

Livingstone Channel.[7] The Commission granted the request and "postponed further consideration of the reference until such time as the Government of Canada would be prepared to proceed."[8]

However, in December 1912, the Commission nevertheless traveled to Detroit to examine the river, the channel, and the site of the proposed dike, "before the close of the navigation [for the winter], in order to expedite the investigation."[9] In February 1913, with all parties present and ready, the Commission heard detailed arguments from the United States and Canada—ship captains, owners, shipping associations like the Lake Carriers Association, and the Corps —for and against the compensatory dike in the Detroit River. Complaints about the dangerous crosscurrent started as soon as the channel opened for navigation.[10] Since the Corps considered the river to be malleable to engineers' designs, it woefully underestimated and misunderstood the fluid dynamics of the crosscurrent.

Throughout the hearings, the Canadian delegation made the case to examine the downstream effects of the Chicago diversion. Specifically, the Canadians argued that the diversion was affecting water levels in the Detroit River. Over the course of the hearings, the Corps did acknowledge that river improvements were affecting Detroit River water levels and outflow volumes of the Great Lakes in general. Altering the river meddled with natural processes. The effects of this meddling were the crosscurrent, increased river pollution, and the possibility of greater ice flow down the Amherstburg Channel. To the Corps, these effects were reasons for compensatory works. This chapter exposes how seriously the Commission took the

[7] John Thompson, "Re: Livingstone Channel," in International Joint Commission, "Report on the Livingstone Channel, April 8, 1913. Recommendations in Reply to Questions Submitted by the Governments of the United States and Canada, October 16, 1912. Treaty of May 5, 1910.," 4.
[8] "Letter of Reference," in International Joint Commission, 4.
[9] International Joint Commission, 4.
[10] H. Burgess, 1917, 11.

equality provisions of the Waters Treaty. The Commission's report following the hearings did not recommend the compensatory dike as first championed by the Carriers and the Corps. Instead, it suggested an entirely new dike, whose location and impact had not been considered until much later in the hearings. Early environmental diplomacy between the United States and Canada, as these hearings show, was as much about the material manipulation of nature as it was about conservation.[11]

In examining the 1913 hearings, this chapter makes three broad arguments. First, through the course of the hearings, the newly formed Commission was put under enormous pressure from the Corps and the Lake Carriers Association. The Commission's response exposes how seriously the binational body took the Doctrine of Equality of States in its operations, as well as a shift in its priority to mitigating pollution which then paved the way for the coming back of the engineer-diplomat run techno-infrastructural diplomacy. For a brief time, the Commission took over infrastructure development from the Corps and Canadian engineers, controlling interactions with the media as well as the public. Second, these hearings reveal the river as a historical actor as the waterbody responded to river training methods. The creation of the Livingstone Channel caused the river to develop a crosscurrent. The differences between American and Canadian responses to the crosscurrent revealed each nation's deeper anxieties about infrastructure development. Third, these hearings show how close the Carriers and the Corps had become. This was most

[11] In the Progressive era, the federal state in both the United States and Canada came to conserve and regulate nature. The conflicting aims of exploitation versus preservation undergird Canadian history as well, where much like in the United States, scientific knowledge was tool for the federal to make citizens and resources conform to neat modes of use. Whereas in the United States, conservation came to be inextricably related to technocratic elites and experts who led the process, disregarding local realities and knowledge, in Canada, the prowess of the same intellectual milieu was limited, and local issues continued to matter. See Neil Stevens Forkey, *Canadians and the Natural Environment to the Twenty-First Century*, Themes in Canadian History 10 (Toronto: University of Toronto Press, 2012); Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920*, Harvard Historical Monographs (Cambridge: Harvard University Press, 1959); Theodore Steinberg, *Down to Earth: Nature's Role in American History*, 3rd ed (New York: Oxford University Press, 2013)

clear in the emphasis the Corps and the American delegation put on the Carriers as expert witnesses. By the same token, during the hearings, the Dominion Marine Association also weighed into the proceedings, further reinforcing how realistic they were about the power the Carriers and the Corps enjoyed. These hearings then offer key insights into the evolving binational regulatory and policy relationship, engineering science, and boosterism.

Under the 1909 Boundary Waters Treaty, both countries reserved "their existing rights to undertake and carry on governmental works in boundary waters for the deepening of channels, the construction of breakwaters, the improvement of harbors, and such other works as may be conducive to the benefit of commerce and navigation."[12] However, this right extended to all work wholly within US or Canadian territorial waters as well as work that would not materially affect the flow or levels of water on the other side. Neither country could undertake any work affecting water quality such as inhibiting or impinging on drinking or sanitation use in binational waters. These provisions, according to some scholars, "seem to imply" that whenever either country intended undertaking "a project in the boundary waters with a view to improve navigation, that party would be bound to seek the approval of the Commission."[13]

The Commission had powers "to approve use, obstruction or diversion of boundary waters" as well as "waters flowing across the boundary" by either government or private parties in addition to requiring "suitable and adequate provisions against injury of any interests on either" through Articles III, IV, VIII, and X of the Waters Treaty. [14] These powers were specific: "in addition" to the "uses, obstructions, and diversion" that had already been permitted or were to be provided, "no further or other uses" of boundary waters "shall be made except by authority

[12] Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*, 90.
[13] Chacko, 90.
[14] Chirakaikaran Joseph Chacko, *International Joint Commission between the United States of America and the Dominion of Canada* (New York: Columbia University Press, 1932), 86.

of the United States or the Dominion of Canada within their respective jurisdictions, and with the approval of… the International Joint Commission."[15] The United States set an early precedent in seeking the Commission's approval for dredging in the St. Clair River on the American side and constructing compensatory work on the Canadian side.[16] However, in the lower Detroit River, both countries consistently bypassed Articles III and VIII of the Waters Treaty and agreed that the dikes, dams, and new islands would not materially affect flows or levels and therefore needed no reference to the Commission.

Dikes and dams

During the four days of hearings from February 17-20, 1913, the Commission heard from Canadian and American witnesses in Detroit. Witnesses opined on the need for and possibility of a dam or dike.[17] The dike itself was not completed (at least on Lake Survey maps) until 1931.[18] These hearings laid the political and diplomatic framework for the dikes' creation. Despite repeated Canadian protests to the contrary, during the hearings, the Corps, Carriers, and the Commission all reasoned that the binational Commission could not investigate matters outside the given reference—although permissible under the Boundary Waters Treaty. Longstanding Canadian concerns about sewage pollution were, according to the Corps and Carriers, outlandish. Through the course of these hearings, however, the Commission took a more direct role in investigating as well as solving the pollution puzzle. In debating the need for as well the design

[15] Chacko, 86.
[16] Chacko, 90–92.
[17] Throughout the hearings and official correspondence, the words dam, and dike are used interchangeably. In this case, dike is used more often and preferably because unlike a dam that might hold back water, the compensatory dike in question did not end up holding back water, even if it tried pushing back the crosscurrent.
[18] "Detroit River," 1931, Nautical Chart, *Historical Map and Chart Collection,* Office of Coast Survey, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Available at: https://www.historicalcharts.noaa.gov/image.php?filename=LC00041_04_1931_LS

and location of the compensatory dike, these hearings revealed how deeply embedded incremental infrastructure development was in engineering practices structured by Congressional appropriations.

The Commission hearings commenced and ended with the Amherstburg-centered protests still in the background. The resonances of these protests permeated the hearings, framing discussions about the location of the dike as well as the Corp's dismissal of most Canadian concerns and suggestions. Through all of these, the crosscurrent remained the preeminent problem. Unforeseen but not forgotten, the crosscurrent was as much a design problem as it was an existential one for it threatened lake shipping and minimized the very safety the Livingstone Channel was premised on. The only way out, to the Corps and Carriers, was to build more infrastructure. As this dissertation shows, building more infrastructure in boundary waters was both a technological and political challenge. Forever ensnared in border anxieties—local, regional, national—structures in the water, whether submerged or exposed, revealed ramparts of the political divisions between the two nations' ideas about the Great Lakes and nature in general.

During the hearings, the crosscurrent, according to the Carriers and the Corps, presented as an undeniable threat to lake shipping, as much as the Canadians denied the same. The Commission hearings were a platform to air out anxieties. In refereeing between the two nations, the Commission took over the subsequent narrative about the dike. Drawing upon Corps' and Canadian engineers' long decades of diplomacy, the Commission furthered this consular mission, emphasizing binational needs instead of local or even national ones, for a few months, before being succeeded by the Corps and provincial engineers again. In taking over dike questions from engineer-diplomats, the Commission also took over the responsibility of speaking

to the press. The Commission's reputation as an impartial evaluator fitted in with trends in early twentieth-century journalism, as newspapers aimed for objectivity and moved away from partisan reportage.[19] The Commission's effective communication of its achievements, limitations, and ambitions, regarding the compensatory dike, went a long way in reinforcing its ability to portray itself as a truly binational body. The previous chapter showed that the lack of a body like the Commission made communications more fraught when both nations disagreed. This chapter will show that in handling communication with newspapers, the Commission not only took over very effectively from the Corps, but it also set a new tone for techno-infrastructural diplomacy along the Detroit River.[20]

Over the course of the hearings, as the Commission heard all sides, it also created a niche for itself that would continue to define its work until today. From weighing the need for a compensatory dike to weighing in on pollution, through the course of the hearings, the Commission had carved out a function for itself. The Commission followed the doctrine of Equality of States in both spirit and letter, listening to both sides equally.[21] It also took the restrictions imposed on it through the narrow scope of the inquiry very seriously. Over the multiple days of statements, counterstatements, and questions, it was obvious that pollution and

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[19] Richard L Kaplan, *Politics and the American Press: The Rise of Objectivity, 1865-1920* (Cambridge, U.K.; New York: Cambridge University Press, 2001).

[20] In his chapter on the Central Commission for the Navigation of the Rhine, Spaulding shows the inextricable relationship between print culture, international governmental organizations, and private sector organizations. Drawing from Spaulding, I show that without the cataclysmic change towards objectivity in print media, the work of the Commission would have been even more fraught. Robert Mark Spaulding, "The Central Commission for the Navigation of the Rhine and European Media, 1815–1848," in *International Organizations and the Media in the Nineteenth and Twentieth Centuries: Exorbitant Expectations*, ed. Heidi Tworek, Jonas Brendebach, and Martin Herzer (London: Routledge, 2018), https://doi.org/10.4324/9781351206433. See also Richard L Kaplan, *Politics and the American Press: The Rise of Objectivity, 1865-1920* (Cambridge, U.K.; New York: Cambridge University Press, 2001).

[21] The Doctrine of Equality of States is an enshrined principle of international law with respect to the inherent parity between two nations when it came to questions about sovereignty and territorial integrity. This doctrine has evolved is not without its controversies. Herbert Weinschel, "The Doctrine of the Equality of States and Its Recent Modifications," *American Journal of International Law* 45, no. 3 (July 1951): 417–42, https://doi.org/10.2307/2194542.

the crosscurrent were related. By the end of the hearings, the Commission had decided to study both the question of water levels and pollution. The regulation and mitigation of pollution became one of the core areas of the work of the Commission, even though it still adjudicated the fate of the compensatory dike. These boundaries about what it could investigate also laid the seeds of cooperation by both governments to bypass this binational organization when needed, as the next chapter will show. Through these hearings then, we can trace the beginnings of the Commission, paying attention to how it defined itself, its zone of influence, as well as its ability to communicate its actions.

Much of the extant work on the Commission has focused on its later role in mitigating and regulating pollution.[22] However, there is little work trying to understand the early years of the Commission when it developed and communicated its mandate and mission. This is also important considering the lack of scholarly engagement on how intergovernmental organizations exert their agency. In his book chapter on the Central Commission for the Navigation of the Rhine, Robert Mark Spaulding remarks that to understand the ways these organizations exerted their agency, it would be important to understand "how intergovernmental organizations communicate their existence, purpose, structures, functions, and other elements of their operations to their intended audiences."[23] Thus, in studying how the Commission communicated the compensatory dike reference, this chapter responds to Spaulding's call.

One way in which the Commission effectively communicated its function and purpose was by listening to everyone involved, even if it could do nothing about some issues. One of

[22] One of the earliest works on the Commission was by Chacko in 1932. Until the recent work by Macfarlane and Clamen, Chacko's work remained one of the few comprehensive engagements with the International Joint Commission. Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*; Clamen and Macfarlane, "The International Joint Commission, Water Levels, and Transboundary Governance in the Great Lakes"; Macfarlane and Clamen, *The First Century of the International Joint Commission*, 2020.
[23] Spaulding, "The Central Commission for the Navigation of the Rhine and European Media, 1815–1848," 34.

these recurrent issues was the Chicago diversion. Great Lakes scholars are conversant with the diversion and its impact.[24] However, there is little or no work on how this diversion impacted downstream infrastructural considerations such as the compensatory dike in the lower Detroit River. Throughout the hearings, Canadians and Americans debated the impact of the Chicago diversion on water levels in the Detroit River and the Great Lakes in general. As much as the Corps' engineers tried to downplay the diversion's effects, they eventually acknowledged that drawing large volumes of water away from Lake Michigan at Chicago was related to the lower water levels in the Detroit River. Their solution to this problem remained a compensatory dike, as the hearings show.

In closely following the Commission hearings, this chapter also reveals the comity between the Carriers and Corps. By tracing this unique and close relationship between boosters and a technocratic and governmental body like the Corps, this chapter offers an important historiographical corrective. There is little or no work analyzing this unique booster mentality. In his work on Chicago, William Cronon discusses booster mentality, showing the combination of the visionary and the practical that made Chicago the perfect subject for such ambitions. He shows how boosters identified and worked from a symbiotic model of urban and regional growth.[25] The close relationship between shipping lobbies like the Carriers and a government body like the Corps has not yet been analyzed. Their relationship deeply impacted regional and international relations and development. The Carriers today identify themselves as "one of the oldest active trade associations in the country" who do not "engage in marketing per se other

[24] Changnon and Changnon, "History of the Chicago Diversion and Future Implications," January 1996; Naujoks, "The Chicago Water Diversion Controversy, III"; Daniel Macfarlane, "Natural Security: Canada-US Environmental Diplomacy," 2019; Macfarlane, *Negotiating a River*, 2014.
[25] William Cronon, *Nature's Metropolis: Chicago and the Great West*, 1st ed. (New York and London: W.V Norton & Company, 1991).

than general promotional activities that educate legislators, regulators, and the general public on the role and importance of Great Lakes Shipping."[26] The Carriers' close relationship with the Corps was an example of a unique boosterism. This chapter traces how it shaped the creation of a completely human-made waterway in the Detroit River along the international border.

Integration and Economies of Scale

On April 1, 1913, the magneto assembly line was installed in Ford's Highland Park plant. Line assembly was achieved around August 1913, which although crude was "phenomenally successful in increasing productivity."[27] Within a year, virtually "every assembly operation at Ford" was on a moving line, making the whole production process immensely more efficient.[28] Emerging "in a specific place (Detroit), a specific time (between 1908 and 1913), in a specific industry (the automobile industry)," the assembly line was a culmination of an "ongoing cultural process" that relied on robust supply chains that would ensure the requisite raw materials got to the factory in time.[29] Workers did not welcome the machine system. The turnover rates at the Highland Park factory were astronomical, straining not just administrative machinery but more importantly operations at the plant.[30] Furthermore, there were growing signs of unionizing at the Ford factory, and there had already been strikes at other automakers. To relieve these pressures,

[26] Lake Carriers' Association, "About Our Organization," Lake Carriers' Association, accessed January 2, 2022, http://www.lcaships.com/about/.
[27]David A. Hounshell, "The Ford Motor Company & the Rise of Mass Production in America," in *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States* (Baltimore: Johns Hopkins University Press, 1985), 253, https://hdl.handle.net/2027/heb.04049.
[28] Vernon W. Ruttan, *Is War Necessary for Economic Growth? Military Procurement and Technology Development* (Oxford ; New York: Oxford University Press, 2006), 30.
[29] David E. Nye, *America's Assembly Line* (Cambridge, Mass: The MIT Press, 2013), 2–3.
[30] Meyer in his book provides an insightful discussion on the company's efforts to reduce turnover rates prior to the introduction of the five-dollar day. See Stephen Meyer, *The Five Dollar Day: Labor Management and Social Control in the Ford Motor Company, 1908-1921*, SUNY Series in American Social History (Albany: State University of New York Press, 1981).

Ford management conducted labor reforms in 1913. These included a reevaluation of jobs to bring them into parity with one another, special raises to efficient employees, and an across-the-board pay increase. However, Henry Ford had become increasingly concerned about the inequities between salaried employees and company directors, the high turnover rate, and growing signs of unionization. Ford proposed a "quick" solution to all three problems—the five-dollar day—adopted in January 1914.[31]

Soon enough though, Ford realized that the Highland Park plant was not large enough to sustain production and was dependent on railroads alone to bring materials into the factory. As early as 1913, Ford was thinking about a new location for a larger and ultramodern factory. According to an institutional history of the Rouge plant, Ford had his eye on land near the Rouge River's mouth for a multitude of reasons. Not only was this land ripe for development, but Ford also knew of the Corp's recent dredging of the river's mouth and their proposal to create a turning basin about three miles up the river underway. The mouth of the Rouge, then, was a propitious location. This location held the distinct possibility of continued help from the Corps to maintain a deep and wide channel that could handle vessels transporting raw materials to the new plant.[32]

Ford's close friendship with William Livingstone possibly influenced his site choice. Livingstone provided Ford with details about the Corp's dredging operations from 1888 to 1912, in addition to describing the work that the federal government had already committed to. This commitment, Livingstone supposedly pointed out, "would be of substantial benefit to Ford in building a manufacturing plant on the Rouge River."[33] The location was easily accessible from

[31] Hounshell, "The Ford Motor Company & the Rise of Mass Production in America"; Meyer, *The Five Dollar Day*. Meyer argues that the five-dollar day was more than just a wage but a profit-sharing plan.
[32] Ford R Bryan, *Rouge Pictured in Its Prime: Covering the Years 1917-1940*, 2014.
[33] Bryan, 15–20.

important thoroughfares as well as labor-rich districts. Planned dredging operations would ensure easy access from and to the Detroit River. Finally, Ford officials were prescient to upcoming changes—thanks in part to the Commission taking an active role in surveying and mitigating water pollution—in sewage treatment requirements for industries; the Rouge River location gave the factory enough room to build any mandated sewage treatment infrastructure before releasing treated waters into the Rouge and thence the Detroit River. The die was cast—the banks of the Rouge River were best suited for the new plant.[34]

Across the river, in the summer of 1914, in the provincial elections, the Liberals swept across Essex including the newly created Windsor riding, even though the Conservatives maintained their grip on both Ontario and Canada. By then Ford Canada, in Windsor, was already a decade old. The town was now even more enmeshed in emerging supply chains and tied more directly to Detroit. Windsor's Liberal turn was related to this cross-border relationship. Liberal politicians had long been more supportive of open borders and economic integration. The "development of a prosperous cross-border economy translated into the extension of transnational culture."[35] Yet any plans for greater integration were quashed when Canada was obligated to join the war as a dominion. Windsorites were reluctant about this move. The United States was yet to join the war. Detroit and Windsor had a permeable if not always amiable border.[36] By 1915, Windsorites' early hope that cross border relations would remain unaffected had melted away, giving way to greater cross border regulation into Canada from Detroit.[37] Meanwhile, even as Americans were committed by President Wilson to remain neutral during

[34] Bryan, 19–20.
[35] Brandon Dimmel, *Engaging the Line: How the Great War Shaped the Canada-U.S. Border* (Vancouver: University of British Columbia Press, 2016), 27.
[36] John J. Buckowczyk et al., *Permeable Border: The Great Lakes Basin as Transnational Region, 1650 - 1990* (Pittsburgh PA: University of Pittsburgh Press; University of Calgary Press, 2005).
[37] Brandon Dimmel, "Sabotage, Security, and Border-Crossing Culture: The Detroit River during the First World War, 1914-1918," *Social History* 47(94) (2014): 401-19

the war, several Detroiters crossed the river and the border to join the war effort, joining the 99th battalion and later the 241st Essex and Kent Scottish.[38] By the time the United States joined the war in 1917, Canadian newspapers like *The Evening Record* had long feared that the war would cost Canada dearly "by killing its best men."[39]

The entry of the United States into the war pushed Ford's factories into manufacturing defense products. President Wilson had asked Ford to serve on the U.S. shipping board with the hope that the former would infuse ideas about the mass production of cargo ships. Instead, Ford suggested mass-producing submarine chasers to eliminate enemy submarines. The partially constructed Rouge site, "because of its embryonic ship canal, was promptly put to use building small seagoing submarine chasers."[40] The growing industrial footprint of Detroit structurally transformed the spatial fabric of the city.[41] The factory order fundamentally altered the ethnic ordering of neighborhoods in Detroit. The city's growth "into an industrial giant and subsequent extension of the city's space" also fostered a shift from a city with one center to one with multiple nuclei.[42] With its multiple factories, port, railroad terminals, and tertiary activities, "its well-separated production and consumption suburbs, its giant territory, and its diverse population" by 1920, Detroit "had become a symbol of urban-industrial America."[43] Lake shipping lay at the core of these developments. The ability to transport enormous amounts of raw

[38] Brandon Dimmel, *Engaging the Line: How the Great War Shaped the Canada-U.S. Border* (Vancouver: University of British Columbia Press, 2016), 38 and Patrick Brode, *Border Cities Powerhouse: The Rise of Windsor": 1900-1945* (Windsor ON: Biblioasis, 2017), 60.
[39] Brandon Dimmel, *Engaging the Line: How the Great War Shaped the Canada-U.S. Border* (Vancouver: University of British Columbia Press, 2016), 33.
[40] Bryan, *Rouge Pictured in Its Prime*, 25.
[41] Olivier Zunz, *The Changing Face of Inequality: Urbanization, Industrial Development, and Immigrants in Detroit, 1880-1920*, Paperback edition (Chicago London: The University of Chicago Press, 1983), 8.
[42] Zunz, 308.
[43] Zunz, 309.

materials to factories, especially the Rouge plant, was essential. Thus, the Livingstone Channel hearings in 1913 were very significant for everything that followed.

Walking along the river bottom

The Commission hearings were to consider the need for dikes to help thwart the crosscurrent, as well as pollution issues raised by local protests that had prompted the Dominion to withhold permission and refer the matter to the binational body in the first place.[44] Figure 3.2 reveals the outcome of the hearings, outlining the diverse options considered. Following the contour lines in the figure reveals the uneven depth and rocky river bottom. One slight incorrect move at the end of the dry cut section could ground a vessel since the surrounding area was only about six feet deep. A crosscurrent as dangerous as the Carriers claimed, could indeed send many a vessel to its doom in such an uneven area. The first iteration proposed was to run between the dry cut and Bois Blanc Island. The rationale for this dike was that it would diffuse the current by reflecting it, and the gap in the dike would allow the movement of tourist steamers. The second possibility was a dike parallel to the channel, on its sides. In this iteration, one of the dikes of the dry cut would be extended with a gap between the extension and the new dike for tourist steamers. The third proposal—initially immediately dismissed by the Corps—was a dike parallel to the channel, in American waters. The basis behind this proposal was that it would both contain the current and allow a safe waterway. Figure 3.3 shows the progression of the compensatory dikes beginning with channel construction in 1907. At the end of the 1913 hearings, the third dike was constructed. In 1919, an extension was approved, and then another in 1921. A decade

[44] *The Evening Record* published a piece in February 1913, with the headline "Amherstburg Dyke to be Protested," in which the paper argued that local protests had led the Dominion Government to hold back permission for the dike and refer the matter to the Commission. See "Amherstburg Dyke to be Protested," *The Evening Record,* February 3, 1913, 5. INK ODW Newspaper Collection. See also "Marine: To Investigate Dike Controversy. International Joint Commission Will Open Next Hearing in Detroit, Next Monday," *Detroit Free Press,* February 14, 1913, 16. ProQuest Historical Newspapers.

later in 1931, there was another system of dikes that eventually created a human-made island north of Bois Blanc Island and a perpendicular dike from Stony Island that met the extended parallel dike. Figure 3.4 is a contemporary drawing of the lower Detroit River. The incremental compensatory dikes that first originated in the 1913 hearings have now been extended. The original dry cut is wider by nearly 600 feet, and the original compensatory dike is now over two miles long, with another of similar length on the other side. The gap between the two sets of dikes is called a "hole in the wall."[45]

The Livingstone Channel was meant to be a panacea for the chokepoint in the lower Detroit River by providing safe, efficient, and reliable unidirectional passages to and from Lake Erie. The 300-feet opening of the dry cut, according to the Carriers at least, was almost obsolete, narrow, and dangerous according to some ship captains. Even though over 1200 vessels went down the channel without any serious accidents in the 1912 shipping season, during their testimonies American ship captains under the aegis of the Carriers complained about the formidable dangers of the crosscurrent and the need for a compensatory dike. Given the lack of accidents, the Dominion Marine Association, on the hand, did not agree. The contradictions between the Carriers and the Dominion Marine Association's responses to the

[45] "Hole in the Wall," https://mapcarta.com/22338164 .

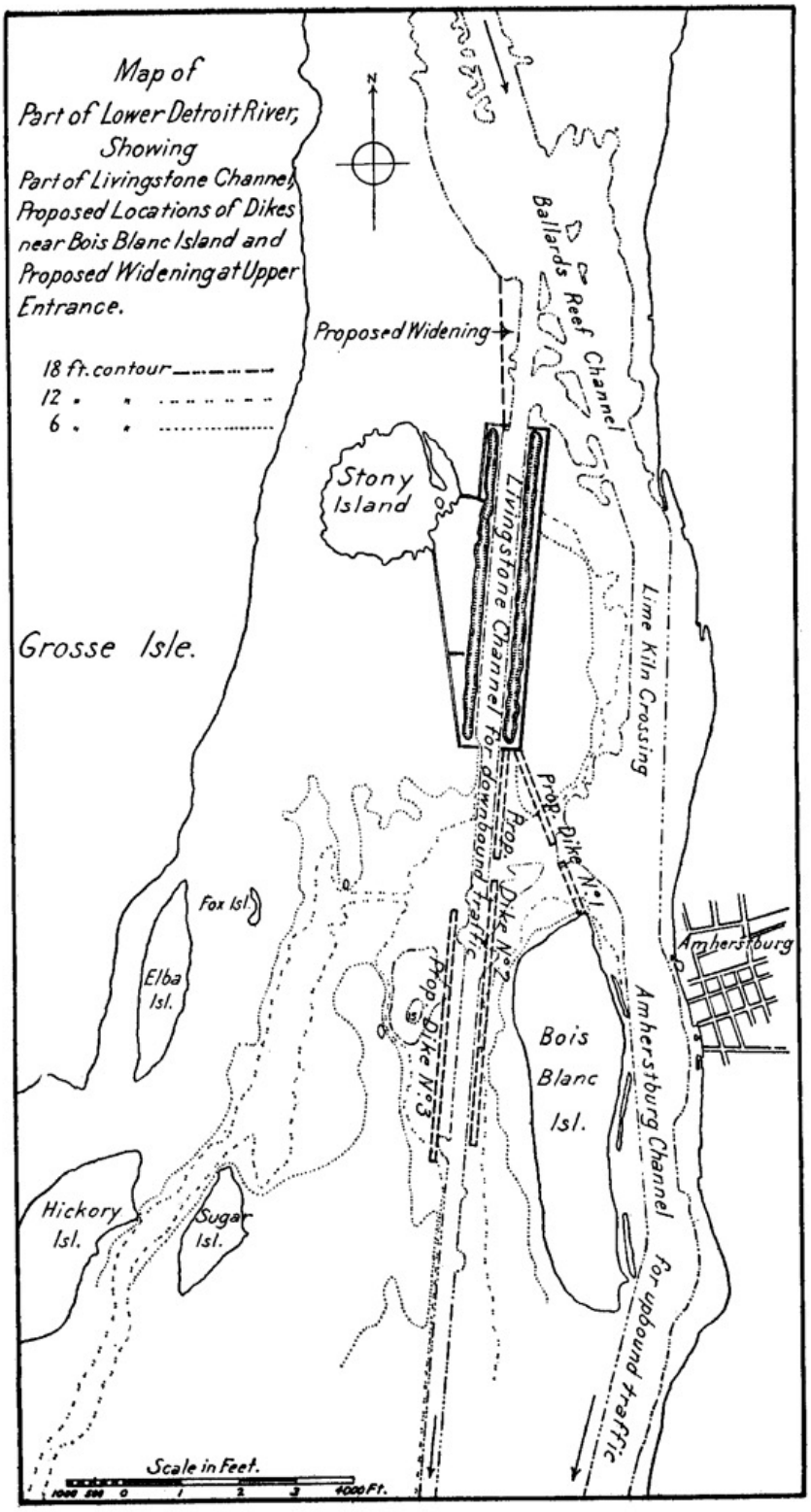

Figure 3.2: Map showing proposed dikes as part of the 1913 hearings.
Source: International Joint Commission, "Report on the Livingstone Channel, April 8, 1913. Recommendations in Reply to Questions Submitted by the Governments of the United States and Canada, October 16, 1912. Treaty of May 5, 1910," IJC Files, 13

crosscurrent and compensatory dike were striking enough that the *Free Press* remarked that both groups were talking past each other.[46] While the Carriers insisted that all their captains were unanimous in their defense of the dike, the president and general manager of Detroit &Windsor Ferry Company claimed to have not faced the crosscurrent. The ferry company thought the dike would make ferry docking difficult.[47] Despite local opposition and Canadian ship captains' concerns about water levels and the overall lack of crosscurrents, by 1918, the U.S. Government had approved expansion and widening.

There was broad consensus on the need for a wider channel from both nations, although there were questions about why, where, and when a compensatory dike should be built. Repeatedly, the Canadians raised questions about the relationship between the compensatory dike and the diversion. In its original plan, the Livingstone Channel's dry cut was meant to be expanded, pending negotiations. This was not a novel problem confronting an infrastructural project.[48] The novelty lay in the response, at the institutional level through the Commission and, at the design level through the compensatory dike. The Commission hearings laid bare the chasm between the American and Canadian positions on infrastructure development. Whereas the Americans emphasized the need for and advantages of piecemeal, local improvements such as

[46] "Picks Site West of Channel for Livingstone Dike. International Joint Commission Disapproves Dam at Bois Blanc. Argues Compensatory Work is not needed. Board believes 4,400 Foot Wall on American Side Will Stop Cross Currents," *Detroit Free Press*, April 18, 1913, 15, ProQuest Historical Newspapers.
[47] The newspaper claimed that Walter E. Campbell, the president, and general manager of the ferry company warned that the dike might produce a strong crosscurrent in the Amherstburg Channel, even with the gap. "Marine: Insist That Dike in Lower River is Unnecessary. Canada's Hydrographer and Engineer Would Apply Remedy at Chicago. Cross Current Eludes W.E. Campbell's Search," *Detroit Free Press,* February 19, 1913, 9. ProQuest Historical Newspapers.
[48] In *Improvising Planned Development,* historian Maurits Ertsen offers a novel re-reading of the Gezira irrigation scheme in Sudan as a continuous negotiation between the various actors instead of the hitherto centrally planned scheme. See Maurits W. Ertsen, *Improvising Planned Development on the Gezira Plain, Sudan, 1900 - 1980*, Palgrave Studies in the History of Science and Technology (Basingstoke, Hampshire: Palgrave Macmillan, 2016).

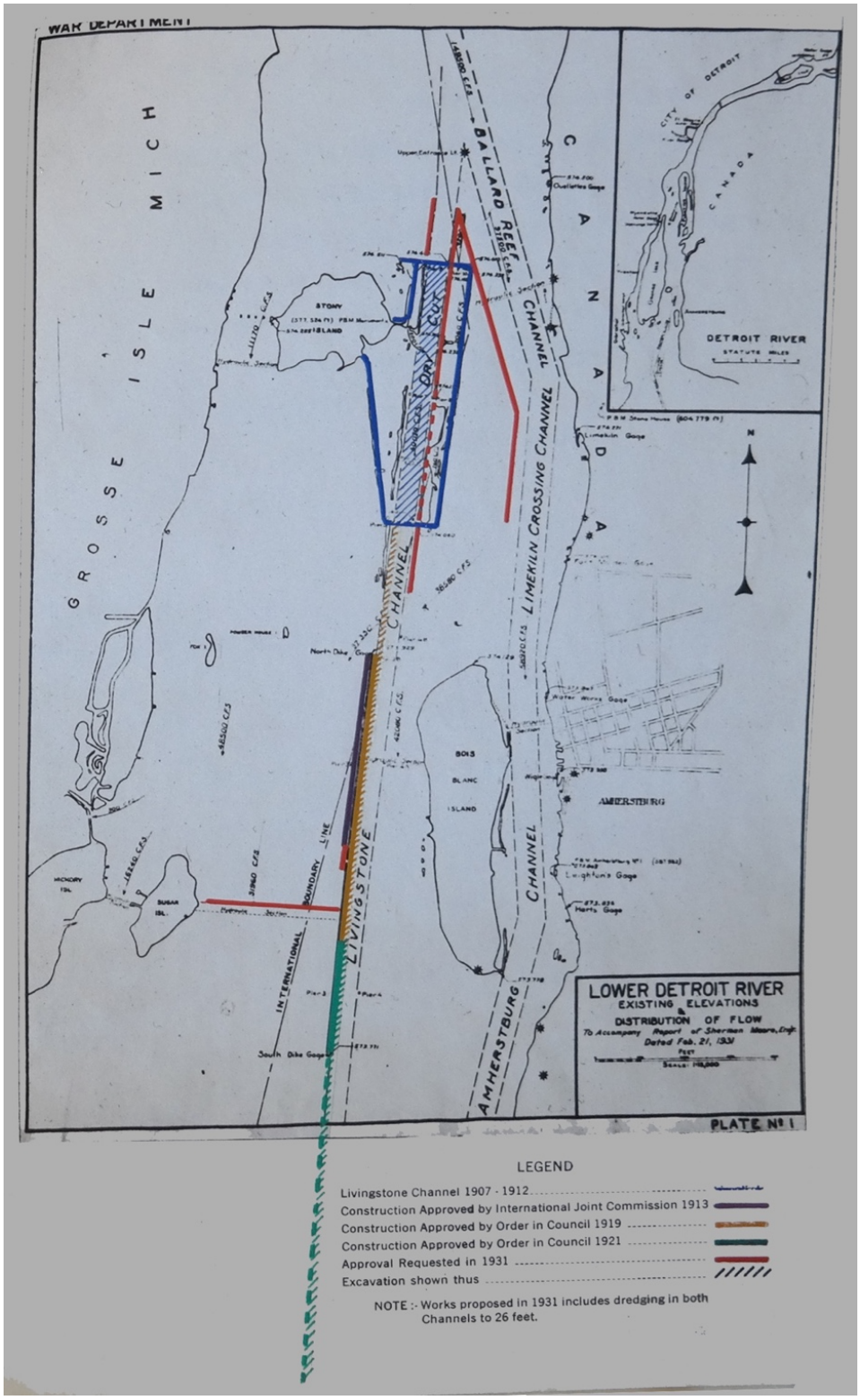

Figure 3.3: Chronology of dikes and compensatory works.
 Source: Library and Archives Canada/Department of External Affairs fonds/RG 25, vol. 1603, file 585 part 1.

the compensatory dike, the Canadians consistently raised questions about the impact of the Chicago diversion on the Great Lakes as a whole. The Chicago diversion was a recurring theme. Despite its "alleged vital connection with the boundary waters" over which the Commission had both judicial and investigative powers, the Chicago diversion was not the subject of a joint

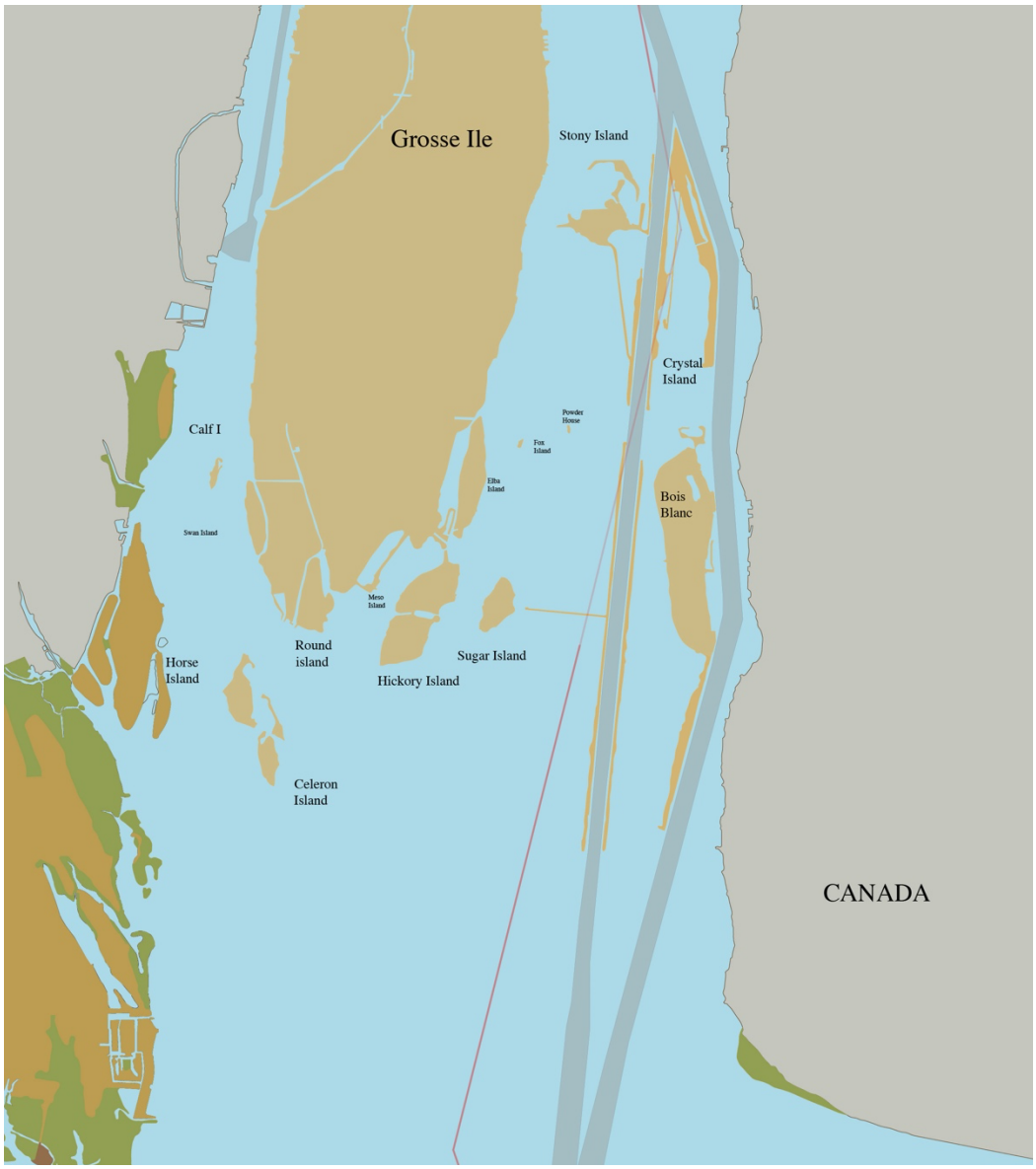

Figure 3.4: Contemporary rendering of the Livingstone Channel, Bois Blanc Island, Stony Island, and Crystal Island. Source: © Ramya Swayamprakash

reference from both nations.[49] Thus, under the Waters Treaty's framework, the Commission could have examined the diversion, either as part of the hearings or separately. The compensatory dike as considered by the Commission was an acknowledgment of the effects of dredging. The Commission's consideration of a dike was also a response to the aftereffects of dredging, one that was specifically iterative and incremental in design.

In the lower Detroit River, this compensatory dike was the first of its kind. Throughout the twentieth century, these compensatory dikes became standard responses to increased outflows or pollution. Eventually, in the latter half of the twentieth century, these dikes also stored extremely polluted dredged material—Confined Disposal Facilities (CDFs)—that are now the norm in the Great Lakes. The expansion was built into the original design of the diked section of the Livingstone Channel. Acquiescence for the same by the U.S. government was unsurprising.

Hearing out both sides

In February 1913, at the Federal Building in downtown Detroit, the Commission investigated the question at hand: the need for and possible location of a compensatory dike. The hearings were open to the public, with notices having been published in cities and towns on both banks of the river. Representatives from both countries testified, including the assistant to the Attorney General of the United States as well as officials and locals from Amherstburg, Malden, Essex County, and the Province of Ontario, the Windsor & Detroit Ferry Company, and the Dominion Marine Association and Canadian shipping interests.

[49] Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*, 245.

Broadly, the Dominion Government opposed the dike because it believed a "piecemeal policy in the development of navigation interests and other mutual interests on boundary waters" was not to "the ultimate advantage" of both countries, for two interrelated reasons. The first was that there were ongoing investigations about a submerged weir in the Niagara River to increase Lake Erie water levels. The Canadians believed another low dike to raise water levels and ward off the crosscurrent would be counterproductive. The second reason the Canadians opposed the dike was the need to investigate the Chicago diversion, which was the root cause of the Niagara and Detroit rivers' dikes. Failing such an analysis of the interrelatedness of all waterways within the lakes "it would appear undesirable at the present time for either Government to commit itself to a policy of compensatory works at individual points." Even if the proposed dike were constructed, the Canadians argued that it would only "just about restore at the head of the Livingstone Channel" the decreased water levels due to the diversion.[50] Without rectifying the diversion, the Dominion repeated at every opportunity, any attempts to compensate downstream were missing the forest for the trees. Eliminating the diversion at Chicago would restore water levels, thus nullifying the need for any local compensatory structures.

Unlike the Corps who sought to limit such questions to the local issue at hand, the underlying Canadian argument was to understand the Livingstone Channel in a larger context. The Canadians hoped to show how interrelated the immediate and downstream dike was with upstream diversions and compensations. This was not the first or the last time the Canadians mentioned the diversion, and it remained a thorny issue well into the mid-twentieth century.[51]

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[50] "Memorandum Re Livingstone Channel Dike," statement read by K.C. White, in International Joint Commission, *Testimony in Re The Livingstone Channel on the Reference of the Governments of the United States and the Dominion of Canada Under Title IX of the Treaty of May 5, 1910* (Washington DC: Government Printing Press, 1913), 13-4, https://www.loc.gov/item/13035458/.

[51] Clamen and Macfarlane, "The International Joint Commission, Water Levels, and Transboundary Governance in the Great Lakes"; Daniel Macfarlane and Murray Clamen, *The First Century of the International Joint Commission*, 2020.

Canadian opposition to the compensatory dike was not borne out of antagonism to the trade but out of the realization that such breaking would be detrimental to commerce in the long run. Geographer Patrick McGreevy designated Niagara Falls as the "end of America and the beginning of Canada," highlighting the differences between the two nations in understanding the falls and the Great Lakes broadly.[52] Understanding the Great Lakes more holistically, the Canadians argued, would aid the creation of infrastructure that would help lake trade sailing all along the political border.

The Canadians believed that if the Commission was dealing with the problem of the Livingstone Channel "they should deal with those in other places" such as Chicago and Niagara, a sentiment echoed in coverage by the *Evening Record*.[53] To be sure, Canadian opposition was not rooted in nor was it a meditation on the pristine nature of the lakes or the need to preserve nature. If anything, to the Canadians, the alacrity with which the Corps wanted to build piecemeal infrastructure defied the logic of the very trade it wanted to foster. The way the Canadians saw it, the compensatory dike was futile simply because it was not considering the larger Great Lakes context. In trying to revert the conversation to the Chicago diversion, the Canadians were making a case for thinking about the lakes as one connected series of waters, as the Waters Treaty had laid out. Thinking about the lakes holistically, would also, the Canadians

[52] Patrick McGreevy, "The End of America: The Beginning of Canada," *The Canadian Geographer / Le Géographe Canadien* 32, no. 4 (1989): 307–18.
[53] "Canadians Strongly Oppose Construction of Amherstburg Dike. Will Prove Menace to People of Down-River Town—Dr. Hodgetts, Col. Lamb and others give evidence protesting on scheme," *The Evening Record* Vol 22, No. 275, February 19, 1913, 1. INK ODW Newspaper Collection. See also "Canadians Opposing Diversion of Water for Chicago Drainage Canal. Declare that to be greatest problem confronting commission—dike arguments are concluded—render decision at April Meeting in Washington," *The Evening Record*, February 20, 1913, 1-2. INK ODW Newspaper Collection.

hoped, show that the American intervention in the Chicago River was running contrary to the spirit of the Waters Treaty.[54]

The crosscurrent driving the compensatory dike question, the Canadians further argued, was not such a severe threat as the Carriers claimed. The 1,227 vessels that had successfully navigated the channel from October to December 1912, without a single grounding, were "silent witnesses" to the lack of danger from the crosscurrent.[55] Canadian ship masters did not dispute the presence of the crosscurrent but added that it could be negotiated—highlighting similar experiences in every new waterway in the lakes including the Soo Locks in the St. Mary's River—if vessel men were willing to learn. The overall arc of Canadian opposition drew upon the Amherstburg-centered protests highlighted in the previous chapter, namely: possible increased ice flow that could damage the town's waterfront, greater sewage pollution, and irrevocably damage the town's potable water supply source.[56] Furthermore, the Canadians argued that the ship draft was governed not by the Detroit River channels but by the locks up at Saulte St. Marie. Thus, deeper, and wider channels downstream did not mean vessels could pass through the locks upstream.

As soon as the Canadians articulated their arguments, the Commission retorted by reinforcing the "limited" reference to the compensatory dike alone and, therefore the binational body could not "go outside" and examine the Chicago diversion. The Canadians remained confident that they would be able to prove their point about the diversion.[57] The primary

[54] There is some scholarship and acknowledgement that the Canadians were shortchanged from the beginning because the Boundary Waters Treaty's guiding principle was the extremely nationalistic Harmon Doctrine. See I. A. McDougall, "The Development of International Law with Respect to Trans-Boundary Water Resources: Co-Operation for Mutual Advantage or Continentalism's Thin Edge of the Wedge," *Osgoode Hall Law Journal* 9, no. 2 (1971): 265.
[55] International Joint Commission, "Testimony in Re the Livingstone Channel, on the Reference of the Governments of the United States and the Dominion of Canada, under Article IX of the Treaty of May 5," 178.
[56] International Joint Commission, 14.
[57] International Joint Commission, 15.

American argument was that the compensatory dike would help prevent the lowering of water levels due to channel expansion and eliminate the dangerous crosscurrent—combining compensation and safety features. In their testimonies, American shipmasters repeatedly voiced concerns about the dangerous crosscurrent as well as the nighttime channel lights that were useless in a thick fog. They claimed the current's onset was sudden and powerful about halfway down the length of the dry cut (see figure 3.2). The entrance to the Livingstone Channel was not clearly marked, they argued, and the flickering lights (along with the crosscurrent) made night navigation too hazardous to attempt. Just days after its opening, the Livingstone Channel had become infamous for its crosscurrent, if American shipmasters were to be believed. American witnesses, then, tended to weigh in on the proposed dike design, site, as well as its impact both on the crosscurrent in the Livingstone and Amherstburg channels.

What are we to make of this recurrent assertion about the crosscurrent by the Carriers, ship captains, and Corps engineers, especially when there were no accidents in the first season? When it was envisioned, the dry cut section was supposed to function like any other canal allowing smooth passage. Until the dry cut, engineers had not conceived of a artificial waterway within a waterway in the Great Lakes. Whether it was the Soo where ships went up locks, or the Flats where ships used dredged channels, engineers had operated alongside nature. The Livingstone Channel's dry cut was different. Operating an open canal within a river was vastly different from managing ship locks to bypass rapids. Vessels initially went into the dry cut at full speed, setting off the current. In the narrow walled-up sides, a small incorrect maneuver could mean a vessel could strike the walls and be grounded or worse, sink. Until such a vessel could be extracted, the channel would be unable to handle more traffic. The dry cut acted like a funnel. Ships going fast cut through the water, sending short waves that struck the channel walls. As a

ship went down the cut, it pushed the waves that bounced back from the wall, forward. Once out of the dry cut, these swift waters would strike nearby islands and dikes before bouncing back towards the channel area through the crosscurrent. Velocity gave ships the edge in dealing with the crosscurrent within the dry cut. Yet once out of the narrow dry cut, velocity did not give an edge. If anything, velocity reduced the ability to control in the face of a crosscurrent.[58]

The dry cut was only about a mile in length in an 11-mile-long channel. Once out of the cut, vessels still had to negotiate the rest of the waterway where they encountered uneven depths. Navigational range lights aided movement through the dredged channel since river depth was uneven. Vessels that were going fast to avoid the crosscurrent were in danger of not having enough control in negotiating the rest of the dredged channel which was not walled but bordered by uneven depths and boulders. A slight variation from the dredged channel at high speeds could be disastrous. The safe negotiation of the channel required a wider dry cut which would give ships more room. Any accidents in the narrow dry cut would create bottlenecks until the stranded ship could be cleared, a tricky operation made even more difficult due to the lack of room in the walled section. Given the high tonnage volumes, the dry cut was a busy waterway.[59] A ship running aground in or around the cut would be catastrophic.

In their opening statement, the Canadians articulated their longstanding opposition to the dike, doubting its efficacy and amplifying its possible ill effects on Amherstburg. Whilst

[58] During his testimony, W.J. Stewart recalled the specificities of the impact of ships going full steam (10 miles an hour) through the walled section arguing that going a little slower (at about 8 miles an hour) might be more beneficial as it allow ship captains more control once they exited the walled section. International Joint Commission, "Evidence on Behalf of Canada Testimony of William J. Stewart," 104, in "Testimony in Re the Livingstone Channel, on the Reference of the Governments of the United States and the Dominion of Canada, under Article IX of the Treaty of May 5," (Washington: Govt. print. off, 1913), https://www.loc.gov/item/13035458/.
[59] There was a great deal of correspondence between the United States and Canada about special navigational rules for the new Livingstone Channel which addressed the size of vessels that could pass through as well all the dangers and rules these vessels had to follow to ensure safe passage. in *Improvement of Livingstone Channel. Detroit River,* RG25-A-3-a, Volume 1244, File No 1919-607, Library and Archives Canada.

acknowledging that the current was a "serious menace to the navigation of this part of the river" they stated that if anyone could navigate the channel safely, it would be the "[ship] masters of the Great Lakes." The compensatory work was not "altogether a necessity" because the channel was still handling traffic. If it were as unsafe as the Americans claimed, traffic would not use the channel, the Canadians reasoned. Hesitation about a new channel, especially from a safety perspective, was an understandable sentiment. Similar concerns were voiced by the Canadian canal at the Soo locks but over time ship captains learned to navigate it without issue.[60] Canadian witnesses reiterated their belief that over time ship captains would learn to navigate the channel safely.[61] The compensatory dike "would probably be a very nice improvement to have," but was not imperative.[62]

In the place of an opening statement, the US government asked the Corps engineer overseeing river improvements in the area, Mason Patrick, to testify. Patrick testified to the need for a compensatory dike to the head of Bois Blanc Island from the dry cut (proposed dike 1 in figure 3.2) to not just bring up water levels but also counter the crosscurrent. Remarking that while the dry cut was now 450 feet wide, vessels could still only use 300 feet because opening it to the full width would mandate some sort of compensatory work, which in turn spawned local opposition. Patrick stressed that even at the limited width a compensatory dike was desired,

[60] International Joint Commission, "Evidence on Behalf of Canada Testimony of William J. Stewart," 104, in "Testimony in Re the Livingstone Channel, on the Reference of the Governments of the United States and the Dominion of Canada, under Article IX of the Treaty of May 5," (Washington: Govt. print. off, 1913), https://www.loc.gov/item/13035458/.The head of the Canadian hydrographic survey told the Commission that water levels would drop due to the proposed construction. Based on historic data from 1860 to 1907 (the year channel construction began), he argued that channel construction brought down water levels. Further he said that if Chicago were "compelled" to restore its surplus extraction, water levels would be restored to their pre-Livingstone Channel numbers and "that would form one if it lessened the effect of the crosscurrent. International Joint Commission, "Evidence on Behalf of Canada. Testimony of William J. Stewart,"100-105.

[61] International Joint Commission, "Evidence on Behalf of Canada. Testimony of Henry J. Lamb," 129, International Joint Commission, "Evidence on Behalf of Canada. Testimony of William J. Stewart," and International Joint Commission, "Evidence on Behalf of Canada. Testimony of Capt. Frederick Trotter."

[62] International Joint Commission, "Evidence on Behalf of Canada. Testimony of William J. Stewart, 105.

should the dry cut be opened for its full envisioned width of 450-feet, such a structure would be "absolutely necessary." In his testimony, Patrick remarked that the choice to restrain the dry cut to 300 feet was based on a report where engineers estimated that a 450-feet wide dry cut would lower water levels "over the entire lake system."[63]

Admitting "freely" that compensatory structures might be cheaper elsewhere, the mitigating factor dictating the choice of location was the crosscurrent. In a channel that was only 300 feet wide with rocky sides, this dangerous current could set a vessel adrift up to 200 feet westward, thus risking grounding. Even though over 1,200 vessels navigated the channel successfully, Patrick did not believe the channel was safe. Rather, the channel's heavy traffic only accentuated the need for compensatory and safety structures to ensure continued smooth passage, because a single blockage could make the channel useless for extended periods. The channel's current safety did not mean continued efficiency in the face of the crosscurrent. While it was inevitable that any "unnatural diversion" (for example, the Chicago diversion) would affect the entire lake system, the compensatory structure as proposed by the Corps would stem both lakes' lowering as well as the crosscurrent. Negotiating the current on opening day was enough "evidence" for Patrick, who sent a notice with directions to avoid it to all shipmasters of the Great Lakes. When asked if he had considered other locations for a dike, especially west of the channel, Patrick unequivocally testified that he "would not" put a dike "on the west side at all" because it "would not" be effective.[64]

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[63] In his testimony, Patrick acknowledged that the proposed compensatory dike would create a reverse current of its own, it was still, according to the Corps compensatory was supposedly "sufficient to prevent any injuries." The proposed gap in the dike, despite Canadian concerns to the contrary, was meant to be a convenience facilitating the movement of local traffic in and around islands without affecting lake shipping. See International Joint Commission, "Testimony in Re the Livingstone Channel, on the Reference of the Governments of the United States and the Dominion of Canada, under Article IX of the Treaty of May 5," 17–51; 158.
[64] International Joint Commission, 27; 33.

Over the course of the hearings, most American witnesses thought a dike west of the Livingstone submerged cut would not stop the crosscurrent and vessels would tend to drift "just the same." A dike and exposed bank west of the Livingstone submerged cut, on the other hand, would eliminate the crosscurrent because the latter would "go up against the dike."[65] An exposed westerly dike instead of a submerged eastern one, as another American witness pointed out, "would help to mark the channel clearly" thus adding to the safety benefits.[66]

Having considered the matter with the Chief of Engineers, Patrick returned to the hearings on the last day and claimed that an exposed westerly dike would indeed be a "palliative measure," which would also be a navigational aid because it would be easy to see.[67] Patrick also asked the Commission to approve widening the entrance to the channel more easily accessible by removing a rocky reef to its west, sowing the seeds for the Commission to go beyond the terms of the referral. Patrick's change of opinion about the westerly dike revealed, yet again, that engineers were listening to new voices and suggestions. The change in opinion was another aspect of iterative and incremental infrastructure. Without adequate long-term flow data, engineers did not have a full picture and were open to recommendations, even those they may have initially dismissed.

The gap in the proposed dikes created more problems than it solved. It was meant to ensure the smooth movement of tourist steamers without impinging on commercial cargo.[68] The Canadians were concerned that this gap would bring down polluted water, ice, and possibly ice jams down the Amherstburg channel thus damaging the riverfront. American witnesses did not

[65] International Joint Commission, "Testimony of Capt. S.C. Allen, 95..
[66] International Joint Commission, "Testimony of Charles Y. Dixon," 56.
[67] International Joint Commission, "Statement of Col. Mason M. Patrick," 213..
[68] While the cargo traffic on the river drove the industrial economy, there was no denying the importance of tourist spots like Bob-Lo. People from both the US and Canada enjoyed this park for nearly a century and it is a part of Detroit urban folklore. Any development affecting access to Bob-Lo and Sugar islands such as the dry cut was bound to invite public interest and opinion. Livingston, *Summer Dreams*.

think the gap would affect the Amherstburg Channel or the town's riverfront adversely, even if there was increased ice flow.[69] Pollution and health hazard concerns were reiterated by later Canadian witnesses. The supposedly treacherous crosscurrent was another source of cleavage, even between the Americans. Some American captains, echoing their Canadian counterparts, thought that by "taking the proper methods of navigating," safe passage was indeed possible.[70]

The star American and Carriers' witness, William Livingstone, vehemently disagreed with the Canadian views. The Carriers had originally wanted a 600-feet wide dry cut. However, since the Corps was concerned about compensation, they settled on a 450-feet wide cut. In the end, however, only 300 feet of the walled section were usable in the absence of compensatory works. Echoing Patrick's earlier testimony, Livingstone remarked that the crosscurrent was a threat even before his namesake channel was opened for navigation. Having negotiated the current himself on inauguration day, Livingstone claimed the Carriers had received a "great many complaints" about the former. A lesser but now increasingly important related issue was lighting the channel. Although not as problematic as the crosscurrent, Livingstone claimed, ship captains were complaining about the flickering lights marking the channel, suggesting fixed lights. In a channel already fraught by the crosscurrent, the flickering lights only compounded the threat. Echoing the Corps, Livingstone testified to the need for a dike with a 300-foot opening in the middle while also remarking that a possible crosscurrent from this opening was "an engineering problem" beyond his expertise.[71]

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[69] International Joint Commission, "Testimony of Harry Hodgman," 65–66.
[70] International Joint Commission, "Testimony Capt. W.C. Brown," 85–87.
[71] Livingstone began his testimony claim that these complaints "began to come in regarding the cross currents," which only intensified when the Corps extended use of the channel for nighttime use as well in November 1912. Ship captains, Livingstone claimed, had been "scared" out the channel because of the "rumours" about the dangerous current." In fact, when the order for nighttime navigation into effect, "the complaints increased" to the extent that some captains even refused to go down the new channel because of the currents. In addition to having experienced the crosscurrent himself in various kinds of crafts, Livingstone claimed that the Carriers had received a "great many complaints in the office from different masters of our [the Carriers] fleet." According to Livingstone,

Livingstone was not an engineer, which is why he claimed he could not comment on the aftereffects of dikes like new crosscurrents. Livingstone was, however, a lobbyist. He had long championed a wider, deeper channel throughout the lakes, acutely aware of how interrelated the waterways were.[72] Not only did Livingstone agree that the Chicago diversion affected water levels across the lakes, but he also thought controlling the diversion would help downstream water levels. Given that the diversion issue was unresolved and still contentious, Livingstone agreed with the Canadians that a compensatory structure downstream in the meantime "would prejudice the interests of navigation with reference to that pending discussion at Chicago," even if he might disagree with "what that would be."[73] Thus, even as Chicago was problematic, Livingstone did not think the compensatory structure in the Detroit River "would interfere in any way seriously with the progress of the drainage canal question" and therefore did not need to be held back. The crosscurrent and its effects as well as the narrow channel width in the diked section were more germane matters because "the importance of having safe navigation" in the lakes was so "great" that weighing the diversion canal against channel improvements was not productive.[74]

Livingstone's testimony epitomized how inextricably linked the crosscurrent and the dry cut width were. No matter how the Canadians asked the question, Livingstone found a way to

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the Carriers' Committee on Aids to Navigation had, in fact, received "a great many complaints" about the "cross currents down at the lower end of the cut." In its December 1912 meeting, the committee had "found considerable fault with the crosscurrent at the lower end of the cut," based on the "actual experience of some of the masters and hearsay from others." There was undoubtedly a need for "something to do away" with the "heavy" and "dangerous" crosscurrent, which in combination with the occasional heavy fog could "undoubtedly ground" the vessels. International Joint Commission, 69–83; 94–95.

[72] Ryan, *Lake Carriers' Association History 1880-2015*.

[73] International Joint Commission, "Testimony of William Livingstone," 75-77. As a longtime proponent of wider, deeper channels throughout the Great Lakes, Livingstone was cognizant of the interconnectivity of infrastructures and had appeared in front of the U.S. Secretary of War (the highest authority in the Corps) to protest the diversion. Livingstone had himself published a pamphlet extolling the virtues of Great Lakes shipping and the need for deeper, wider channels throughout the lake system. See William Livingstone, "The Great Lakes or The Twenty Foot Problem," 1891.

[74] International Joint Commission, "Testimony of William Livingstone," 77.

justify increasing the dry cut width as well as the compensatory dike, all while highlighting the crosscurrent. To both the Corps and the Carriers, the crosscurrent was "thoroughly objectionable," disrupting their assumptions of how the river should behave.[75] In his testimony, Livingstone portrayed fluid dynamics and repurposing of kinetic energy through the crosscurrent, as forces[?] that needed taming and controlling. When read closely, Livingstone's testimony reveals underlying cultural assumptions about nature. The Suez Canal had been completed a few decades prior and the Panama Canal would only open in 1914. Both these infrastructures were not just interventions but were seen as indicators of human supremacy over the natural world.[76] Livingstone's (and the Corps') contempt for the crosscurrent was born out of this newfound confidence and faith in human invincibility while also ignoring the most direct source of their problem: inadequate engineering data. Based on assumptions, ideas, and desires, the dry cut as well as the channel itself were testing the waters. Neither the engineers nor the Corps was prepared for the ferocity of the results of this testing.

The hearings also revealed that the Canadians understood how little they controlled river improvements. For instance, at the end of the testimonies, the Dominion Marine Association (henceforth the Marine Association) expressed a keen appreciation for the enormous U.S expenditure noted and therefore thought it "the height of presumption" for it "to advocate too strong a view in opposition to the proposed improvements." Aware of the smaller Canadian fleet, the Marine Association "heartily" supported US-led improvements so long as they were "at the proper time and in the proper place." The Marine Association did not oppose the improvements in principle but did think the proposed dike was not advisable. This was keeping in line with the

[75] International Joint Commission, "Statement of Col. Mason M. Patrick,", 213.
[76] Carse, *Beyond the Big Ditch*; Zachary Karabell, *Parting the Desert: The Creation of the Suez Canal* (New York: Distributed by Random House, 2003).

overall Canadian argument. While dangerous, the crosscurrent was surmountable. The Marine Association reiterated the need to rein in Chicago further pointing out that any compensatory work would inevitably destroy any data on the impact of the Chicago diversion on the Detroit River.[77] Even as Canada attempted to dismiss the idea of a compensatory dike, it acknowledged its limited power in being able to stall the proposed improvements. By consistently raising the Chicago diversion, the Canadians were questioning the Americans' understanding of the Great Lakes basin as a collection of discreet waterways and projects whose development would be spasmodic.

A public health hazard

One of most the prominent oppositions to the dike were public health concerns from Amherstburg, which were longstanding and recurrent. The central pollution problem was the possibility of the proposed dike increasing the town's typhoid rates by polluting its potable water intake with upstream sewage. This was particularly important because the water intake pipe was "just below" where the dam was to be built.[78] Chlorination, the town's primary filtration method, would not work because it was not "feasible" to "add quantities of chlorine" that would "penetrate such gross particles" (disintegrated feces) which might harbor disease-causing pathogens.[79] Thus, the greater the amount of water flowing down the Amherstburg channel, Canadian officials said, the greater the risk of pollution and infection.[80] Some local witnesses

[77] International Joint Commission, "Testimony of Francis King," 171-174
[78] International Joint Commission, "Evidence on Behalf of Canada. Testimony of Dr. W. Fred. Park," 162.
[79] As a water purification method, chlorination has limited efficacy in turbid waters. Chlorination is of limited use in disinfecting turbid waters Sewage, especially full of human feces is turbid. Theoretically, turbid waters could first be allowed to settle before being chlorinated. However, when allowing sewage to settle does not take away the pathogens the water carries, which chlorination cannot catch. International Joint Commission, "Testimony of F. A. Dallyn," 166. See also Centers for Disease Control, "Chlorination," https://www.cdc.gov/healthywater/global/household-water-treatment/chlorination.
[80] International Joint Commission, "Testimony of Dr. John Amyot," 167.

were afraid that the increased river volume in the Amherstburg channel could make ice conditions worse in the winter.[81]

The Commission also filed a memorandum from residents in and around Amherstburg. Similar in content to the one they had earlier sent to the Governor-General, this memorandum to the Commission reiterated residents' concerns. Signed by over 1,000 residents of Essex County, including "very influential people" the memorandum "humbly" requested that the compensatory dike because it would "permanently destroy the scenic beauty" and work "irreparable" injury to Amherstburg.[82] Detroiters had used Bois Blanc Island and Amherstburg as summer resorts. The Bob-Lo Island amusement park on Bois Blanc Island was extremely popular, with multiple ferries departing both Detroit and Windsor daily. A dirty and polluted river could be detrimental for tourists and vacationers alike. Amherstburg and Bois Blanc/Bob-Lo's local economy was dependent on these seasonal employment and service opportunities. As the hearings neared their end, the locals reiterated their anxiety about how any possible changes to this economic regime due to pollution or changes in river levels struck at the heart of the region's identity as a vacation and tourism spot.

The Americans assumed that the Canadian concerns about Detroit's sewage and garbage making its way down to Amherstburg were farfetched, an interesting conclusion given the long resentment that Amherstburg harbored about garbage floating down the river. Canadian concerns about drinking water safety and availability were not new. Most recently, the Amherstburg-centered protests that had halted channel construction had outlined these very same concerns. Furthermore, scarcely two decades preceding the Commission hearings, in 1894-5, there had been a major controversy when an American garbage barge was shot at by a Canadian patrol

[81] International Joint Commission, "Evidence on Behalf of Canada. Testimony of Edward J. Patton,"159.
[82] International Joint Commission, "Memorial from the Residents of Amherstburg and Vicinity," 168.

near Amherstburg for allegedly polluting the waters. In the 'Garbage Trial' that ensued, consistent sewage pollution and littering by Detroit-origin boats in Canadian waters was the overarching complaint.[83] Between 1894 and 1913, little had changed in terms of pollution mitigation or treatment technologies. There had, however, been an increase in Canadian concern about access to clean drinking water. During the Commission hearings, Canadians reiterated their long-felt concerns about the cleanliness of drinking water.

The Commission heard these concerns closely, though the U.S. Counsel remained unimpressed, slowly moving to take on a more active role in investigating this question. Early on the Commission took great interest in examining and mitigating river pollution in the Detroit River. Unlike the expression of overt national interests when it came to the dike, there was a broad consensus between American and Canadian representatives that pollution was a problem. Eventually, pollution became *the problem* that the Commission concerned itself with, while the Corps and Canadian engineers worked cooperatively to circumvent the binational body as the next chapter will show. At this moment, caught in the crosshairs of two nations trying to talk at each other and acutely aware of differential power dynamics, the Commission gravitated towards pollution mitigation as its raison d'être. In sticking to the spirit and letter of the reference, the Commission had shown early on that it would not be taking an overzealous role in trying to weed

[83] On a summer night in June 1895, a Canadian petrol vessel shot at an American garbage scow and tug and then proceeded to seize it. The allegation against the scow was that it was going to dump garbage in the river just above the water supply intake of the town of Amherstburg, Ontario thus polluting the water. Garbage dumping by Detroit in downriver areas and in Lake Erie was a major source of contention for downriver communities. In fact, Amherstburg blamed Detroit for recurring waterborne disease outbreaks into the twentieth century. The 1895 incident led to a 'garbage trial' during which there were international tension. The trial was eventually dismissed by the Canadians. Margaret Bogue noted the garbage trial as part of the larger pollution and fisheries in the Great Lakes. Garbage dumping in the river, or in water bodies in general, were the norm in the 19th century. The Detroit River was the sole drinking water source for communities like Amherstburg (and continues to be) and Detroit's pollution and dumping were a problem for all downriver communities. See Margaret Beattie Bogue, *Fishing the Great Lakes: An Environmental History, 1783-1933* (Madison, Wis: University of Wisconsin Press, 2000); "The Garbage Trial," Department of Marine and Fisheries, Records of the Fisheries Branch, RG 23, Vol. 292, File 2247, Part I, MReel T-3217. Library and Archives of Canada.

out the fundamental and longstanding problems in the Great Lakes such as the Chicago diversion. The Commission's engagement and overall conduct during the hearings were impartial, limited, and unimaginative when it came to interpreting its investigative powers under the Boundary Water Treaty. Yet, this was an important lesson for the Commission itself. Unlike the Detroit River, which was not a great trainee, the Commission was, learning early on that its narrow framework would not enable comprehensive addressing of transboundary issues. Over the course of the twentieth century, the more the Commission sought to break out of the imposed narrow framework to address binational environmental issues more holistically, the more its ability to act was limited by the reluctant national governments that did not allow the Commission to fully use the powers it had been granted.[84]

In closing the Canadian reiterated their core arguments about the safety of the dry cut as well as the need to address the Chicago diversion first. They also accused the United States of not making a clear and compelling case for the compensatory dike.[85] Provincial counsel accused both the U.S. and Canada of acting "illegally" if the compensatory dike was constructed despite the public health risks it posed.[86] Amherstburg reiterated public health as well as possible harm to the waterfront. In addition, the Amherstburg town counsel highlighted that in his testimony Patrick had been unable to definitively opine about the effect of channel widening on the

[84] Chandler and Vechsler, "The Great Lakes-St. Lawrence River Basin from an IJC Perspective"; David Lemarquand, "International Joint Commission and Changing Canada-United States Boundary Relations," *Natural Resources Journal* 33, no. 1 (1993): 59–91; Jutta Brunnée and Stephen J. Toope, "Freshwater Regimes: The Mandate of the International Joint Commission," *Arizona Journal of International and Comparative Law* 15 (1998): 273–87.

[85] The Americans, they argued had "failed" to establish a clear and compelling case. Reemphasizing the need to settle the Chicago diversion *before* any compensatory structures downstream, they asked the Commission to consider "with regard to everywhere along the Lakes, how depletion or diversion of the water at one point affects the waters at other points." International Joint Commission, "Argument of Mr. White, K.C., for Canada," 176-177.

[86] "Theoretically" Ontario argued, even though in the Commission both the United States and Canada were "under one flag," there were numerous and uneasy underlying legal questions. In constructing a dike, the U.S. could "injuriously affect the rights of its own citizens" or those of Canadians when there were other viable locations at hand. International Joint Commission, "Argument of G. Lynch Staunton, K.C., on behalf of the Province of Ontario," 187-9.

crosscurrent and therefore the proposal for the dike "should" wait because it was "too early to consider" it.[87]

The Americans, in closing, reiterated the need for the dike to "eliminate" the crosscurrent, dismissed the improbability of ice damage as well as increased sewage flow, and accentuated the enormous costs of any shipping delays due to channel stoppages. Forced to respond to the Chicago Diversion, the U.S. government claimed the difference between the two nations lay in their respective interpretations of the diversion's effects. Whereas the Canadians thought reigning in Chicago would restore water levels across the lakes, even if the dry cut was widened, the Americans on the other hand thought that the compensatory question was a local one. The Chicago diversion notwithstanding, compensation was a local matter. After all, the Corps had not denied the effect of the diversion on downstream water levels. The difference was that even if the diversion were eliminated, that would still not reduce the changes to water levels in the Detroit River if the dry cut were widened.[88]

Before the hearings ended, two peculiar events took place. First, Livingstone returned; ostensibly to clarify "certain things" from his earlier testimony, but he merely reiterated the importance of lake shipping.[89] Second, Corps engineer Patrick testified again and convinced his audience that a westerly dike was indeed a "palliative measure" while also asking the Commission to recommend widening the entrance to the dry cut.[90] The Canadians agreed that

[87] International Joint Commission, "Argument of Mr. F.A. Hough, on behalf of the Township of Amherstburg, Ontario," 196.
[88] Addressing the Chicago diversion question, the Americans remarked that the "only difference of conclusions" between the two sides was that the Canadians thought that decreasing flow through the Chicago diversion canal, "nearly normal conditions would be restored in the Detroit River, even if the [Livingstone] channel were opened to a greater width." The United States, on the other hand, believed that "there should be a local compensation for such a disturbance of local regimen if the channel were opened to a greater width." International Joint Commission, "Argument of Mr. Reeves T. Strickland, Assistant to the Attorney General, Washington D.C., on behalf of the Government of the United States," 196-201.
[89] International Joint Commission, "Supplemental Statement by Mr. Livingstone," 204-5
[90] International Joint Commission, "Statement of Col. Mason M. Patrick," 213.

both versions of the dike would eliminate the crosscurrent, but they did not think the western dike was "a very good solution." Either way, they did not object to widening the entrance to the dry cut.[91] In light of the consistent Canadian calls to understand lake levels, the Commission did study them.[92]

Following the hearings, the Commission during its semiannual meeting in Washington D.C. concluded that the 300-foot width of the diked section of the Livingstone Channel below the cofferdam had not affected water levels. The proposed dike would prevent the crosscurrent even though "evidence further tended to show that the dike was most objectionable to Canadian interests, fearing serious damage therefrom to both health and property."[93] The Commission did "not deem" a compensatory dike necessary but did think it would be "at least desirable" to prevent the crosscurrent and help navigation. Keeping Canadian concerns about the effects of the proposed dike, the Commission recommended a western dike. This dike, parallel to the channel, below the cofferdam, would "mitigate or reduce" the crosscurrent offering navigational safety without affecting the flow or the velocity of the current in the Amherstburg Channel. The Commission did, in a rare act, go beyond its referral and recommended dredging the Livingstone channel entrance through a "wedge-shaped strip" on its west, based on Patrick's recommendations.[94] Endorsing widening the channel entrance and not the channel itself was a delicate balancing act for the Commission. Recognizing the commercial importance of the

[91] The Canadians were "surprised" that the Corps had not already excavated the entrance to the channel and did not think the Canadian government would have any objection to the same. International Joint Commission, "Statement of Mr. William J. Stewart," 221-223.
[92] "Livingstone Dyke Held in Abeyance. Protests of Canadians Cause Commission to Investigate Question of Lake Levels," *The Evening Record* February 24, 1913, 1. INK ODW Newspaper Collection. See also "Marine: Channel Question Held in Abeyance. Question of Lake Levels Is Investigated by International Joint Commission. Two Alternatives Under Consideration," *Detroit Free Press* February 24, 1913, 10. ProQuest Historical Newspapers.
[93] International Joint Commission, "Report on the Livingstone Channel, April 8, 1913. Recommendations in Reply to Questions Submitted by the Governments of the United States and Canada, October 16, 1912. Treaty of May 5, 1910.," 13.
[94] International Joint Commission, 16–17.

channel and the prowess of the Lakers without compromising the Canadian concerns meant the Commission was walking a tight rope, balancing an international treaty that recognized nation states' rights against the economic weight of the private shipping lobby.

Widening the channel entrance would ease navigational and the Carriers' concerns. Building a dike to control the crosscurrent, without much adverse effect on Amherstburg, was a sensible response to Canadian concerns, even if the Carriers refused to endorse it.[95] Rendering the compensatory question moot, the Commission obliquely responded to the Chicago diversion issue. Not only was the diversion outside the scope of the referral, but the Commission suggested that its effects on the downstream developments were minimal. A dike to reduce the crosscurrent instead also normalized the need for infrastructural fixes to combat the river's response to engineers' meddling. Often, these fixes were not gargantuan, and sometimes they were barely above water. As piecemeal structures, they were finite and manageable interventions. When viewed at a watershed level, however, these piecemeal structures were colossal, both in ambition and impact. In arguing to keep the focus on local, small-scale fixes, the Corps and American witnesses were promoting an insular vision of improvements. The hearings and the Commission's recommendations only cemented piecemeal responses, and to all involved, it seemed as if these solutions would only expand further.

Environmental diplomacy, in the case of the Livingstone Channel expansion, was about the extraction of river bottom silt and water through the channels. The impacts of this extraction were definite and long-lasting, as the Canadians reemphasized repeatedly. There was no quick fix to these extractive practices. Diplomacy in this case sought to create a common regime of

[95] Lake Carriers Association, "Compensating Dam," *Annual Report of the Lake Carriers Association 1913* (Detroit: P.N. Bland Printing Co.), 41. HaathiTrust Libraries. https://hdl.handle.net/2027/mdp.39015010732819.

extractive practices along and across the political border.[96] This extractive regime, underpinned by and favoring governmental and industrial interests, was representative of the Commission's initial forays into water apportionment even if it came at the cost of local and provincial concerns.[97] The Commission did not discourage large hydraulic projects. If anything, it supported them.

Whereas the Waters Treaty had helped settle some important persistent water disputes, it was, more importantly, perhaps the first time the word pollution had been used in transborder environmental governance. Scholars have argued that an unparalleled "philosophy of dispute-settlement and conflict-avoidance" was built into the treaty and the Commission. The compensatory dike hearings and recommendations only further reveal the depth of this philosophy. Much of the transboundary governance questions in the Great Lakes, throughout the twentieth century were centered around questions of and solutions to pollution. Avoiding conflict and promoting cooperation became the hallmarks of the Commission, despite hiccups in the mid-twentieth century when it was "defined by partisan politics resulting in large-scale endeavors with dubious environmental impacts."[98] At a time when the detrimental effects of industrialization were slowly visible, investigating, and fixing pollution became the primary driving force of the Commission.

Following its investigation on the compensatory dike, both nations jointly referred the Commission to scrutinize the sources of and workable solutions to pollution in all boundary waters. During these hearings, the Canadians argued that Detroit as the largest urban

[96] In his book, Alvarez argues cross border extractive regimes were instrumental to the U.S.-Mexico border evolving into a site of construction. Alvarez, *Border Land, Border Water*.
[97] Clamen and Macfarlane, "The International Joint Commission, Water Levels, and Transboundary Governance in the Great Lakes."
[98] Macfarlane, "Natural Security: Canada-US Environmental Diplomacy," 2019, 112–17.

agglomeration in the area, was responsible for most of the pollution, a claim that the Commission found irrefutable. Detroit's health officer questioned how the Commission could be so sure of the pollution crossing borders, which ruffled more than a few feathers.[99] William Livingstone testified at these hearings as well, claiming at first that he was unaware of how much the Carriers could help with pollution issues. Acknowledging that steamers discharged their sewage indiscriminately into the Great Lakes, he claimed they did not take much water in from the lakes because of pollution. He assured the Commission of all possible cooperation from the Carriers to stem pollution.[100] The Carriers had now been asked to weigh in two important hearings, both of which raised some uncomfortable questions about their role in pollution.[101] The Carriers disagreed and tried to diminish the Commission's report when they reiterated the

[99] This investigation, instigated by a joint referral in August 1912, was to identify sources, location, and extent of pollution of boundary waters as well as the effects of such contamination with an aim to outline remedies. Led by a chief sanitary expert and director of field work, Dr. Allan J. McLaughlin, the commission conducted an extensive bacteriological examination of all boundary waters in the Great Lakes region as well as in Acadia (i.e., the St. John River running between Maine and New Brunswick). Pollution crossing the boundary was irrefutable, the Commission stated. While "the bulk" of Detroit's sewage went through the Wyandotte channel, there was no question that a large portion of that effluent split "by the edge of Gross Isle and gradually spread out fanlike until it may even reach the Amherstburg shore." The discussion about pollution with or without borders became very heated, enough for the Commission to ask the city of Detroit if the latter was questioning the former's authority and jurisdiction over the subject matter. The city agreed that raw water from the river was not potable, however, its objections were about the possible economic burden of any suggestions the commission may make to mitigate the sewage pollution issues. International Joint Commission, *Hearings of the International Joint Commission in Remedies for The Pollution of Boundary Waters between the United States and Canada* (Washington: Government Printing Office, 1915), 121-126. Haathi Trust.

[100] To keep pollution in the Detroit River to a minimum, the Carriers had issued a bulletin that vessels "were not to discharge any offal or anything else of that kind within 5 miles of the mouth of the [Detroit] intake." When questioned about his namesake channel and its safety, Livingstone argued that there had been "[C]omparatively few" accidents near the entrance of the channel even though the compensatory downstream dike as advised by the Commission had not yet been constructed. Livingstone assured the Commission that the Carriers would follow any joint regulation on pollution. International Joint Commission, 227-234.

[101] Thousands of Great Lakes vessels emptied their sewage "indiscriminately along their routes—and in harbours—contributed materially to pollution in both countries." Even their ballast was problematic "since some vessels took on water ballast before leaving port and discharged it just before entering the port of destination." Polluted water could easily be discharged near the water supply intakes of cities and towns along the shores. Passengers and crew on these vessels were at risk as well since unpolluted water was so difficult to find. As much as Livingstone tried to dimmish the effect of lake vessels on the pollution levels in the lakes during the hearings, thanks to the Commission hearings, a survey revealed that vessels were not equipped with any kind of holding tanks and discharged their sewage directly into the lakes. The sheer volume of lake traffic meant that vessel discharge was undeniably an important source of pollution. Jamie Benidickson, *The Culture of Flushing: A Social and Legal History of Sewage*, Nature, History, Society (Vancouver: UBC Press, 2007).

infinitesimal role lake vessels played in polluting lake waters.[102] This emphasis was rooted in their desire to ensure the continuation of vessel ballasts being discharged into the lakes. Despite the Carriers' belief that vessels were not polluting the lakes, the Commission disagreed.

These hearings, a part of the Commission's "first boundary waters pollution reference (1912–18), failed in resolving the water quality challenges of the early twentieth century" but did succeed in bringing "greater awareness of bacterial contamination and potential responses."[103] The hearings achieved another significant-end: they strengthened the links that Amherstburg and Canadian officials had made in the compensatory dike-related hearings between sewage pollution and river improvements. At a time when the lack of sewage treatment was not easily seen as a directly abetting water pollution, the Commission's investigations exposed how closely linked sewage treatment was to ensuring cleaner waterways. By putting pollution on the binational agenda, against evolving scientific opinion, both the United States and Canada achieved some important ends. The Commission's research program analyzed over 18,000 samples from 1,500 locations in addition to reviewing the historic incidence of certain diseases and conducting interviews, making this investigation comprehensive and historic. Since there were no historic baselines, the report used a comparative method to analyze data and conditions. The use of "these horizontal benchmarks—perhaps the best or most persuasive indicators that might have been obtained—had the effect of establishing standards already far removed from pre-industrial conditions on the lakes." For the first time, pollution was "being defined against a baseline or norm that appeared already to take for granted a significant level of contamination

[102] Lake Carriers Association, "Pollution of Lake Water," 177-182.
[103] Clamen and Macfarlane, "Introduction," 115–16.

from human activity."[104] The Commission concluded that the lack of sewage treatment infrastructure was the most crucial factor polluting Great Lakes waterways. Pollution was also the platform on which the Commission unsuccessfully sought more regulatory powers.[105] Focusing on pollution—sources, treatment, and mitigation—the Commission laid out its future path.

Focusing on Expansion, again

The Great War not only changed countries' borders but also highlighted the importance of supply chains, especially those in the Great Lakes. Manufacturers like Ford were dependent on dredging to keep waterways running and able to bring raw materials. Thus, it was not surprising that even as the Great War raged on, the Corps and Carriers wanted to start expanding the dry cut to the predesignated 450-foot width (first approved in 1909 and partially completed but stalled due to Amherstburg-centered protests). In 1915, the Carriers "heartily" endorsed the Corps' request to Congress for funds to widen the dry cut on account of the "large number of accidents"—30 according to the boosters—in the channel since 1912.[106] According to the Carriers, their endorsement was seminal in pushing the U.S. Government into action.[107] Indeed, in their preliminary report on the dry cut expansion, the Corps recounted the Carriers'

[104] Jamie Benidickson, "The International Joint Commission and Water Quality in the Bacterial Age," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen (Calgary: University of Alberta Press, 2020), 124-128, http://hdl.handle.net/1880/111575.
[105] Benidickson, 131.
[106] Lake Carriers' Association, *Annual Report of the Lake Carriers' Association 1915* (Cleveland: Lake Carriers' Association), 173-174. Access provided by the HaathiTrust. http://hdl.handle.net/2027/mdp.39015020918390
[107] In their 1916 report, the Carriers' claimed that "[I]nspired" by their 1915 resolution urging "the [U.S.] Government to increase the width of the Livingstone Channel to 450 feet," a "clause was inserted in the rivers and harbors bill" of 1916 to "provide for preliminary examination and survey with a view of making this required improvement." Lake Carriers' Association, *Annual Report of the Lake Carriers' Association 1916*, 41.

endorsement as the "official expression" representing "the views of the navigation interests" as the latter controlled "about 75 percent of the tonnage on the Great Lakes."[108]

In preparing their report, the Corps asked both the Carriers and their Canadian counterparts, the Dominion Marine Association, to furnish letters from shipmasters on the need for widening, while noting that between 1912 and 1916, there had been (only) 35 major accidents. Of these 35 accidents over four years, five were attributed to the crosscurrent, and nine had ensured temporary blockage of the channel. The full economic costs of these accidents with vessel delays, cargo transfer, and damage, were "unknown."[109] The channel handled over 70 million tons in cargo, and the river over 100,000 million tons. For the Corps and Carriers, even minor accidents brought major costs, especially considering tonnage. Relatively few accidents did not decrease the cumulative cost of those accidents as well as any future ones. Keeping the channel safe depended on expanding it.

The Corps claimed that of the 153 letters from the American and 12 from the Canadian masters, only one "failed to express a desire for a widening of the channel." This survey of shipmasters also revealed that over 130 believed the crosscurrent was "a menace to navigation" and 78 even went so far as to call the channel "unsafe or dangerous." Without revealing the nationalities of the shipmasters, the report pointed out that a "majority" desired a 600 feet wide channel. "Several masters" even recommended "the construction of dikes along one or both sides of portions of the channel for the purpose of eliminating the danger due to cross currents and for the better marking of the channel limits in thick weather."[110] Recalling the 1913 hearings and

[108] To be clear, the 450-foot width was only "for that part of the channel excavated in rock and 800 feet for the remainder." H. Burgess, "Preliminary Examination of Livingstone Channel, Mich," 9
[109] William M. Ingraham, "Livingstone Channel, Detroit River, Mich. Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich. with a View to Securing Increased Width," August 4, 1917, 24;11.
[110] The Corps noted that a 300-feet wide channel would be "sufficient for safe navigation" in the absence of a crosscurrent. In the case of the Livingston Channel however, the crosscurrents were a "serious menace to

recommendations, the Corps thought it "practicable" for safer navigation to widen the dry cut and build a westerly dike with a gap, at the spot where the crosscurrent was the greatest. This dike, the Corps acknowledged would "not eliminate the chief danger to navigation," but in conjunction with the widening would "probably" reduce the strength of the crosscurrent.[111]

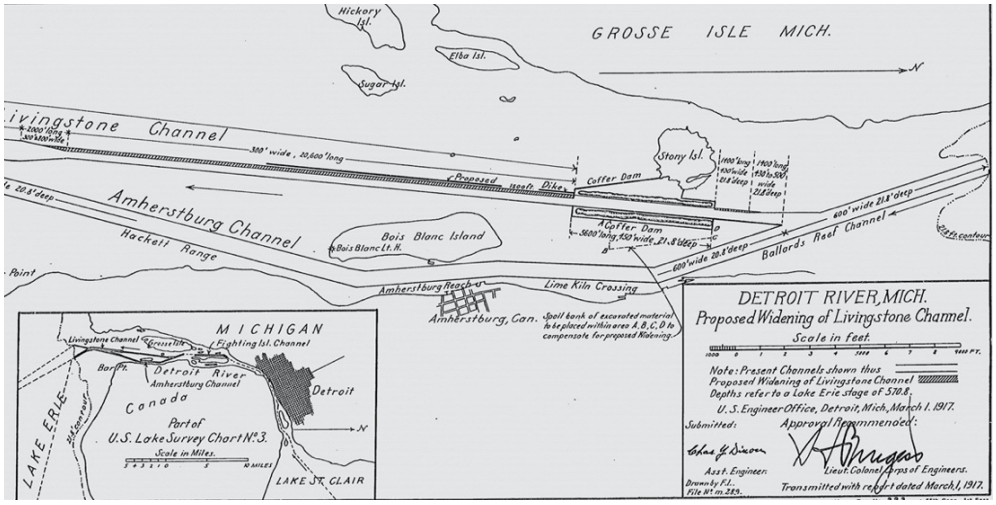

Figure 3.5: Map showing recommended widening as well as the creation of the waste bank as recommended by the USACE in 1917. Source: Letter from the Secretary of War transmitting, with a letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich., with a view to securing increased width, House of Representative 65th Congress, 1st Session. Document No. 322, August 2, 1917, 26

navigation." Vessels had to move at nearly full speed to avoid drifting away and hitting the channel's rocky sides. If a vessel at full speed struck "the sharp projections on one or the other side of the channel," there could be considerable damage. In case of "fog, snow, or heavy rainstorms" vessels moved at slower speeds and were in "serious danger of striking on the rocky sides of the channel." While steamers, "when practicable" could "pass through the cross currents at about 12 miles per hour," vessels with tows could "seldom attain a greater speed than about 8 miles per hour through this narrow waterway." At lower speeds, the drift was "such as to make it difficult to prevent the tow from striking the submerged banks of the excavated cut." The Corps claimed a "number of groundings" had occurred in the Livingstone Channel "resulting in damage to vessels." To "lessen the danger" of collisions, new rules of navigation of the channel stipulated a "time interval of five minutes (or nearly 1 mile) between vessels." Even though vessels that were following preceding ones could still be damaged by groundings ahead, the new rules did give the former some time to react to ensure "minimal injury." The most important accidents in the channel had blocked it completely necessitating the use of the Amherstburg channel in the interim, "thus adding to the congestion there and increasing the danger of collisions." To add to the substantial cost of vessel repairs, were those "due to vessel delays, to transfer of cargoes, and to damage to cargoes" the value of which was unknown. However, these could all easily be attributed to the crosscurrent. William M. Ingraham, 9–13.

[111] The Corps warned that vessels navigating the widened channel should not expect the channel to "be free of danger" as the crosscurrent would remain –albeit hopefully of a lesser velocity—and which in "thick weather" might still cause accidents and/or groundings. The extra width would not only "materially reduce the chances of vessels striking the sides of the cut," but it would allow vessels to pass grounded ones in the channel. William M. Ingraham, 12–13.

The widening of the dry cut raised, yet again, the question of altering lake levels. In 1913, the Commission noted that the Livingstone Channel's original plans had "no effect" on water levels. Between expanding the dry cut's width as well as the entrance, the Corps now thought, water levels would go down. Citing "several" studies that sought to determine "the best method for providing compensation," the Corps concluded that the best compensatory work would be a waste bank of excavated material, between the dry cut cofferdam and the Amherstburg Channel. Acknowledging that the "greater part of the work to be done" was to be in Canadian waters, the Corps remarked that the widening would have "no effect upon the levels of boundary waters" and thus needed no referral to the Commission since it already had examined questions regarding the widening of the channel and compensating works. The Corps did, however, plan to exchange data with the Canadians and "hoped" this would be sufficient to ensure consent from the latter. If the Canadians agreed, then the question of a referral to the Commission would be moot. Any joint referral, the Corps pointed out, would inevitably delay the widening project.[112]

Ultimately, widening the dry cut section was an attempt to eliminate the danger posed by the crosscurrent, rather than increasing the channel's carrying capacity. While there was no separate data on the traffic through the Livingstone Channel, there was an increase of 12 percent in total freight movement from 1915 to 1916. The Corps estimated that thanks to the Livingstone

[112] There was now a gap in the upper end of the cofferdam that had been extended from 300 to 450 feet and the channel upstream from the cofferdam had been widened from 300 feet to a minimum of 430 feet. Further widening of the entire channel to a width of 450 feet would "give a further effective increase in discharging capacity of Livingstone Channel, and unless compensated for by contraction elsewhere there will result an ultimate lowering of the water levels above Ballards Reef." There had also been widening of the channel's entrance which had lowered water levels at the head of the channel by "0.05 of a foot." Widening the channel to 450 feet would lower water levels by a further "0.05 of a foot." The resultant lowering by 0.1 feet would require some form of "compensation." The waste bank compensatory dike could be accomplished "without detriment to any other interest." The exact area of the bank of wasted material would depend on data that were yet to be gathered. To do so, the Corps recommended that "careful hydraulic and water-level measurements" be taken which would "permit a variation in the area or height of the bank of waste material, so as to have the extent of the compensation provided conform to corrected calculations based upon the more accurate data." William M. Ingraham, 14–15.

Channel, downbound freight movement to Lake Erie freight tonnage increased 285 percent in terms of revenue and by 229 percent from 1902 to 1916. The channel could easily handle a hundred million tons without changing shipping schedules if the crosscurrent could be eliminated. The Board of Engineers for Rivers and Harbors in 1917 concurred with the Detroit district Corps' recommendation.[113]

Conclusion

Eventually, the U.S. government, rather quietly, appropriated funds to finish expanding the dry cut. The United States only entered the Great War in 1917. As the *Echo* pointed out, the global war would not be "delaying" the expansion project. In the same article, the newspaper noted that the Detroit district Corps engineers, U.S. federal engineers in Washington D.C., and Ontario provincial engineers were the "only three bodies" involved in the matter.[114] That the Commission was not one of these bodies is more than an omission as much as the normalization of engineer-led diplomacy instead of the Commission. By 1917, the engineers took over from the Commission. According to the Corps, these funds were to finish expanding the dry cut to 450-feet (see figure 3.5).[115] The Carriers reported their success in getting this legislation to Congress, adding that in recommending expansion, the U.S. Secretary of War "urged" the same "as a war measure."[116] Interestingly, both the *Free Press* and *Echo* thought the appropriation was to increase the dry cut width to 600-feet, revealing the inevitable expansion. That the expansion

[113] William M. Ingraham, 14–15.
[114] "Livingstone Channel Project Approved. Another Boost for Amherstburg," *The Amherstburg Echo* Vol.XLIII No. 36, August 3, 1917, 1. INK-ODW Newspaper Collection.
[115] H Burgess "Preliminary Examination of Livingstone Channel, Mich,"
[116] Lake Carriers' Association, *Annual Report of the Lake Carriers' Association 1917* (Cleveland: Lake Carriers' Association), 79. Access provided by the HaathiTrust. http://hdl.handle.net/2027/mdp.39015020918390

itself was now a wartime measure is unsurprising given the importance of supply chains and the demands of wartime production.[117]

Scarcely four years after the dike reference, it was already clear the Commission would not be referred to when it came to such matters again. The Commission, through the hearings, calibrated its "fairly narrow range of issues," resistant to taking on a more expansive role.[118] The hearings were a moment where the Commission took over the techno-infrastructural diplomatic functions from the Corps and provincial engineers. Through the hearings, it became clear that the Commission took the narrow scope of the reference to heart, unwilling to color beyond the lines and investigate the Chicago diversion.

During the four days of hearings and until they made its recommendations, the Commission, despite being confined and strictly defining restrictions for themselves, was able to consider as well as offer innovative solutions, particularly the westerly dike.[119] The Commission also did not seem to mind thinking beyond the reference, if both nations agreed, as in the case of widening the entrance to the dry cut. According to Article IX of the Waters Treaty, either nation could make a reference to the Commission, though in practice seldom has one not been made by both nations.[120] By premising initiatives that both nations agreed to, even if those were not in the reference, the Commission showed how seriously it took bilateral cooperation. Although it eventually decided on the question of the compensatory dike, this was a one-off. Both nations realized that a recurrent reference to the Commission would be both time-consuming and bring more local voices to bear. Instead, after that moment when it took over from the Corps and

[117] Bryan, *Rouge Pictured in Its Prime*, 25.
[118] Lemarquand, "International Joint Commission and Changing Canada-United States Boundary Relations," 61.
[119] "Commission Abandons American Project. Recommends A Dike on United States Side of Livingstone Channel," Special Dispatch to The Globe, *The Globe*, April 18, 1913, 4. ProQuest Historical Newspapers.
[120] Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*, 86.

provincial engineers, the Commission paved the way for the engineer-diplomats to take over again. Future developments and improvements were premised, yet again, on cooperation and correspondence, instead of making another reference to the Commission, which in turn refused to take a proactive role, as the next chapter shows.

The public health and pollution concerns as outlined by Amherstburg residents, town council, and politicians gave the Commission an easy zone of influence, narrow but powerful: pollution. Public health concerns, as well as those about changing lake levels, from the Canadians, were not disregarded, no matter how much the Corps and the Carriers ought to downplay them. Understanding the waterscape of extraction along the political border also opens a new means to analyze environmental diplomacy, especially in an era when bilateral diplomacy was still nascent. Progressive era public health concerns only further complicated this evolving relationship, pushing the limits of available data and science in trying to understand the source of pollution as well as its dispersal patterns. River improvement infrastructure was, in this schema, not just a means to ease faster travel, but also a factor determining pollution flows. Linking the compensatory works to pollution helped accentuate the importance of the issue further driving the Commission to take pollution seriously. Indeed, pollution regulation and mitigation remain two primary concerns of the Commission even today.

The hearings about the compensatory dike most clearly revealed the limits to modeling and manipulating nature, especially the Great Lakes. As the Canadians raised the Chicago diversion repeatedly, they were also highlighting how the Great Lakes were indeed one body of water. Thus, a massive upstream diversion was bound to have downstream effects i.e., decreased water flow. Even if the said upstream diversion was outside the scope of the inquiry at hand, consistent Canadian questioning firmly established how and why this was a thorny matter.

Despite the lack of a resolution of the diversion issue, the Canadians highlighted the fallacies in thinking about 'local' issues while negating the larger ecological context. A stop to the massive diversion upstream would negate the need to compensate downstream. The Canadians showed that increased water flow from Niagara Falls would need compensatory works in Lake Erie to make sure river levels were maintained in the Detroit River. This was not dissimilar to the compensatory works in the Detroit River to compensate for the massive diversion upstream at Chicago. With each dike, as engineers iterated design solutions to problems created by their lack of holistic data (not imagination), the river worked harder to combine velocity and time. To the engineers, there remained more infrastructure to create.

Chapter Four

Proposing Dikes and Dams: An Island Takes Shape Quietly 1917-1938

In February 1931, Sherman Moore, a U.S. Lake Survey engineer recommended a system of dikes in the lower Detroit River (figure 4.1) to compensate for the widening and deepening of the Livingstone Channel. In the past, compensation, Moore commented consisted "largely in dumping excavated material," in shallow sections of the river below the surface. Above surface dikes or dams, Moore believed "while more expensive," would "give more satisfactory results."[1] Essentially Moore was arguing that the Corps should stop dumping excavations from channel widening to below-surface areas and instead create above water level dikes and dams. Figure 4.1 shows Moore's proposal, in red. The largest subsystem of dikes was in an inverted triangular shape, which would run parallel to the Livingstone and Amherstburg channels respectively. Moore recommended these dikes and ensured they were infilled above the surface of the water to aid in navigation. With each layer of excavated material added on in each iteration, the dikes took a more defined shape. Over time, as trees and vegetation embellished these dikes, they became another island in the river, Crystal Bay and Island.

This new island was the culmination of a series of iterative and incremental changes to the river—beginning with dredging in the late nineteenth century. This dredging was initially conducted to make the river more serviceable for shipping. Tracing the creation of this island from 1917 to 1937-8, this chapter shows how the Corps and Canadian engineers cooperated to bypass the Commission by invoking the 1912 hearings, while the Commission chose to look

[1] Sherman Moore, Engineer, U.S. Lake Survey Office Detroit, "Report Upon the Question of Compensation Water Levels for Effect of Deepening Channels in lower Detroit River," March 17, 1931, 7 in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

away. I show that the Corps added dikes and dams to stabilize and slow the river down, ironically recreating the primeval river.

In so doing, I make three broad arguments. First, compensation was no longer about singular dikes but entire islands instead. The physical footprint and impact of this island did seem to be large and that was precisely the point—the creation of hidden-in-plain-sight infrastructure that could easily be camouflaged over time. This obscuring was not rooted in malice but instead was the maturing of the compensatory regime. Second, the creation of this island coincided with the second coming of the techno-infrastructural diplomacy led by engineer-diplomats as the Commission shifted gears to pollution abatement instead of infrastructure creation. Rooting its recommendations and designs for dike and island creation in the 1912 hearing, in its new avatar, the techno-infrastructural diplomacy closer together across borders to ensure this new infrastructure was created. Third, this new avatar of cooperation came at the cost of the Commission. On the one hand, the Corps and Canadian engineers bypassed the Commission. On the other hand, the Commission purposefully looked the other way when it came to these dikes and dams, leaving the door open for Canadian and Corps engineers to revert to their pre-commission cooperative framework. The Commission could have easily decided independently to examine these developments, like it had, without prompting, in 1913 with its recommendation to enlarge the opening to the Livingstone Channel. When it came to the new island, both engineers and the Commission agreed that there was nothing more to discuss. Engineers agreed that these new dikes and dams were mere extensions of the original compensatory dike authorized in 1913. The rationale was that these infrastructures worked towards preserving overall lake levels. Both nations agreed that temporary disruptions in stream flows, especially accelerated river velocity and outflow in deeper and wider channels, could

easily be managed by these and future compensatory structures. Through a complicated series of requests for permissions by the Corps and the Orders-in-Council by the Dominion Government, both the United States and Canada cemented their co-operative bypassing.

This cooperation reinforced extant power equations. Even as the Dominion Government cooperated with regards to the Detroit and Niagara Rivers, when it came to the Chicago diversion, the Dominion continued to send references to the Commission. During the Seaway negotiations in the first few decades of the twentieth century, the province became invested in the development that would help both hydropower generation and aid manufacturing.[2] Between the end of the Great War and the beginning of the Second World War, as the province invested further in the Seaway, it routinely acquiesced to projects, even as the Canadian balance of trade—provincial and federal—shifted decisively, moving away from Great Britain to the United States. This growing interest in the Seaway allowed more opportunities to transform Great Lakes waterways to handle even more traffic.

Unlike the Livingstone Channel which drained the river and the lakes more quickly—in both velocity and volume—this new island in the river stabilized water levels. Both the channel and the new island were created to aid shipping, making commerce faster, safer, and more efficient. Crystal Island and Bay embodied creation, compensation, and navigational aid, all in one place. Even though this was a new island, it was a response to some old concerns like crosscurrent plaguing the Livingstone Channel's dry cut. Despite the creation of a compensatory dike after the 1913 hearings, there continued to be a crosscurrent. The response was more infrastructure creation through Crystal Island. The Corps expanded its imaginative and creative lexicon, going beyond channels and dams. Furthermore, these new structures were themselves

[2] In *Negotiating a River,* Macfarlane shows how Ontario saw profits in the Seaway and therefore was keen on its development. Macfarlane, *Negotiating a River*, 2014.

incremental advances towards the St. Lawrence Seaway.[3] Although the Seaway was not constructed until after the Second World War and did not include streams like the Detroit River, Crystal Bay and Island (henceforth referred to as Crystal Bay) were the building blocks of the larger Great Lakes Navigation System that ran from Duluth to the Atlantic Ocean.

Much of the compensatory structures in the Detroit River, as previous chapters have shown, were as much trying to adapt to and compensate for upstream transformations, such as the Chicago diversion. Much like in previous chapters, the diversion animated Corp's arguments about compensating downstream. That the Canadians were also a part of a series of legal battles which included U.S. states against the diversion only underscores its persistence in both domestic and bilateral politics. The Chicago diversion revival in the 1920s as a news item coincided with the lack of precipitation in the upper lakes, especially Lake Superior, which lowered lake levels in all the lakes. The locks at the St. Mary's were not deep enough.[4] Forced to act, the Corp's response was, unsurprisingly, to seek funds for more infrastructure creation, specifically compensatory strictures like Crystal Bay. The rationale was that the island—as a system of dikes—would raise water levels in the immediate, sidestepping the Chicago Diversion. These dikes sheltered supply chains from any possible disruptions due to ships running aground.

The need to supply materials, minerals, and finished products to markets was pursued not only through shipping but also through emerging auto traffic. Although primarily dependent on lake shipping for long-distance and bulk trade, cross-border auto trade was fast developing as a competitor. Even as ships traversed up and down the lakes, connecting factories to materials, some longstanding promises were close to fruition. To balance both cargo and passenger

[3] Larson, "History of Great Lakes Navigation."
[4] Larson.

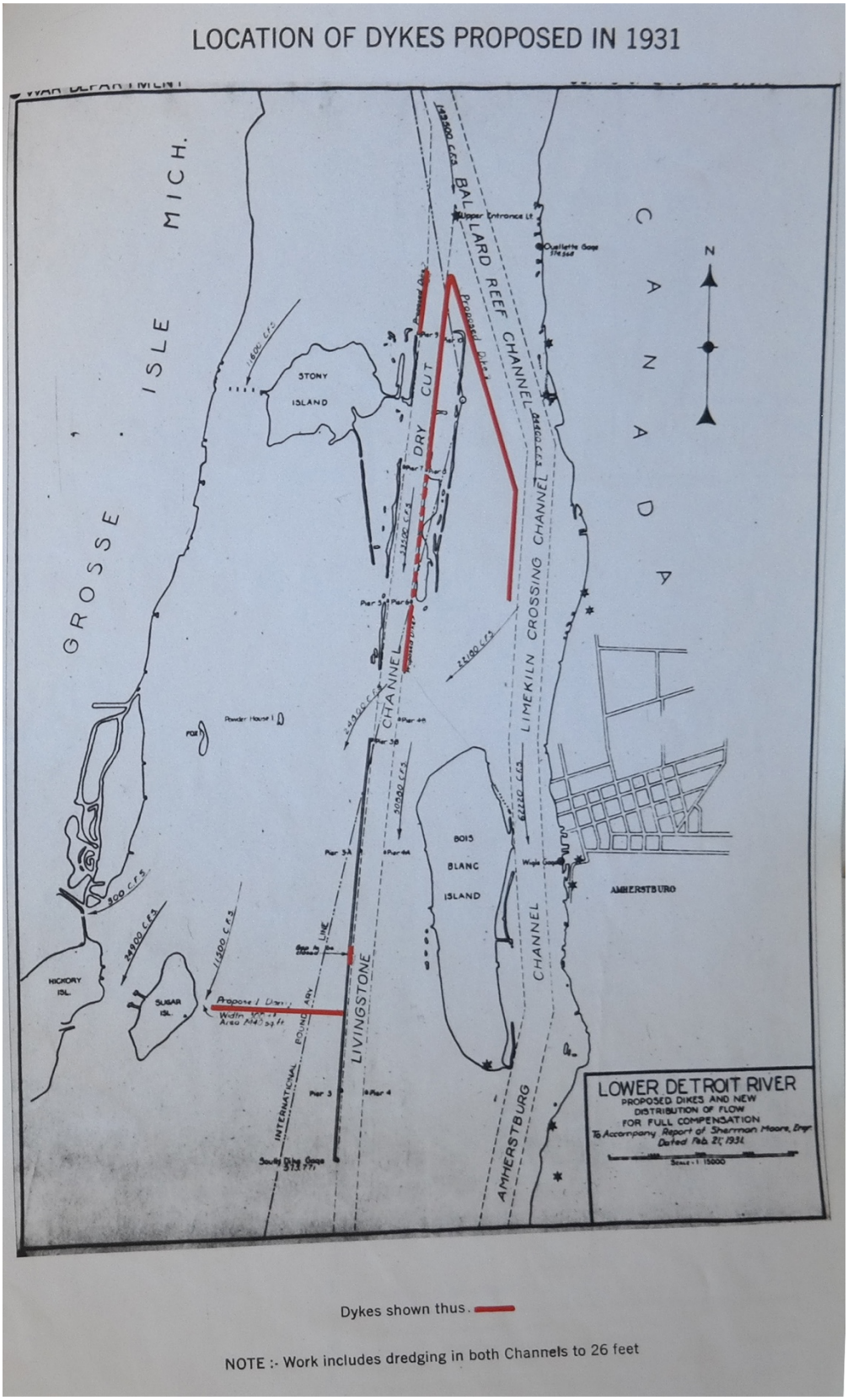

Figure 4.1: Proposed dikes in 1931. © Government of Canada. Reproduced with the permission of Library and Archives Canada (2022). Source: Library and Archives Canada/Department of External Affairs fonds/RG 25, vol. 1603, file 585 part 1.

needs, the auto tunnel, and the bridge were constructed across the Detroit River during this period, laying the groundwork for further social and economic integration between the two nations. One was cross-border connectivity in the form of the Ambassador Bridge and the Detroit Windsor auto tunnel, and the other was the St. Lawrence Seaway. By the time two small cannons signaled the opening of the Ambassador Bridge in November 1929, the stock market had recently crashed, sending reverberations across the globe.[5] The Detroit Windsor auto tunnel, which connected the downtowns of both cities was still under construction when the market collapsed. That these two cross-border infrastructures were constructed was a testament to the rising importance of auto as well as greater integration of auto production.[6] After bringing the auto tunnel and bridge into context, this chapter argues for their inextricable relationship with lake shipping. Greater vertical integration in manufacturing processes also underscored the importance of dredging to fostering and maintaining supply chains.[7] Already at the end of the Great War, when the Rouge plant was producing war vehicles, it was clear how important supply chains and dredging were. Thanks to wider, deeper waters—the mouth of the Rouge and the entire length of the Detroit River—ships to and from factories could easily get from one location to another. Much of Metro Detroit's manufacturing prowess was premised on dredging.

The other longstanding promise was the St. Lawrence Seaway. As I have argued in the previous chapters, the possibility of an all-American waterway in the lower Detroit River was shot down repeatedly as unviable. Though Canada threatened to build an all-Canadian waterway to the Atlantic more than once, there was never enough funding or traffic to legitimize such a

[5] Mason, *The Ambassador Bridge*, 134.
[6] "Detroit International Bridge: The Ambassador Bridge" (Detroit, New York Detroit International Bridge Company, 1929, Windsor Community Archives PM 970 and "Windsor: The Logical Location for Manufacturing and the Best Shipping Point in Canada (Windsor: Industrial Department, City of Windsor, 1914), Windsor Community Archives File PM 850.
[7] David E. Nye, "Narrating the Contested Space of Detroit's River Rouge, 1600–2015," *Zeitschrift Für Anglistik Und Amerikanistik* 64, no. 1 (January 1, 2016), https://doi.org/10.1515/zaa-2016-0004.

large expenditure. Although the Seaway would not be constructed until after the Second World War, Crystal Island was a part of its ramparts.[8] Dredging and compensatory works were folded into wartime manufacturing—creating much sought-after employment during the Great Depression. As an employment generator though, dredging was controversial. While Canada wanted to hire natively for the dredging being conducted in their territorial waters, especially during the depression, the United States refused to acquiesce.[9] I argue that dredging (and islands like Crystal Bay) was a part of the economic response to the Great Depression, one that has not yet been considered.[10]

During the first few years of the Great Depression, unemployment rose steadily and Michigan "experienced the largest degree of unemployment among industrial workers."[11] In the United States, the years of economic crisis converged with an unparalleled ecological catastrophe, "in the decade of the 1930s the dust storms in the plains were an unqualified

[8] In his book, Macfarlane lays out the chronology of the Seaway, showing the number of times it almost came to life. Macfarlane traces the persistence of the all-Canadian waterway remarking that as "a transportation megaproject, the all-Canadian seaway offed a nation-building parallel to the transcontinental railways, promoting Canadian identity, national identity, progress, and prosperity while linking the country in an east-west orientation, in contrast to the north-south pull of the United States." Macfarlane, *Negotiating a River*, 2014, 211.

[9] In 1933, the Canadian Under-Secretary of State for O.D. Skelton wrote to the deputy minister of public works, in response to the latter's query about employing Canadians in creating Crystal island because the work was in Canadian waters, Skelton informed Public Works that "in the particular cases of Livingstone Channel and St. Clair River, it was impossible to incorporate stipulations requiring the use of Canadian labour; the funds being supplied entirely from the United States and drawn largely, if not entirely, form relief accounts." O.D. Skelton, letter to Deputy Minister of Public Works November 23, 1933, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part II. Library and Archives Canada.

[10] Some of the important work on the Great Depression and the New Deal in the United States includes Morton Keller, *Regulating a New Economy: Public Policy and Economic Change in America, 1900 - 1933*, 1. Harvard Univ. Press paperback ed., 2. print (Cambridge, Mass.: Harvard Univ. Press, 1996); Alan Brinkley, *Voices of Protest: Huey Long, Father Coughlin, and the Great Depression*, 1st Vintage Books ed (New York: Vintage Books, 1983); Robert Cohen, *When the Old Left Was Young: Student Radicals and America's First Mass Student Movement, 1929 - 1941* (New York Oxford: Oxford Univ. Press, 1997); Lizabeth Cohen, *Making a New Deal: Industrial Workers in Chicago, 1919-1939*, 2. ed., new ed (Cambridge: Cambridge Univ. Press, 2008). Donald Worster's work on the Great Plains connected economics to ecological events in new ways. See Worster, *Dust Bowl*.

[11] Richard T. Ortquist, *Depression Politics in Michigan, 1929-1933*, Modern American History (New York: Garland Pub, 1982), 126; See also Alan Brinkley, *Voices of Protest: Huey Long, Father Coughlin, and the Great Depression*, 1st Vintage Books ed (New York: Vintage Books, 1983).

disaster."[12] Even before his election, Roosevelt supported federal flood control spending, especially in response to the devastating 1927 Mississippi floods, although he was more invested in forests than rivers.[13] The New Deal offered new hope even as it "reaffirmed relations between the state and landowners that had been developing since the nineteenth century."[14] The New Deal tried to combat economic problems at a national level but did "not aim to alter fundamentally the American economic culture."[15] It sought to give farmers and workers much-needed hope and financial support.[16] The New Deal supported major civil works to generate employment. Infrastructure creation and maintenance, especially multi-purpose river valley projects, received tremendous funding during this period. During this era, multipurpose irrigation and dam projects grew radically, and the TVA acted as a "providential panacea" for social and economic ills.[17]

In his book, Jason Scott Smith outlines how between 1933 and 1939, public works programs received two-thirds of U.S. federal emergency expenditures on average. This expansive public works program hinged on the creation of new agencies such as the Public Works Administration (PWA) and the Works Progress Administration (WPA).[18] Before the PWA and WPA even got to work, the administration created the National Recovery Administration (henceforth referred to as the Recovery Administration) in the summer of 1933.

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[12] Worster, *Dust Bowl*, 24.
[13] O'Neill, *Rivers by Design*, 153; See also William E Leuchtenburg, *Franklin D. Roosevelt and the New Deal, 1932-1940* (New York: Harper Perennial, 2009).
[14] O'Neill, *Rivers by Design*, 177.
[15] Worster, *Dust Bowl*, 43.
[16] Leuchtenburg, *Franklin D. Roosevelt and the New Deal, 1932-1940*; Worster, *Dust Bowl*.
[17] North Callahan, *TVA: Bridge over Troubled Waters* (South Brunswick, [N.J.]: A. S. Barnes, 1980), 29.
[18] The PWA "applied" its initial appropriation of $ 3.3 billion to heavy construction and large-scale building through a reliance on private contractors. The WPA, on the other hand, although initially "intended as a vast relief effort for employing the unskilled" ended up built a vast array of impressive projects. These two programs—the PWA and WPA— "integrated a multitude" of municipal agencies, the Army Corps, and civil engineers "into the national state." Jason Scott Smith, *Building New Deal Liberalism: The Political Economy of Public Works, 1933-1956* (New York: Cambridge University Press, 2006), 1-2.

The Corps worked with all three agencies—the PWA, the WPA, and the NRA—throughout the 1930s on various projects, including large-scale dam projects. Congress let the executive branch finalize the details of the PWA, meaning that though the legislature had not yet approved dredging-related projects, the funds were already available through the National Industrial Recovery Act. Congress acted retroactively, mostly, and sanctioned various dredging-related projects.[19] The Recovery Administration carried out much of the civil works in the Great Lakes, and especially in the Detroit River, during this era.[20]

Crystal Bay was a part of an economic and ecological recovery project. Dike creation was also an exercise in water level restoration, ultimately bringing stasis to a faster flowing river through the Livingstone Channel. Much like the faster current, the island had its origins in the 1912 hearings. Though cast as extensions of the 1913 proposal, the dikes that made up Crystal Bay were more than just that. These were unique, separate, incremental, and iterative infrastructures that were also the preparatory building blocks of the Seaway. Even as the Chicago diversion plagued a cohesive Great Lakes water agreement that would usher an international waterway connecting Duluth to Montreal and beyond, the building blocks in Great Lakes connecting channels were the perfect segue between actions of the past such as the Livingstone Channel and crosscurrent and the prospect of the future such as the Seaway. This infrastructure then compensated for the past as it paved the way for the future.

This chapter uses a narrative strategy of overlap. Three subsections all beginning in 1921—on auto and increasing shipping tonnage, incremental improvements in the Detroit River,

[19] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 195.
[20] In its 1933 report, the Army Corps applied over $2 million in funds from the National Industrial Recovery Act in new work in the Detroit River, which included over $1.7 million dollars towards deepening the Livingstone Channel over 19334-5. "Annual Report of Chief of Engineers United States Army, 1933," Part I, Washington: Government Printing Office, 980-2

and the resurgence of the Chicago diversion—chronicle the 1920s in related but different ways. This is a deliberate choice to allow the reader to consider events at the watershed, economy, and river levels. Overlapping these three chronologies allows us to consider processes, politics, and people more holistically.

Deciding to Agree

The Corps believed that the dike proposed in 1913 "would so mitigate or reduce the velocity of the cross current" thus protecting navigational interests without being an onerous financial expenditure. As of 1917 though, most of the dry cut was only 300 feet wide and with a full depth of 21.8 feet. The westerly dike, as recommended by the Commission, to reduce the crosscurrent had not yet been constructed to "the full height intended, lacking about 8 feet of such height."[21] The Livingstone Channel did not just encircle a placid river with walls. In deepening the river bottom, the dry cut increased river velocity since it offered a deeper, faster passage into Lake Erie. The river was now caught between two opposing forces—displacement by ships and its memory of the area being shallow. Forced to run through a channel it did not choose, the river repurposed its kinetic energy into the crosscurrent.

The Corps responded with another recommendation for a dike "between the cofferdam and the Amherstburg channel" using excavated material.[22] This new dike's area and height could be varied based on water-level measurements taken during channel expansion. These recommendations underscored two of the Corp's formative claims. First, the new dikes would

[21] William M. Ingraham, "Livingstone Channel, Detroit River, Mich. Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich. with a View to Securing Increased Width," August 4, 1917, 8-9.
[22] William M. Ingraham, "Livingstone Channel, Detroit River, Mich. Letter from the Secretary of War, Transmitting, with a Letter from the Chief of Engineers, Reports on Preliminary Examination and Survey of Livingstone Channel, Detroit River, Mich. with a View to Securing Increased Width," August 4, 1917, 14.

not alter water levels; therefore, there was no need to further refer to the Commission, instead, the Corps only needed agreement from the Canadians. Second, the crosscurrent would not disappear. Elimination may be impossible, but mitigation was not. As always, the only way out of this conundrum was to build more.

The Carriers had hoped that these new improvements would be a part of the 1917-1918 Rivers and Harbors Bill, but the Great War interceded, and these plans moved to the 1919 bill instead, which did authorize dry cut expansion.[23] In the summer of 1919, the Acting U.S. Secretary of State, William Phillips, wrote to Great Britain's Charge d'Affaires ad interim informing the latter that the U.S. Congress had approved monies for the compensatory dike. As before, since a "considerable portion" of the work was in Canadian waters, the United States needed formal Canadian permission to widen the channel to 450 feet and a depth of 22 feet.[24] The handmaiden of widening was compensation, the other part of the plan. The Corps proposed the creation of one cofferdam west of the Livingstone Channel as well as a disposal area to the east. This disposal area would consist of "sufficient excavated material," which in addition to the dike, would ensure "full compensation of water levels from the increased flow through the widened channel."[25] In asking the Canadians for permission, the Corp's engineers argued that they believed the new work would not materially alter water levels because they had already factored for any drop by proposing compensatory dikes. The ultimate dredging equation was balanced by inserting compensation as the other side of extraction. If the Canadians concurred with this observation, then there would be no need to refer the proposed work to the

[23] Lake Carriers' Association, "Annual Report of the Lake Carriers' Association" (P.N. Bland Printing Co., Detroit, 1917), 79, Haathi Trust, https://hdl.handle.net/2027/mdp.39015010724378. Lake Carriers' Association, "Annual Report of the Lake Carriers' Association" (P.N. Bland Printing Co., Detroit, 1918), Haathi Trust, https://hdl.handle.net/2027/mdp.39015020918366.
[24] William Phillips, letter, June 2, 1919, 1, in RG 25 Vol 1244 File 1919-607, Library and Archives of Canada.
[25] William Phillips, letter, June 2, 1919, 2.

Commission. If there was a disagreement though, the U.S. government was open to making a reference to the Commission.[26]

The Canadians acquiesced to the Corp's proposal and did not see the need to go to the Commission. The Canadians relied on the Corps to monitor water levels and share gauge data. So, there was little the Canadians could challenge about changes in water levels, without data. This cooperative moment stands out among other examples. Instead of choosing to go to the Commission or the Commission intervening, both nations agreed to bypass the binational body. In couching additional dikes as being a part of the 1913 recommendations, engineers on both sides of the border were reviving the techno-infrastructural diplomacy from the pre-commission era. In seeking a path of cooperation to not make a reference to the Commission, when they ought to have, both countries were testing the binational body's powers, which seemed to "be empowered to fulfill the functions of a conciliation commission."[27] The Commission could weigh in on matters that had not directly been referred to it, using its investigative powers, such as the expansion of the dry cut entrance in 1913.[28] Under the Boundary Waters Treaty, the Commission could have considered the post-1917 system of compensatory dikes on the other side of the Livingstone Channel. Yet, it chose not to use its investigative or judicial powers. To be sure, the infrastructure being considered was physically and materially different from the 1913 dike. By agreeing that eventually creating a new island in the lower Detroit River was an extension of the Commission's 1913, both nations sidestepped the binational body. In effect, cooperation created a pathway for Commission to look the other way when it came to the

[26] William Phillips, letter, June 2, 1919, 2.
[27] Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*, 37.
[28] Chacko, *International Joint Commission between the United States of America and the Dominion of Canada*, 37-38.

Livingstone Channel whilst also empowering both nations' engineers to continue building through cooperation.

Concurrently with the Corp's changes to the Livingstone Channel, the largest tributary upstream of the Detroit River, the Rouge, went through drastic alterations as well. Construction on Henry Ford's River Rouge Plant began in 1917, which sat by the river it shared a name with. Immediately, the plant aided war production.[29] The new automobile plant, with access to rail lines, a turning basin, as well as easy access to sister plants across the border was a radical departure from the original marshlands that had lined the Rouge as it created an oxbow before merging into the Detroit River. Through the nineteenth and early twentieth centuries, this marshland was claimed for housing and industry. Finally, in 1917, the River and Harbors Bill authorized the expansion of the 'short-cut' canal which created a straighter, deep navigational channel that ended in a turning basin at the mouth of the Ford slip at the River Rouge Plant. The 'old channel' of the Rouge through the oxbow was also widened and continued its curvy path to the Detroit River. Between the two arms of the Rouge there now was another human-made island—Zug—which was former marshland and today is known as one of the most polluted places in North America.[30] Through the short-cut canal, Ford's River Rouge plant was connected to the Atlantic Ocean.

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[29] Henry Ford and Samuel Crowther, *My Life and Work* (Seattle, WA: CreateSpace Independent Publishing Platform, 2014).

[30] Tim Lougheed, "Arising from the Ashes? Environmental Health in Detroit," *Environmental Health Perspectives* 122, no. 12 (December 2014), https://doi.org/10.1289/ehp.122-A324; John H Hartig, *Burning Rivers: Revival of Four Urban-Industrial Rivers That Caught on Fire* (Brentwood: Multi Science Publishing, 2010); John H. Hartig, ed., *Honoring Our Detroit River: Caring for Our Home* (Bloomfield Hills, Mich: Cranbrook Institute of Science, 2003); J. H. Hartig et al., "Long-Term Ecosystem Monitoring and Assessment of the Detroit River and Western Lake Erie," *Environmental Monitoring and Assessment* 158, no. 1–4 (November 2009): 87–104, https://doi.org/10.1007/s10661-008-0567-0; Brian Allnutt, "'The Dirtiest Square Mile in Michigan': Exploring the Past, Present, and Future of Zug Island, the Heavily Industrialized Site on Detroit's Border," Curbed Detroit, January 23, 2020, https://detroit.curbed.com/2020/1/23/21078486/zug-island-detroit-closing-river-rouge-pollution. Zug island has also been the subject of fiction. See Gregory A Fournier, *Zug Island: A Detroit Riot Novel* (Tucson, Ariz.: Wheatmark, 2011); Paul Vasey, *The River: A Memoir of Life in the Border Cities*, First edition (Windsor, Ontario: Biblioasis, 2013).

The Rouge Plant's development and its alterations to the river were key parts of a larger plan for economic and industrial developments. At the end of the Great War thanks to "the wartime growth of North American industrial and agricultural production, the strain that the great conflict placed on railroad systems, the need for protected shipbuilding, and shortages of electrical power gave the St. Lawrence idea momentum in the post-1918 years."[31] The "Great Waterways Conference" in Windsor was a prime example of this gathering drive. Organized by the Windsor-based Border Chamber of Commerce, the gathering was meant to create and ratify the Canadian Great Lakes-St. Lawrence Tidewater Association. In his opening address, chair F.A. Nancekivell remarked that water transportation was "much cheaper than rail transportation" especially when considering the "wonderful natural system of inland waterways" that was the "joint heritage of Canada and the United States."[32] Nancekivell believed that there that this waterway would aid transportation and supply grains. There was "comparatively little" to do in addition to all that had already been done to ensure "a deep waterway from the Atlantic Tidewater to the head of the Great Lakes," the time was ripe "to get behind the project and push it through."[33]

Ches P. Craig, the Vice-President of the Great Lakes-St. Lawrence Tidewater Association opined on the possibility of creating an "American Mediterranean" which would be as beneficial to North America as the Mediterranean Sea was to Europe.[34] Canadian producers

[31] Macfarlane, *Negotiating a River*, 2014, 28.
[32] Great Waterways Conference, *Great Waterways Conference: Organization of the Canadian Deep Waterways and Power Association: Proceedings: Border Chamber of Commerce, 18th and 19th November 1919.* (Windsor, Ont.? éditeur non identifié, 2018), 5, http://online.canadiana.ca/view/oocihm.74367.
[33] Nancekivell believed that apart from the savings in transportation costs, the possible development of electrical energy "in connection with the work would most desirably offset the present and anticipated coal shortage" and might even aid finance the project. See Great Waterways Conference, 5.
[34] Great Waterways Conference, *Great Waterways Conference: Organization of the Canadian Deep Waterways and Power Association: Proceedings: Border Chamber of Commerce, 18th and 19th November 1919.* (Windsor, Ont.? éditeur non identifié, 2018), 7, http://online.canadiana.ca/view/oocihm.74367.

needed greater access to more markets, Craig remarked. He commented not just on the need to connect Canada to the world but also on the changing balance of trade between Great Britain and Canada. Canadian railroads, Craig pointed out, should not object to this development as the former was reaching maturity.[35] The "great North American Mediterranean" was a "safety cable" so that if "conditions" around one "class of transportation" rendered it useless, the other could remain open.[36] The economic life of both countries depended on it. Craig thought the project could be completed inside of five years, and it would "be just two years after the shoe pinches." Such a development would help each country to come "into its own by our common efforts for a common purpose."[37]

The Great Lakes-St. Lawrence Tidewater Association traced its lineage to the 1895 Deep Waterway Commission which was the first time both Canada and the United States had agreed on creating a canal along the course of the St. Lawrence to facilitate ocean liners. The Tidewater Association was a binational attempt at discussing what would become the St. Lawrence Seaway. The resurfacing of the seaway idea was also the expansion of shipping interests' ambitions for the waterways of the Great Lakes. Even though the seaway would still be decades away, the possibility of "a deep waterway leading out from the heart of the continent," much like Livingstone's calls in the 1890s.[38] When finally constructed, the Seaway expanded connections

[35] Emphasizing that the railroad network was not robust enough to deal with the increasing freight demands, Craigs remarked that railroads and fuel could not have supported the war effort if it had continued any longer. It was the prerogative of the waterways to relieve the railroad networks and the railroads "should not" oppose this development. The railway "situation" could not "be remedied in the nature of things," which only meant that the deep waterway was an emergency because it would save thirty-six million tons of coal and would be the most efficient alternative and back-up to rail transportation. Great Waterways Conference, 7; See also Macfarlane, *Negotiating a River*.
[36] Great Waterways Conference, *Great Waterways Conference*, 11.
[37] Great Waterways Conference, 11.
[38] Daniel Macfarlane, "To the Heart of the Continent: Canada and the Negotiation of the St. Lawrence Seaway and Power Project, 1921-1954" (Ottawa, Canada, University of Ottawa, 2010), 56, https://central.bac-lac.gc.ca/.item?id=TC-OOU-19685&op=pdf&app=Library&oclc_number=1032900972, see also Livingstone, "The Great Lakes or The Twenty Foot Problem."

from Montreal to Kingston and incentivized the altering of connecting channels including the Detroit River to handle the projected new traffic.[39] Looked at from a watershed level, the incremental changes to the connecting channels of the Great Lakes, along with the St. Lawrence Seaway and the Erie and Welland canals, fundamentally altered the hydrological regime of the lakes, in addition to bringing in invasive species.[40]

Before the Great Waterways Conference in 1919, W.J. Stewart, a consulting engineer in the Canadian Department of Marine wrote to the Canadian under-secretary of State outlining the history of the channel construction and previous improvements. Stewart noted that the new improvements proposed by the Corps—new dikes to thwart the crosscurrent and raise water levels—would only "slightly increase the discharge capacity of the river." Steward confidently stated that the westerly dike proposed in 1913 would also "contract" this increased discharge capacity, so the "disturbance will be practically a negligible quantity." This negligible disturbance could "easily" be corrected by depositing the excavated material "east of the cofferdam as proposed." In so doing, Stewart was echoing his colleagues in the Corps who had long argued that by balancing dredging with compensation, lake levels would not be altered and therefore local project proposals could be explicitly limited from upstream or downstream effects. Stewart further recommended that the Canadian government express no objections if the United States constructed the project under the condition that Public Works was satisfied and kept informed about the expansion plans and actions. [41]

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[39] "Detroit River Is Blasted to Deepen Link to Sea," *Chicago Daily Tribune*, May 29, 1957; Robert E. Jackson, "Seaway Will Open Gate to Midwest: St. Lawrence River Project Will Put Great Lakes Cities on World Doorstep," *Los Angeles Times*, July 21, 1957; "Great Lakes Channel Work Starts," *The New York Times*, May 29, 1957.
[40] Alexander, *Pandora's Locks*.
[41] W.J. Stewart, letter, July 30, 1919, 4-5 in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives Canada.

These conditions were reminiscent of those first imposed in the 1890s regarding expansions to the Amherstburg Channel. These instructions were an important bridge ensuring bilateral communication and therefore cooperation. Engineers in both nations communicated with one another and agreed that water levels would not be altered substantially. Without the oversight of a bilateral body like the Commission, this agreement was based on data supplied by the United States. In the absence of binational data or oversight, this communication then bonded and furthered the engineers' diplomatic mission, one that they had been fulfilling since the late nineteenth century. Despite the short episode of the Commission taking over the techno-infrastructural diplomacy in the lower Detroit River during the 1912 hearing, engineers in both nations had carved back this role. A seminal catalyst and legitimating factor in their confidence were conditions outlining the new dikes being a part of precedent stipulated in the 1913 recommendations. In locating new infrastructure creation in precedent, engineers obviated any possible need to refer the matter to the Commission. By streamlining this communication amongst themselves, engineers went back to being interlocutors between politicians and political matters when it came to dredging.

Armed with these conditions about the need to keep Canadian engineers informed about current and future dikes in the Detroit River, in August 1919, H.H. Walker, the Canadian under-secretary of State for External Affairs gently nudged the deputy ministers of Public Works, Marine, Naval service, and the Interior who were "yet in a position to furnish" their observations regarding the proposed improvements.[42] No one indicated objections.[43] Ontario though had yet to

[42] H.H. Walker, various letters, August 20, 1919, in *Improvement of Livingstone Channel in Detroit River,* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada.
[43] Letters from the Deputy Minister of the Interior, August 26, 1919, Assistant Deputy Minister, of Marin (August 23, 1919) and D.J. Desbarats, Deputy Minister of Naval Service, August 21, 1919, in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada.

weigh in.[44] When the province did, its Lieutenant-Governor John Hendrie expressed no objections to the project in so far as navigation was concerned because that was under the purview of the federal government, in a detailed response to the Department of External Affairs. However, Ontario was "vitally interested in the maintenance of proper access to every lake and river port" in the province and "bound to object to any work" that would injure the same. [45] Presuming that the waste banks were compensatory structures (see figures 4.2 and 4.3), Hendrie remarked that if these were unable to "serve such purpose effectively" the province expected the U.S. government to "undertake whatever further, or other work that may be necessary to fully maintain such balance, and protect the interests of the owners on the Canadian side, as well as the chief commercial interests of the citizens of Ontario in the maintenance of efficient water transportation to its harbors and water fronts."[46]

By September 1919, the department of Naval Service had also confirmed that the improvements should not affect water levels and that it would "be quite unnecessary to refer the matter to the International Joint Commission."[47] The Privy Council followed with approval based on two conditions: one, that the Corps should start monitoring water level as soon as construction began. And two, that all the "work on the Canadian side including the dumping of material shall be done to the satisfaction of the Chief Engineer of the Department of Public

[44] P. Pilletier, Acting Under-secretary of State, letter, August 8, 1919, in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada.
[45] John S. Hendrie, Lieutenant Governor of Ontario, letter, August 11, 1919,1- 2 in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada.
[46] John S. Hendrie, Lieutenant Governor of Ontario, letter.
[47] M.J. Stewart, letter, September 5, 1919, 1-3, in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada.

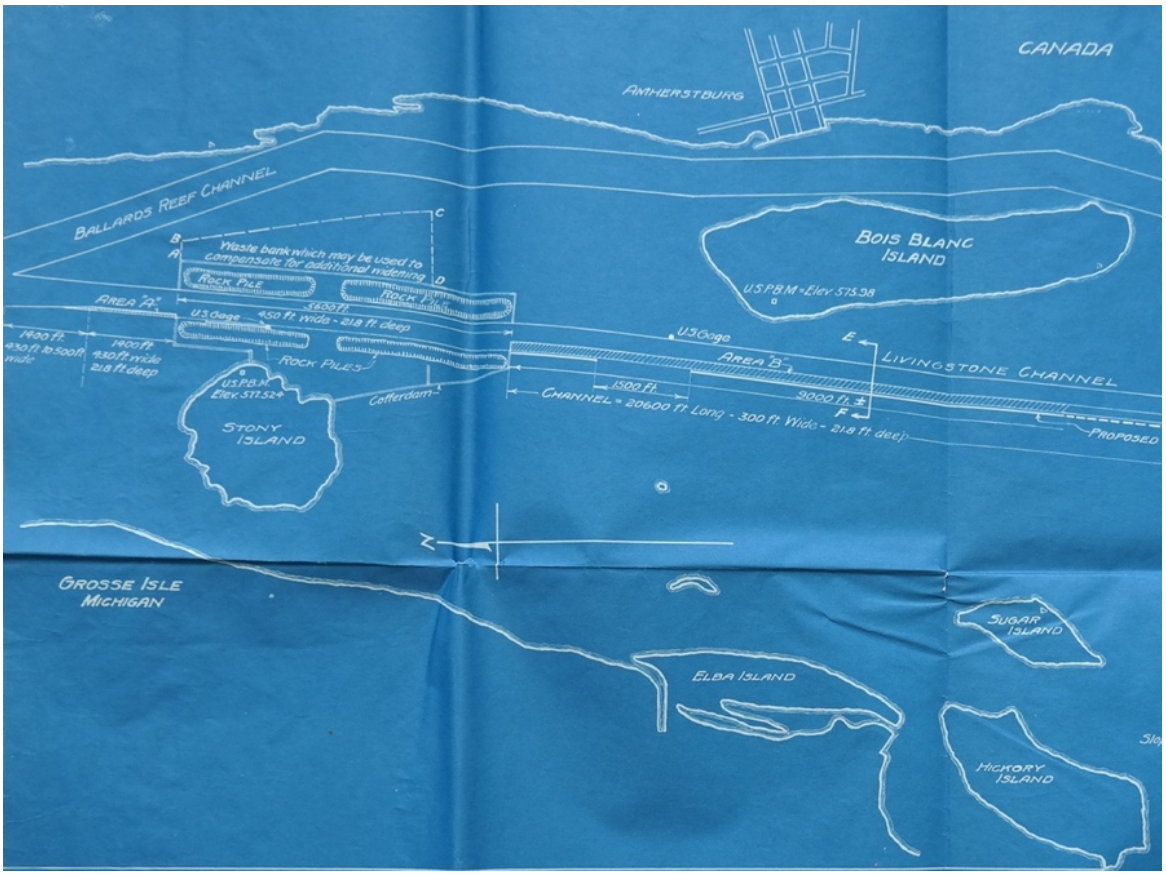

Figure 4.2: Planned dikes and compensatory works in Improvement of Livingstone Channel. Detroit River.

Source: Library and Archives Canada/Department of External Affairs fonds/RG 25-A-3-a, vol. 1244, file 1919-607

Works."[48] That same month, an Order in Council acquiesced to the expansion.[49] Though this approval did not give the US government the explicit right to deposit dredged material into what

[48] Canada also agreed to a temporary change in navigation rules to allow both up and downbound traffic to use the Amherstburg channel, thus taking navigation back to pre-Livingstone Channel rhythms. These temporary rules were revoked in 1926 by mutual agreement. Letter from the Privy Council, September 12, 1919, 3 in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada.
[49] Letter from the Privy Council, September 12, 1919, 1-4 in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG25 Vol 1244 File 1919-607, Library and Archives of Canada; Clerk of Privy Council, June 25, 1921, 4 in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG 25 Vol 1297 File 1921-577.

would become Crystal Bay, the Dominion Government condoned the practice as it was "an extension" of that which had already been authorized.[50] The Order in Council further reinforced the techno-infrastructural diplomacy as run by engineers and not the Commission. Both nations worked together to undermine the Commission.

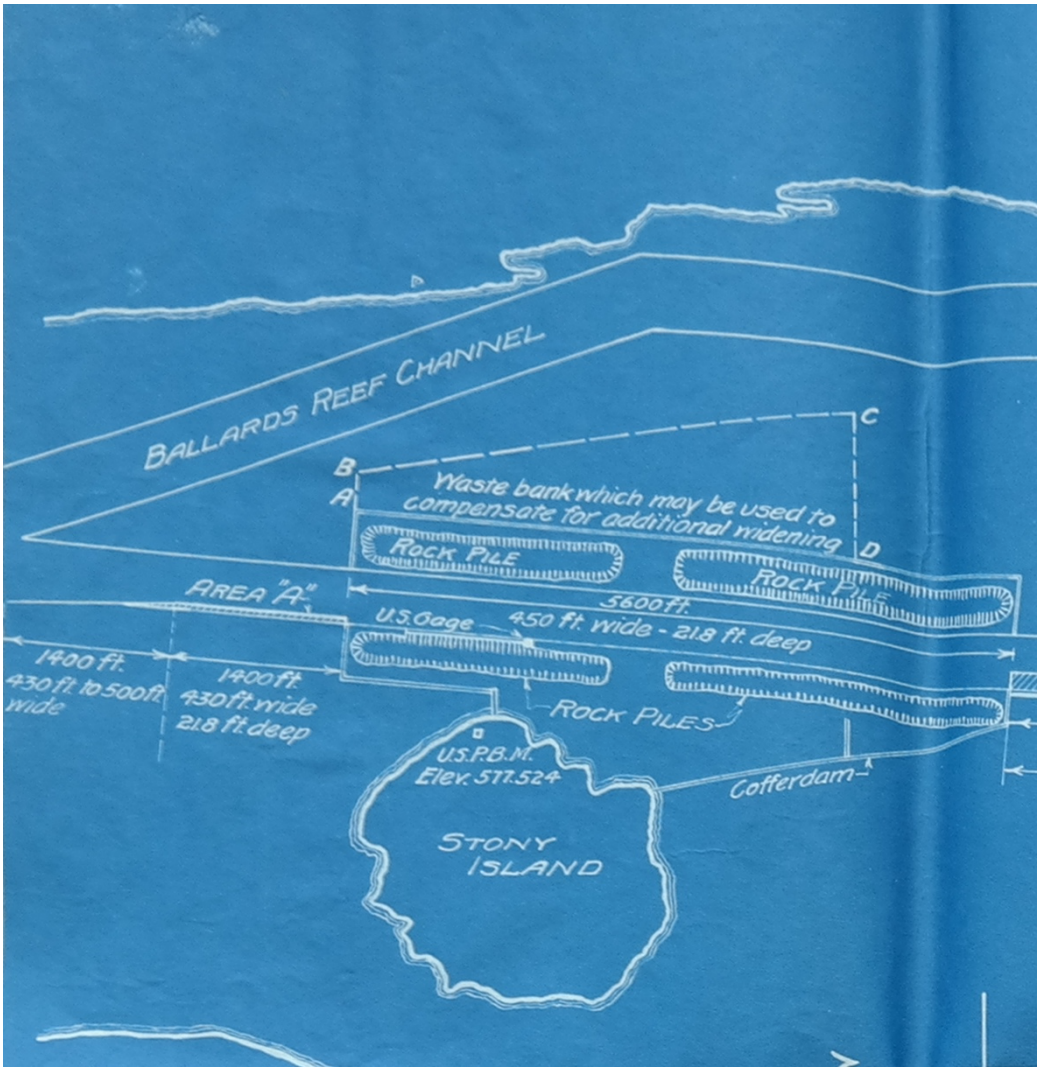

Figure 4.3: Footprint of Crystal Bay and Island. Area A-B-C-D is the footprint of Crystal Bay and Island today.

Source: Library and Archives Canada/Department of External Affairs fonds/RG 25-A-3-a, vol. 1244, file 1919-607

[50] Eugene D. Lafleur, "Memorandum for the Assistant Deputy Minister," April 21, 1921, in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG 25 Vol 1297 File 1921-577.

By ignoring the binational body meant to regulate developments to ensure equity of both access and preservation, both nations were hollowing the Commission from its base.[51] The 1919 Order in Council set a precedent for both the Corps and their Canadian counterparts to continue working together and go around the Commission. Through the 1920s and 1930s, when Crystal Bay and Island took form (Area A-B-C-D in figure 4.2 and 4.3), there were further such orders by the Privy Council acceding to the Corp's requests for widening, deepening of the channel, and/or depositing dredged material on to dikes that kept the Commission out of the Livingstone Channel. In the summer of 1920, the Corps began work on the dry cut by shutting it down thus sending all traffic down the Amherstburg channel. Col. Markham, the Corps district engineer noted that reverting to pre-Livingstone Channel navigational rhythms accentuated the "appreciable, though unavoidable, hazard" of an accident or grounding and therefore "should be reduced to a minimum" by making sure the entire length of the dry cut in the Livingstone Channel was also widened as soon as possible.[52] While everyone intended the work to finish as quickly as possible, this new problem placed pressure on the old Amherstburg channel which now handled all the shipping traffic again, bringing calls for further improvements.

[51] During the 1913 hearings, the Canadians had constantly complained about the Chicago diversion, hoping to bring it to bear to anything the Commission would recommend in the Detroit River. This was a rare chance at equity, even if procedural and nominal, giving "Canada a voice within the commission equal to the United States." Yet, by the end of the hearings when it was obvious that the Commission was circumscribing its own role, as well as its narrow scope of influence, the Canadians had reluctantly reverted to engineers running the techno-infrastructural diplomacy. Daniel Macfarlane, *Negotiating a River: Canada, the US, and the Creation of the St. Lawrence Seaway*, Nature, History, Society (Vancouver: UBC Press, 2014), 23; see also Lemarquand, "International Joint Commission and Changing Canada-United States Boundary Relations."

[52] "Annual Report of the Chief of Engineers, U.S. Army, 1920. In Three Parts." (Washington D.C. Government Printing Press: War Department, 1920), 1606.

Limits to shipping: Economics and Ecology

The Roaring Twenties began with great uncertainty about the ability of shipping channels to sustain the growing trade. In 1920, after a few months of the United States living under Prohibition, the navigation season began. *The Globe* reported that the Livingstone Channel was a "graveyard" of missing "loads of liquor" from smugglers' convoys originating in Canada.[53] The Detroit River was one of the most effective rum-running corridors in addition to carrying bulk cargo.[54] For the burgeoning auto trade centered around Detroit, the river was an all-important artery for the increasingly vertically integrated and more dependent on rivers to feed their plants, even though there were fewer firms left.[55] For instance, until 1920, Ford-Canada was operationally independent of its American ancestor in Detroit. Even though they

[53] A U.S. federal official had discovered a truckload of Canadian liquor which had "foundered" when the ice gave way. The truck obstructed 21 of the 22 feet depth in the channel ensured no boats could pass through. The salvage operation "caused much excitement among watchers on the shores and on motor boats that swarmed in the vicinity." The paper noted that the U.S. federal government had forbidden "liquor fishing" in or around the channel but had reserved that right for itself. Special Dispatch to *The Globe*, "Get Many Missing Loads of Liquor: Livingstone Channel Will Be Cleared of Submerged Casks and Trucks," *The Globe (1844-1936)*, March 6, 1920, 14, ProQuest Historical Newspapers.

[54] Coinciding with the Federal enforcement of Prohibition was the expiration of the Wartime Prohibition Acts on January 1, 1920. Ottawa authorized the provinces to make their own decisions about Prohibitions. Ontario, like all the provinces (except Quebec) passed legislation prohibiting the sale of liquor except for medicinal use. The Canadian federal government did, however, authorize liquor production irrespective of the province's stance on the sale of liquor. In 1920, Ontario authorized twenty-nine breweries and sixteen distilleries to manufacture liquor. Several of the largest manufacturers were along the Detroit River including Hiram Walker's that produced Canadian Club Whiskey. Boats laden with alcohol ostensibly bound for Cuba regularly docked on the American shore, allowing bootleggers to unload the illegal commodity. The Detroit River was a particularly advantageous smuggling frontier not just because of its short length but also the numerous islands that were perfect hiding places for smugglers, especially Bois Blanc, Grosse Ile, Belle Isle, Peche, and Fighting islands. Prohibition brought renewed attention to the Detroit River. The illicit liquor trade was especially pronounced along the waterway. According to some estimates, nearly 75 percent of all smuggled alcohol entered the United States via the river. The river became infamous as a 'smugglers paradise' because of its many islands and the prevalence of homes along the river. Philip P. Mason, *Rumrunning and the Roaring Twenties: Prohibition on the Michigan-Ontario Waterway*, Great Lakes Books (Detroit: Wayne State University Press, 1995); Ronald G. Hoskins, "Walker, Hiram," in *Dictionary of Canadian Biography* (University of Toronto/Université Laval, 2003), http://www.biographi.ca/en/bio/walker_hiram_12E.html; Paul-Matthias Tyrell, "Utilizing a Border as a Local Economic Resource: The Example of the Prohibition-Era Detroit-Windsor Borderland (1920–33)," *Comparative American Studies An International Journal* 13, no. 1–2 (June 2015): 16–30, https://doi.org/10.1179/1477570015Z.00000000096; Holly M. Karibo, *Sin City North: Sex, Drugs, and Citizenship in the Detroit-Windsor Borderland* (Chapel Hill: The University of North Carolina Press, 2015); Larry Engelmann, *Intemperance, the Lost War against Liquor* (New York: Free Press, 1979).

[55] Charles K. Hyde, "The Dodge Brothers, the Automobile Industry, and Detroit Society in the Early Twentieth Century," *The Michigan Historical Review* 22, no. 2 (1996): 48, https://doi.org/10.2307/20173586.

shared the same progenitor, Ford-Canada was not owned by Henry Ford.[56] Apart "from sharing products, production plans, and a name that had little to do with each other."[57] Ford-Canada also gave Ford vehicles a unique entry point to the rest of the British Empire. By 1920 however, there was a change in thinking at Ford Detroit and Ford-Canada that went from being benign neglect to being actively seeking control by its American namesake.[58] This move towards greater control and integration between Ford Detroit and Ford-Canada was inevitably related to the changes across the river where the Rouge plant was taking shape with greater parts of the Rouge River altered to make space for it. The plant "was built to accommodate changing production flows without creating a rigid arrangement that might constrain further innovations."[59] The Rouge River plant was completed in 1928, by which time the "river was subordinated to industrial production, and in the area near the Ford factory it appeared to be an artificial waterway."[60] As the plant became the heart of the growing Ford empire, the river worked as the thoroughfare that supplied raw materials like iron ore and coal.

Rising tonnage on these rivers reflected the success of these changes. According to the Corps, the estimated value of tonnage that traversed the Detroit River went up from $450 million in 1902 to over $1 billion in 1918.[61] At the end of the 1920s, the estimated value of tonnage

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[56] David Roberts, *In the Shadow of Detroit: Gordon M. McGregor, Ford of Canada, and Motoropolis*, Great Lakes Books (Detroit: Wayne State University Press, 2006).
[57] Dimitry Anastakis, "From Independence to Integration: The Corporate Evolution of the Ford Motor Company of Canada, 1904–2004," *Business History Review* 78, no. 2 (2004): 220, https://doi.org/10.2307/25096866.
[58] Henry Ford was not very interested in controlling Ford-Canada. Edsel Ford was. First appointed to the Ford-Canada board in 1922, Edsel Ford worked with brokerage firms in Detroit to purchase more shares. By 1929, the family had the opportunity to have greater control over the Canadian operations. Anastakis, "From Independence to Integration," 229-230.
[59] Nye, "Narrating the Contested Space of Detroit's River Rouge, 1600–2015," 32.
[60] Nye, 32. See also Ford R Bryan, *Rouge Pictured in Its Prime: Covering the Years 1917-1940*, 2014
[61] United States. Army. Corps of Engineers, "Annual Report of the Chief of Engineers, United States Army, 1919; Report of the Chief of Engineers, U.S. Army, 1919; Annual Reports, War Department, Fiscal Year Ended June 30, 1919; Report of the Board of Engineers for Rivers and Harbors and Reports of District Engineers Accompanying the of the Chief of Engineers, U.S. Army for the Fiscal Year Ended June 30, 1919; Reports of District Engineers Accompanying the of the Chief of Engineers, U.S. Army for the Fiscal Year Ended June 30, 1919" (Government Printing Office, 1919), Part II, 3279.

stayed around the $1.2 billion mark.[62] Through the first half of the 1920s, there was a fair amount of variation in the quantities of iron ore shipped from Lake Superior to the lower Lakes on account of two kinds of fluctuations: industrial and climatological. In 1921, "a year marked by postwar industrial stagnation and deflation," 22.5 million tons of iron ore passed through the locks at Saulte. St Marie, as compared to 47 million tons in 1920. By 1923, when "American industry was better adjusted to a peacetime economy" about 59 million tons of ore moved through the locks and leveled out at about 54 million tons in 1925.[63]

The lack of adequate precipitation over Lake Superior reduced the carrying capacities of both the St. Mary's River and canal. Before 1916, the annual mean flow of the St. Mary's River had been about 80,000 cubic feet per second (CFS), but this dropped to 40,000-50,000 CFS between 1922 and 1925. This "reduced flow, combined with evaporation in the lower lakes caused by high, persistent winds and exceedingly hot summers between 1920 and 1924, resulted in a reduction in the levels of the lower lakes as well as in the channels connecting them." Thus, connecting channels like the St. Mary's River could "no longer offered continuous safe passage for vessels of 20-foot draft throughout the navigation season." In fact, in 1921, channels were deep enough to offer a "20-foot draft for only 40 percent of the navigation season." Water levels were fluctuating enough that the Commission stepped in and instituted rules that restricted discharge to the lower lakes "except what was needed for power, lockage, and a very small flow over St. Mary's Falls," effectively thwarting any new plans for massive expansions of the locks in addition to stopping traffic. This fluctuation meant that by 1923, an additional four million tons of freight could have passed through the connecting channels but was unable to. By 1924,

[62] United States. Army. Corps of Engineers, "[1930 Chief's Annual Report]; Report of the Chief of Engineers, U.S. Army, 1930; Annual Reports, War Department, Fiscal Year Ended June 30, 1930" (U.S. Government Printing Office, 1930), Part I., 1588.
[63] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 191.

"it was not possible to pass through the connecting channels with 20-foot draft at any time during the season." [64] The yearly fluctuation meant the "loss of more inches of channel depth due to receding lake levels became a matter of increasing import to shipping efficiency and transportation charges for bulk commodities."[65]

The Corp's response to natural limitations was to remove obstacles. Recommending the removal of the Round Island Middle Ground in the St. Mary's River to facilitate navigation in 1925, the Corps faced a fiscally conservative administration that dragged its feet on the question since federal monies were at stake. In 1927, was there some movement as Congress authorized monies to improve channels in Lake Superior followed by a Corps recommendation for more improvements in Lake St. Clair and deepening of connecting channels throughout the lakes to facilitate the larger ship drafts. The latter was stalled until the crash of 1929. When President Hoover took over, investments in lake improvements received a fillip. President Hoover promoted the Corps "into a better position to compete with other agencies for multipurpose projects by having the boundaries of Corps districts remapped to match river drainage areas."[66] He appropriated funds "for work on the 1928 Mississippi flood control project by justifying it as a relief program for the unemployed."[67] Hoover opposed "providing direct federal aid to the unemployed" but was amenable to infrastructure investments that could drive employment. [68] A few months before the Ambassador Bridge opened in July 1930, Hoover signed "a $145 million rivers and harbors act which, among other things, authorized implementation of the 1928

[64] Larson, 191.
[65] Larson, 191.
[66] O'Neill, *Rivers by Design*, 147.
[67]O'Neill, 147. See also Joseph L. Arnold, "The Evolution of the 1936 Flood Control Act" (Office of History, U.S. Army Corps of Engineers, 1988), https://usace.contentdm.oclc.org/digital/collection/p16021coll4/id/257/.
[68] O'Neill, *Rivers by Design*, 148.

recommendation to deepen downbound sections of the connecting channels.[69] Together, this opened the path to Crystal Bay and Island.

This renewed interest in lake improvements was driven in part by the Great Depression and the New Deal but also by parallel movement on the St. Lawrence Seaway. These improvements to deepen connecting channels were a part of the long-negotiated Seaway. The Chicago diversion was the constant stumbling block in the Seaway's path. Through the 1930s and 1940s, policymakers pushed to make the St. Lawrence Seaway legislation more comprehensive—supporting better-defined roles and clearer impact statements to ensure the safe and efficient movement of ships in addition to generating electricity.[70]

Seaway, Tunnel, and Bridge, again in the Detroit River

In April 1921, Col. Markham, the Corp's Detroit district engineer asked the Dominion Government for permission for further channel widening and extension of dumping grounds. That same month, the Canadian Public Works Chief Engineer, based on input from the district engineer advised that this permission be given. Since much of the work was in Canadian waters, it was "entirely reasonable that the materials excavated in this work should be wasted in Canadian waters." The Canadian district engineer, Craig, in agreement with Markham, pointed out that areas proposed for dumping were an "extension of dumping areas heretofore utilised," even though this extension had "not been approved by Order-in-Council of September 10th, 1919." The "resulting benefit to navigation," from widening could not be obtained without this extension. Additionally, utilizing dumping area A (figures 4.2 and 4.3) "should tend to reduce or correct the cross current," which was a result of "the dike constructed on the west side of the

[69] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 194.
[70] Macfarlane, *Negotiating a River*, 2014.

Livingstone Channel, as ordered by the International Joint Commission [in 1913]."[71] Public Works concurred with Craig and thought the project should go on subject to the same conditions that the Privy Council had laid out in their 1919 Order in Council. Eventually, the Canadians permitted the new expansion and deposition plans, bypassing the Commission as in 1919.

As policymakers continued to work on the possibility of bridging the Detroit River, in 1920, both Ottawa and Washington had created a joint two-man engineering board to study the St. Lawrence Seaway. In 1921, the board produced a report which favored a general deepening of the waterway from Lake Ontario to Montreal. It also suggested that the St. Lawrence River be canalized to a depth of twenty-five feet consisting of locks and hydropower potential at the International Rapids with the two nations sharing costs. At the end of 1921, the Commission endorsed the St. Lawrence route, asking the two governments to produce a treaty that would authorize the project whilst including the Welland Canal as part of the larger waterway system.[72] Meanwhile, in April 1921, the U.S. Congress and the Canadian government authorized a bridge across the Detroit River, bringing a plan many decades in gestation, one step closer to fruition.[73] This plan—the Fowler Plan—was not eventually executed and the Ambassador Bridge was completed only in 1930. While the Fowler Plan hiccupped its way to extinction, the fundamental concept of a Detroit River cross-border bridge underwent a fundamental change. In its final

[71] There was some confusion though about what Markham had really proposed. Although he sought permission for widening the length of the dry cut, the plan attached to his letter for permission "only covered the work" undertaken by the first contract. Most of that work was now complete, "but the resulting benefit to navigation anticipated in the work of widening" the Livingstone Channel would not "be obtained" unless the widening was continued over the extension under question all the way down to Bar Point near the mouth of the river. H.B.R. Craig, letter to Eugene Lafleur, April 4, 1921, and April 13, 1921, and Eugene D. Lafleur, "Memorandum for the Assistant Deputy Minister," April 21, 1921, in *Improvement of Livingstone Channel in Detroit River* Department of External Affairs fonds RG 25 Vol 1297 File 1921-577.
[72] Macfarlane, *Negotiating a River*, 2014, 29. See also "Annual Report of the Lake Carriers' Association" (Cleveland: Lake Carriers Association, 1922), 98–108, Haathi Trust.
[73] "Annual Report of the Lake Carriers' Association" (Cleveland: Lake Carriers Association, 1921), 54, Haathi Trust.

avatar, the Ambassador Bridge was funded and designed very differently from its most immediate precursor envisioned in the Fowler Plan.[74] The bridge uncertainty in the 1920s ran concurrently with the many problems the St. Lawrence Seaway project faced as Ontario and the Canadian federal governments were unable to push the project forward.

In the mid-1920s there was renewed interest in a cross-border bridge. The new proposal contained a subsidy for the bridge by Essex residents who did approve it in 1926. However, in January 1927, the provincial government announced that under the British North America Act, Ontario (and the residents of Essex) could not guarantee bonds for the bridge. Despite the minor setback, the bridge project did begin construction later that year with a guarantee of completion within three years.[75] The summer of 1928 marked the beginning of the construction of the Detroit Windsor auto tunnel connecting both downtown centers.[76] Constructed at record speed and finished a year ahead of schedule, the Detroit Windsor tunnel was a long time coming.[77]

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[74] The plan came with endorsements from both governments stipulated that construction should start within three after the bill became law and the bridge itself must be constructed within seven years. The Fowler Plan called for a privately-owned international bridge that would cost about $15 million dollars. At a time when ending the private ownership of streetcars in Detroit had been a rallying cry in municipal elections, the possibility of a privately owned bridge was not well received in the city. Across the river, in Windsor however, the bridge had vocal support. The principal reason for the bridge plan's failure was its inability to generate enough funds through selling stocks. Out of the $12 million needed, the bonds had only raised $420,000. By the end of 1923, the possibility of the bridge was in jeopardy. See Mason, *The Ambassador Bridge*, 55–57.

[75] Mason, *The Ambassador Bridge*; see also "Report of Col. C.N. Monsarrat on the Proposed Detroit River Bridge" (Better Transportation Committee of Essex County, 1911), Windsor Community Archives.

[76] Although originally begun in 1871, the tunnel had been mired in many controversies and had suffered accidents that had derailed construction more than once. Modeled along the Holland Tunnel that connects New Jersey to New York City, the Detroit Windsor tunnel was to have air ducts to aid air circulation. Construction involved three distinct methods: a cut and cover method at both entrances of the tunnel; a shield method to clear earth; and finally, the trench and tube method. Through the cut and cover method, workers cut earth away for a shield wall. The shield method used a hollow steel cylinder—one each from both nations—that lay on its side with one end snug to the earth face that was to be dig. Workers dug earth out from the shield. The third method, the trench and tube method involved steam-powered shovels dredging the river to create a trench where cylinders were placed in sections. Overall, nine such sections were placed in the trench. The various parts of the tunnel were joined together to create one tunnel. "The Windsor-Detroit Tunnel," *Border Cities Star* December 31, 1927, 65. Source: INK-ODW Newspaper Collection.

[77] Unlike the bridge being built downstream, the tunnel offered unparalleled access to the centers of both cities. To be owned by both cities for the first sixty years, the tunnel was (and remains) the world only international underwater border crossing. "First to Link Two Nations: Windsor-Detroit Tunnel is Unique; Cost Is $25,000,000. 1,000 Cars Hourly. Capacity Of 22-Foot Roadway Is Large; Saves Time for Commuters" *Border Cities Star* November 1, 1930. INK-ODW Newspaper Collection.

While tunnel construction barreled on, a few weeks after the stock market crash, the Ambassador Bridge was formally dedicated on Armistice Day, November 11, 1929, offering an auto-link between Detroit and Windsor.[78] The *Wall Street Journal* reported that the bridge clearance "over high water" allowed ample clearance room for vessels and freighters.[79] A year later, in November 1930, President Herbert Hoover pressed a golden button from the White House, which "actuated" gongs on both sides of the river, inaugurating the Detroit-Windsor tunnel.[80] A bridge and tunnel across the Detroit River had been over 55 years in the making.

The bridge and tunnel represented further integration between both nations. Another aspect of this integration was the St. Lawrence Seaway. There was some renewed movement from the Canadian side, with regards to the St. Lawrence Seaway as there had been steady American advocacy of the project. The negotiations preceding the 1932 Great Lakes Waterway Treaty were tough. The treaty provided for a twenty-seven-foot-deep waterway from the head of the Great Lakes to Montreal and addressed other water issues in the Great Lakes basin, in line with the 1930 River and Harbors Act. While the United States would be responsible for any navigational improvements above Lake Erie, Canada would build navigation works on the St. Lawrence in Quebec. The treaty also created a ten-person person joint commission (five members from each nation) to supervise the seaway as well as other water diversions in the

[78] Earlier that year there had been various dedication ceremonies on both sides of the border. Tens of thousands of pedestrians "reached the center of the bridge, where they were restrained by police and a strong steel fence." The bridge was opened to traffic on November 15 when the first official car made the crossing driven by a member of the Detroit Automobile Club followed by hundreds of cars, "some of which had been waiting all night." Thousands of pedestrians "had waited overnight also to make the two-mile hike." Between November 15 and December 6, the bridge handled over 100,000 vehicles and over 50,000 pedestrians walked across. Mason, *The Ambassador Bridge*, 132-135.

[79] When complete, the span of the Ambassador Bridge was 135 feet high near the shore and 152 feet near the center. This would ensure that the bridge allowed ample clearance for ships. "Ambassador Bridge to Open Next Year: Construction Well Advanced on the United States-Canadian Span-Date Set Is July 1, 1929," *Wall Street Journal*, October 15, 1928, 10.

[80] "Windsor Detroit Tunnel Opened," *Border Cities Star* November 1, 1930, 1. INK-ODW Newspaper Collection.

treaty. Both Canada and the United States agreed to build compensatory works at Niagara Falls and in Lake St. Clair to offset the diversions at Chicago and Niagara, the latter to generate electricity. The 1932 treaty came at the end of the Hoover administration when the president, although invested in the treaty was weary about the upcoming election. In Canada too, federal elections loomed. Canadian Prime Minister Bennett did want not to introduce the treaty in the Canadian parliament until the U.S. Senate ratified it. In 1934, when the new President Roosevelt finally brought the treaty to the Senate floor, it floundered because of domestic politics, thus killing the treaty, and crushing Canadian hopes. In both the 1934 and 1941 versions, the Chicago Diversion remained an important issue. In specific, as more diversions into the lakes were being considered, there remained a pressing need to consider diversions and developments in a watershed context where domestic and binational politics made a comprehensive solution difficult.[81]

More Problems Thanks to the Chicago Diversion

In 1921, the State of New York claimed that the Chicago diversion was affecting its power generation, and Wisconsin filed a suit in the U.S. Supreme Court against the Sanitary District of Chicago (henceforth Sanitary District) in 1922.[82] That same year, when the Calumet-Sag Channel was opened, Minnesota, Michigan, Pennsylvania, New York, and Ohio joined

[81] Since Roosevelt inherited the treaty from Hoover, he was agnostic about it in the form he had received it. Further many Democrats in Congress opposed the treaty because a Republican president had negotiated it. Congressional Republicans opposed it because a Democratic president was trying to credit for the treaty. The Seaway treaty was also briefly enmeshed in a British Columbia based transboundary pollution dispute. Congress debated the treaty for months and the Senate finally passed it with a 46-22 vote for the treaty in 1934. However, in order to be ratified, the treaty needed a two-thirds majority and therefore was defeated. Macfarlane, *Negotiating a River*, 37- 39.

[82] In the first few decades of the 20th century, the Illinois River improvements became a federal project, bringing with that more appropriations and more controversies. See John Larson W., *Those Army Engineers : A History of the Chicago District, U.S. Army Corps of Engineers* (Chicago: U.S. Army Corps of Engineers, Chicago District, 1980); Hill, *The Chicago River: A Natural and Unnatural History*.

Wisconsin in suing Illinois. This was a new turn of events, as the rest of the U.S. Great Lakes states turned against Illinois.[83] In 1924, Canada registered its protest about the Chicago diversion even as the U.S. Congress debated the drainage canal and the U.S. Supreme Court heard arguments about the project. The *Watertown Standard* quoted an embassy note from the Canadians where they voiced concerns about the lack of provisions to restore water levels in channels predominately used by Canadian ships. The note characterized the waters of the Great Lakes as the two nations' common heritage and therefore urged the U.S. government to consider conserving these waters instead of further menacing navigation.[84] This sentiment about the diversion being a binational issue, even if within U.S. territorial limits was reminiscent of the consistent Canadian refrain against taking an explicitly project-specific view. Eventually, this sentiment would be carried into St. Lawrence Seaway negotiations as both countries sought to create a treaty that recognized and regulated all diversions that carried waters into and diverted them outside the watershed.[85]

American newspapers agreed that the diversion was problematic; however, they also argued the matter was purely domestic because no nation needed to surrender its own rights "in considering the rights of others."[86] This position was similar in tone and spirit to that evinced by Detroit-based newspapers concerning the Detroit River.[87] The diversion in question was an

[83] 1921 was not the first time the Sanitary District had been sued. Wisconsin had sued the district in 1913 to limit the division. The Wisconsin suit was consolidated along with the federal suit and went through the lower courts as the district continued to increase the diversion and outflow. See Changnon and Changnon, "History of the Chicago Diversion and Future Implications," January 1996, 108.
[84] "Canada Opposes Drainage from Chicago Canal: Declares the Dominion Waterways Have Suffered Through Operations," *Waterford Standard* May 6, 1924, in GMLS 44 Roll 23. Bowling Green State University, Lake Carriers' Association Collection, Institute for Great Lakes Research.
[85] Long Lac and Ogoniki diversions bring water into the Lake Superior watershed, instead of the Hudson Bay. See Macfarlane, *Negotiating a River*, 2014.
[86] "A Question of Fact," *Pittsburgh Times* May 9, 1924, in GMLS 44 Roll 23. Bowling Green State University, Lake Carriers' Association Collection, Institute for Great Lakes Research.
[87] According to Denning, the Chicago Diversion had been left out of the Waters Treaty to prevent further politicization. Meredith Denning, "Construction of a Keystone: How Local Concerns and International Geopolitics

increase in the volume of the diversion from 4000 odd CFS to 10,000 CFS. The *Syracuse Journal* acknowledged that Canadian fears about this increased extraction out of the Great Lakes were justified but they could be rest assured that Uncle Sam could "be depended upon to do the right thing and prevent improper diversion of water" in which the Canadians were interested as well.[88] However, the *Free Press* believed that the Waters Treaty interpretation making the rounds was a Chicago-specific one that was "quite diverse from an American interpretation." Pointing to the local, regional, and national problems with such an interpretation—from Milwaukee's objections to the challenges the diversion posed to the St. Lawrence Seaway project—the paper concluded that a "genuine 'American' interpretation of the boundary waters treaty would knock Chicago's schemes sky high."[89] This diversity in newspaper opinions about the diversion offers an insight into the multiple domestic stakes in the project.

All the suits against Illinois were consolidated between 1922 and 1925. The root matter was Chicago's use of the dilution method to treat its sewage which had already cost the city $125 million. Back in 1909, the Sanitary District had concluded that dilution would need to supplement through some form of sewage treatment and therefore began major construction works. By the time the suits reached the U.S. Supreme Court in 1922, the Sanitary District hoped the construction works in progress would help make its case. In 1925, diversion-related activities "were monumental in diversity, frequency, and intensity" so much so that the U.S. Supreme Court "upheld the authority of the [U.S.] Secretary of War and issued an injunction against Illinois to reduce the diversion" to near-impossible levels.[90]

Created the First Water Management on the Canada- US Border," in *The First Century of International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen (Calgary: University of Calgary Press, 2020), 99.
[88] "Chicago Wants More Water," *Syracuse Journal* May 7, 1924, in GMLS 44 Roll 23. Bowling Green State University, Lake Carriers' Association Collection, Institute for Great Lakes Research.
[89] "Not What Chicago Really Wants," *Detroit Free Press* May 14, 1924, in GMLS 44 Roll 23. Bowling Green State University, Lake Carriers' Association Collection, Institute for Great Lakes Research.
[90] Changnon and Changnon, "History of the Chicago Diversion and Future Implications," January 1996, 108.

Illinois immediately protested and the Supreme Court relented when it charged the Secretary of War to "decide" on the amount of the diversion. At a time when lake levels were at an all-time low, all Great Lakes states except Illinois blamed the diversion for the variable levels. Illinois counterclaimed the low levels were a result of dry weather. The argument led to hydrologic studies of the Great Lakes. Meanwhile, the U.S. Secretary of War decided to issue a larger diversion permit to the Sanitary District but did ask the latter to "build sewage plants as quickly as possible."[91] The other lakes states complained about this decision. In response, Wisconsin amended its suit before resubmitting it to the U.S. Supreme Court, joined by Ohio, Pennsylvania, and Minnesota. This back-and-forth between the states, the U.S. Supreme Court, and the Corps shows how hotly contested the diversion was in the United States as well.

In 1926, Canada issued another formal protest, and Michigan and New York joined Wisconsin in the new suit. Illinois countersued, joined by downstream states: Kentucky, Tennessee, and Louisiana. All of which valued the diversion for their own navigation activities downstream in the Mississippi. To further bolster its claim for the diversion, Illinois moved to have the Rivers and Harbors Bill "include the Illinois River for a major transformation into a navigable river in the Upper Mississippi River basin system."[92] Hearings began in 1926 and the following year the first authoritative scientific analysis of the Great Lakes hydrology was released which pointed out that lake levels were only affected in a "minor" manner by the diversion, "lowering Lake Michigan by 12 to 15 centimeters (cm)."[93] Using that interpretation as a baseline, the U.S.

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[91] Changnon and Changnon, 109.

[92] Naujoks, "The Chicago Water Diversion Controversy, III."

[93] The report used by the Court also clearly stated that one of the reasons lake levels had reduced were channel improvements in the Detroit and St. Clair rivers. It claimed that the "Chicago and other diversions have lowered the levels of Lakes Michigan-Huron 6-8 inches, while they have been lowered by channel improvement 8-10 inches." Overall, the levels of Lakes Michigan-Huron were four feet lower in 1925 than they were in 1885. A drop of 14-18 inches in waterbodies measuring over 45,000 square miles in water area is a large drop. Combined water area volumes are based on EPA figures. How the Court concluded any drop in combined lake levels was "minor" and chose to sidestep the larger context as laid out in the same report remains to be studied. Changnon and Changnon,

Secretary of War recommended that the suit be dismissed. However, the U.S. Chief Justice "held that the lake states were entitled to a decree" and thus sent the case back to the Secretary of War who then "recommended an 8-year schedule to accomplish the Court's requirement for the major reduction in the diversion."[94] Eventually, in 1930, the U.S. Supreme Court decreed that the Chicago diversion would need to be limited. [95] This cap legitimized not just the anxiety of other Great Lakes basin states in America but also the longstanding Canadian apprehension. In specific, it created a seminal avenue for the Chicago diversion to now be a part of the evolving St. Lawrence Seaway dialogues. With limits in place, regulating and monitoring became another issue that a binational comprehensive treaty could address. That same year, President Hoover authorized appropriations to deepen Great Lakes connecting channels, offering a fillip to the creation of Crystal Island in the Detroit River, based on a 1928 Corps recommendation for a deeper channel.[96] The 1930 appropriations called for a 27-feet deep channel throughout the Great Lakes, laying the groundwork for a channel to the Atlantic Ocean.

"History of the Chicago Diversion and Future Implications," January 1996, 109; "Physical Features of the Great Lakes" (United States Environmental Protection Agency, n.d.), https://www.epa.gov/greatlakes/physical-features-great-lakes; Engineering Board of Review on the Sanitary District of Chicago on the Lake Lowering Controversy., Robert E. Horton, and Chicago (Sanitary District), *Report [to the Board of Trustees of the Sanitary District of Chicago] and a Program of Remedial Measures.*, 3 pts. in 4 v. (Chicago, 1924), 22–24, //catalog.hathitrust.org/Record/002005348.

[94] Changnon and Changnon, "History of the Chicago Diversion and Future Implications," January 1996, 109.

[95] The court first decreed that outflow at Lockport to 6500 CFS until 1935, thereafter to 6000 CFS and after December 31, 1938, to 1500 CFS. This included water drawn from Lake Michigan to dilute Chicago's sewage but not the water drawn from the lake for other purposes that eventually made its way down the diversion. Larson, *Those Army Engineers: A History of the Chicago District, U.S. Army Corps of Engineers*, 210–20. See also Changnon and Changnon, "History of the Chicago Diversion and Future Implications," January 1996.

[96] John Larson W., "History of Great Lakes Navigation" (Institute of Water Resources; United States Army Corps of Engineers, January 1983), 61–63, https://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/HISTORYOFGREATLAKESNAVIGATIONJANUARY1983.pdf; see also John Larson W., *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers* (U.S. Army Corps of Engineers Detroit District, 1995).

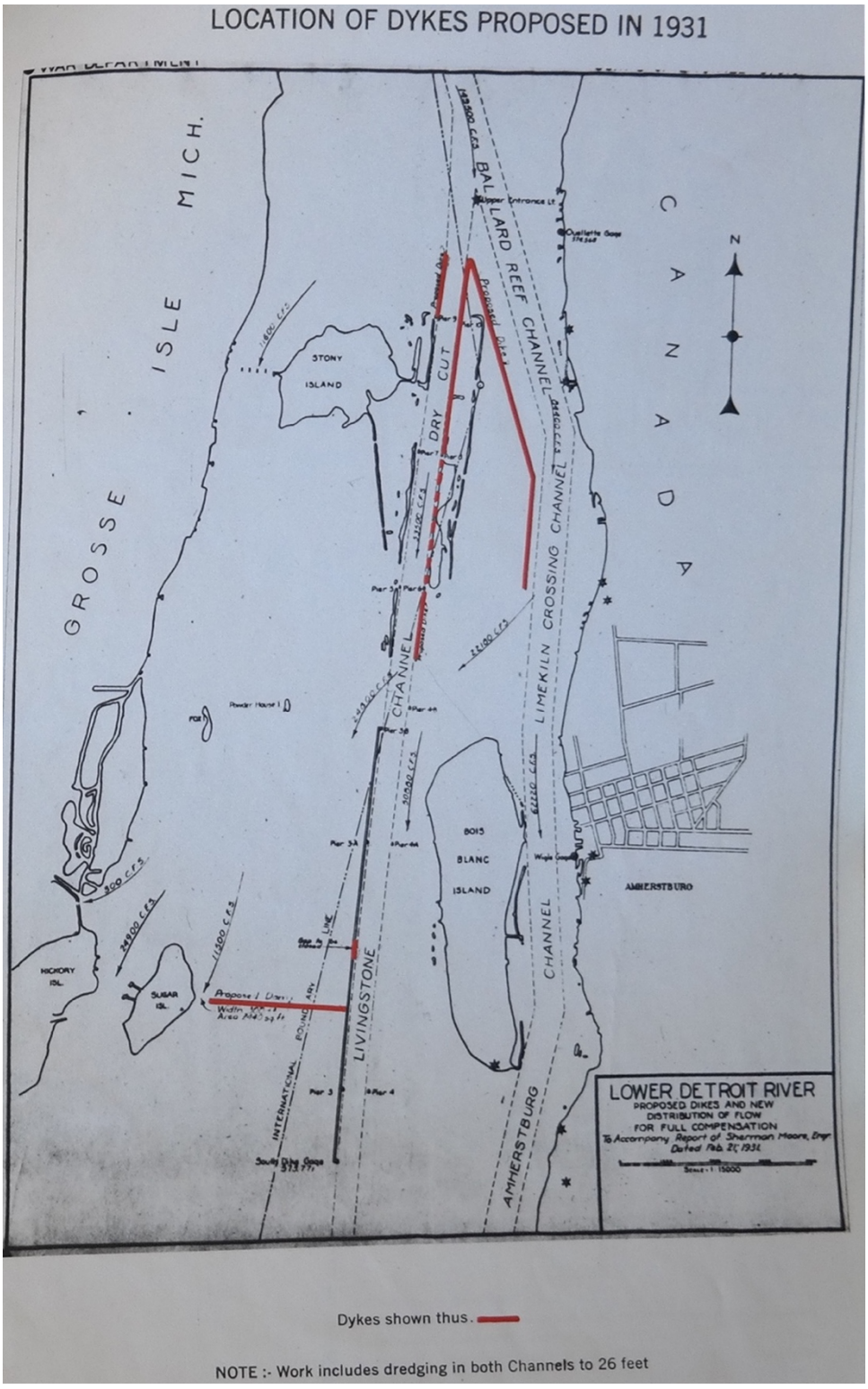

Figure 4.4: Proposed dikes in 1931.

Source: Library and Archives Canada/Department of External Affairs fonds/RG 25, vol. 1603, file 585 part 1.

An island takes shape

When Sherman Moore was advocating a system of dikes in 1931 as seen in the vignette at the beginning of this chapter, he was acting upon the new appropriations as part of which the U.S. Lake Survey had been asked to monitor lake levels. Basing his overall arguments on the precedent of the limekiln channel, Moore acknowledged that any "enlargement of channels in the lower Detroit River will increase the discharge capacity of such channels." If left uncompensated, it would lower the levels of all above the project. However, Moore believed this lowering could be prevented by a simple tit-for-tat: "by choking the flow" in other channels by "the same amount" as the improved channel had increased. While noting that the changes were quite high and therefore "compensating works must be of rather extensive magnitude," he recommended an inverted V-shaped dike (figure 4.4). To prevent erosion due to higher river velocities in the channel, Moore further suggested a disposal area that would solidify the new system of dikes and create a bay, thus creating Crystal Island and Bay. To make sure these dikes were visible and convenient, Moore recommended that they be "2-4 feet above" the high-water level. In addition to the island, the new proposal called for a dike near Sugar Island extending from the island to the existing dike in the Livingstone channel. Leaving the door open for alterations based on river flow, Moore believed that conditions in the upper section of the Livingstone Channel and around Bois Blanc Island were "complex" and defied "accurate hydraulic analysis." The new compensatory works may alter the distribution as well as resistance to flow beyond calculations thus warranting a possible change in their design.[97]

[97] Based on river velocity and quality, Moore noted that near the Livingstone Channel and Sugar Island, water was "extremely foul" with a slow-moving current and an irregular surface at the bottom. Moore merely outlined where the river had hitherto known to slow down and settle. Moore noted that water levels would drop by 0.16 feet due to the new proposed deepening and widening. Thanks to deepening, river velocities would go up by 12 % in the up-bound and by 14% in the downbound channels, respectively. Moore thought it "desirable" to "make occasional determination of the flow and the water surface elevations" as the deepening work progressed as the work progresses, to allow modifications in the proposed compensating works as necessary because there was "more or

Per precedent, since the bulk of the work was to be in Canadian waters, the U.S. Secretary of War suggested that Moore's report be sent along to the Dominion Government with a request for permission.[98] Even though the work was not to begin before spring 1932, the Corps seemed impatient for an answer.[99] As the proposal made its way through the Canadian bureaucracy, there was a broad consensus that the new proposal would be an extension of previous areas and would not affect navigation since they were a part of the "Deep Waterway Navigation Project."[100] This agreement meant the Canadians agreed to bypass the Commission since this new work was an extension of previous work. This was, however, conditional on, as outlined by the Dominion Water Power and Hydrometric Bureau, that the Dominion engineers be allowed to inspect the works freely; the design of dikes was required to be iterative and flexible to ensure the maintenance of lake levels.[101] The most interesting condition and one appearing for the first time was that "works on either side of the boundary line, no matter by whom constructed, shall become the property of the country" in which they were located.[102] Had

less uncertainty" in the estimates presented. Sherman Moore, Engineer, U.S. Lake Survey Office Detroit, "Report Upon the Question of Compensation Water Levels for Effect of Deepening Channels in lower Detroit River," March 17, 1931, 1-13 in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

[98] F.H. Payne, Acting Secretary of War, letter to the Secretary of State, 1 in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

[99] O.D. Skelton, letter to J.B. Hunter, The Deputy Minister of Public Works, 24 October 1931, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

[100] J.T. Johnston, "Memorandum: The Deputy Minster: Re: Despatch of June 20th, re Detroit River channels, December 2, 1931, 13, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

[101]The Department of Railways and Canals thought that the disposal areas were, "in the main, extensions of previous disposal areas" and would not affect navigation. J.T. Johnston of the Dominion Water Power and Hydrometric Bureau evaluated the project historically and concluded that "it should be definitely assured that the works proposed form an integral part of the Deep Waterway Navigation Project." Johnston agreed that the proposal could bypass an International Joint Commission referral because it was an extension of extant work. Johnston laid out the conditions outlined above. G.A. Lindsay and D.W. McLachan, "Memorandum- Re Deepening of Downbound Channels in the Detroit River," August 26, 1931, 1 and J.T. Johnston, "Memorandum: The Deputy Minster: Re: Despatch of June 20th, re Detroit River channels, December 2, 1931, 13-14, emphasis original, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

[102] Johnston also remarked that these dikes were very novel. J.T. Johnston, "Memorandum: The Deputy Minster: Re: Despatch of June 20th, re Detroit River channels, December 2, 1931, 13-14, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada. Emphasis original

this condition remained in the final communication, it would have been a minor coup for it reversed the territorial ambitions of the U.S. that had long manifested in ways the previous chapters have shown. Specifically, this condition would have enshrined, very clearly, that Crystal Bay would be Canadian territory even if the United States had paid for its construction. However, in its final form, this condition went back to the boilerplate language that had been in use for decades which advised that all work would need to respect Canadian sovereignty. Respecting Canadian sovereignty was far different from overtly recognizing their ownership of the island.

Apart from the permissions, there were also two related aspects of the proposal causing delays.[103] The first was a change in dredging technology necessitating channel closure during improvements. The second was that this new method would mean a longer construction time. Departing from their original desire to use a floating plant and dredging in the wet which would

[103] The Lake Survey's report along with a letter from the U.S. Secretary of War were sent to the Secretary of State to nudge the latter into action in getting the requisite permissions from the Canadians. Patrick J. Hurley, Secretary of War, letter, December 11, 1931, 1-2, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

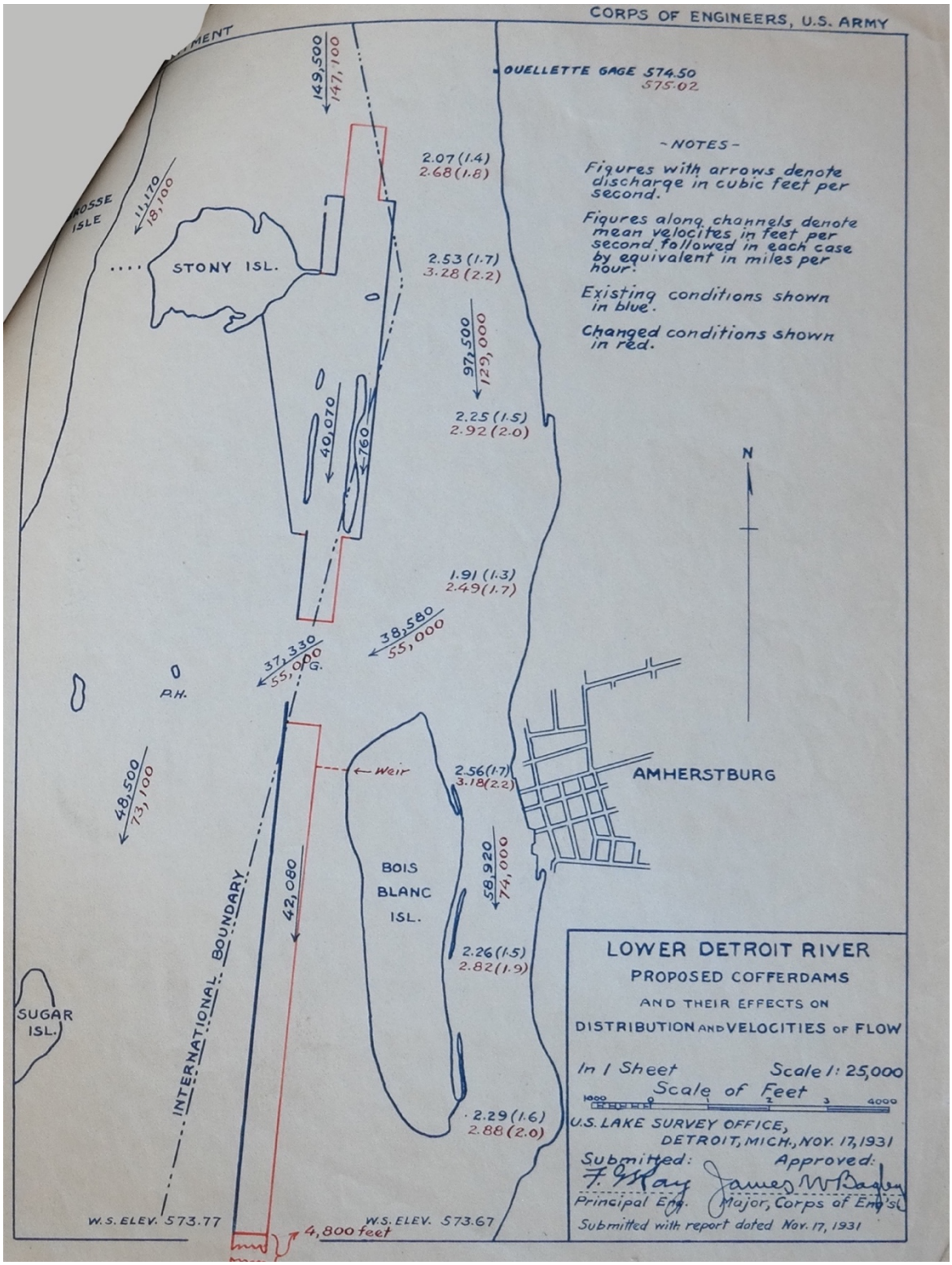

Figure 4.5: Proposed cofferdams and their effects on distribution and velocity of flow.

Source: Library and Archives Canada/Department of External Affairs fonds/RG 25, vol. 1603, file 585 part 1.

be less disruptive, the Corps now recommended excavating in the dry by closing off the channel.[104] In the meanwhile, the Lake Survey had concluded its survey and noted that the deepening work would increase river velocity temporarily.[105] (figure 4.5) The Canadian Public Works agreed with the Corps that while excavating in the dry would put a lot of pressure on the Amherstburg Channel as it would handle all the traffic, that method would still be more efficient and better in the long run. Public Works also thought it "desirable" to deepen the channel to 28 feet, instead of the proposed 26 feet because the deeper channel "would correspond" with the 1928 Corps recommendations for a consistent depth of 27 feet.[106] This would also complement the improvements underway from Lake Ontario to the head of the canal navigation in the St. Lawrence River. The additional foot of depth would allow for the "frequent and large fluctuations" in the water levels of the lower Detroit River.[107] The only wrinkle in this scheme was that a deeper channel meant that the project would not be complete until 1936, a delay of at least a year from original estimates. Subject to the Corps agreeing to the location of the compensatory works as articulated by the Dominion Water Power and Hydrometric Bureau, Public Works agreed that the proposed project could bypass the Commission.[108]

By the end of February 1932, the Canadian federal government departments seemed to agree about the project proceeding, subject to conditions. There remained one outlier: Ontario

[104] In his letter, Cameroon also remarked that the "ownership of any works or materials deposited or built in Canadian waters should automatically become the property of the Crown in the right of the Dominion, of the Province, or the property of private individuals, depending on the ownership of the site where the material is placed or works are built." K.M. Cameroon, Chief Engineer, "Memorandum for the Deputy Minister," January 29, 1932, 3-5, in in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[105] James W. Bagley, "Current Velocities in Lower Detroit River – Effect of closing Livingstone Channel," November 17, 1931, 1-2, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[106] K.M. Cameroon, Chief Engineer, "Memorandum for the Deputy Minister," January 29, 1932., 3-7, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[107] K.M. Cameroon, Chief Engineer, "Memorandum for the Deputy Minister," January 29, 1932, 3-7.
[108] K.M. Cameroon, Chief Engineer, "Memorandum for the Deputy Minister," January 29, 1932, 3-7.

who still needed to weigh in on the dikes but had not been asked until the very end.[109] The Corps sent an urgent telegram to their Canadian counterparts in Public Works saying it would "appreciate" a wire be sent to Cleveland as to "when consent for Livingstone Channel may be expected."[110] The Corps completed all the preliminary work and were waiting on the Canadians (via the Public Works) to advertise for bids.[111] With mounting pressure and still waiting on the province, Ottawa then wrote to the province who then began looking into the matter despite being asked so belatedly.[112] Pointing out that there might increase water turbidity that might adversely water supply, the province eventually complied.[113] Within a week of Ontario's "acquiescence" and the PWD, an Order in Council was drafted and moved.[114]

Design and function worked together to ensure these dikes were not a navigational hazard as the order contained a paragraph about keeping the compensatory dikes five feet above the water surface and of uniform shape to be "maintained hereafter in good condition by the United States Government." It also contained provisions for the disposal areas becoming the property of either the Crown or private owners and that the U.S. government would need the owners' permission "before commencing operations." The order ended with a paragraph noting that if the U.S. Government deemed it fit to "carry the excavation depth to 28 feet", especially in the rock section of the channel, the Canadian government's consent could be assumed provided

[109] O.D. Skelton, letter to J.D. Hunter, February 26, 1932, 1-2, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[110] J.B. Hunter, letter to O.D. Skelton, under-secretary of State for External Affairs, February 25, 1932, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[111] B. Hunter, letter to O.D. Skelton, under-secretary of State for External Affairs, February 25, 1932.
[112] R.B. Bennett, letter to the Prime Minister of Ontario, February 27, 1932, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[113] G. Henry, letter to the Prime Minister of Canada, March 16, 1932, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[114] O.D. Skelton, letter to J.B. Hunter, March 17, 1932, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada; Earnest J. Lemaire, Clerk of the Privy Council, Certified copy of Order-in Council, March 24, 1932, 5-6, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.

conditions were met. The order ended with the standardized language that "whatever works" were in Canadian territory "shall be carried out without prejudice to the sovereign or territorial rights of the Dominion of Canada."[115]

These permissions cemented the necessity of a human-made island in the lower Detroit River. What had begun as augmenting nature in the limekiln crossing culminated in a set of dikes that resembled and whose function was to be a navigational aid, in addition to being a dumping ground for dredge spoils. The iterative process of design, dredging, and dumping had transformed the river into a series of structures and channels that at first glance were 'natural.' With each layer of new dredge spoil added on, the dikes took a more concrete shape. Over time, these layers were planted with trees and vegetation, embellishing the dikes they stood on as any other part of the river. To the local community, these dikes became a fixed part of the riverscape, one that was healthier than the river itself.[116] To the engineers, it was always a riverscape in flux, one that could be molded to fit function. Mitigation of the crosscurrent went hand in hand with compensation and Crystal Island was the visible result.

Conclusion: a new river

To the Corp's engineers, the unaltered river represented a bottleneck needing elimination. Through each iteration, more obstructions appeared as the design tried to match the ambition of engineers and shippers as well as the river's response to the original designs. And after each iteration, engineers', lobbyists', and politicians' conception of what could and should be achieved only expanded. Crystal Bay was a testament to the ideology of transforming and

[115] Earnest J. Lemaire, Clerk of the Privy Council, Certified copy of Order-in Council, March 24, 1932, 5-6, in *Deepening of Detroit River* RG 25 Vol 1603 File no 1931-585 Part I. Library and Archives Canada.
[116]Peter Kasurak, "Keep Crystal Bay Unpolluted," *Detroit Free Press*, July 21, 1969, 4A.

moving sediment from spots that choked capital to others that allowed its smooth transit. For most of the nineteenth century, dredged sediment was often dumped in waters downstream with the hope that the current would either take it away and/or settle to the bottom. The Livingstone Channel construction—more importantly, the dredged after effect in the form of the crosscurrent—created an opportunity for dikes to remain in the river as navigation aids, thwarting crosscurrents and allowing safe transit within their confines. These dikes were filled with the bottom soil that had been dredged out, thus serving a multipurpose. Crystal Bay represented the next step: an entirely human-made system of dikes whose function was to promote safe navigation whilst propitiously offering a spot to store sediment. Crystal Bay was a precursor to Confined Disposal Facilities (CDFs) that now dot the Great Lakes. What had begun as a navigational aid had ended in an island with multiple purposes, through patchwork promises and permissions. Each incremental maneuver gave the island more room to grow. This patchwork infrastructure was a template Corps engineers took to combat the next challenge: heavily polluted sediment. [117]

The Commission continued to investigate boundary waters pollution, especially in the Detroit and Niagara rivers, even as it did not take it upon itself to intervene in the Livingstone Channel matter again. The United States referred a matter to the Commission in the upstream St. Clair River that involved widening and dredging, not dissimilar to the projects in the lower Detroit River.[118] Both sets of projects were contemporaneous yet their treatment vis-à-vis the Commission was vastly different. In choosing to cooperate, both nations tested the judicial powers of the nascent body. As extensions of the 1913 proposal, the dikes that became Crystal

[117] "Dredging Water Quality Problems in the Great Lakes: Appendices A1 to A19 -Sampling Surveys with Separate Reports" (United States Army Corps of Engineers, 1969).
[118] Chandler and Vechsler, "The Great Lakes-St. Lawrence River Basin from an IJC Perspective."

Island and Bay were built to expand and house new sediment from further channel expansion. Even though it was over two decades away, the Seaway had been decades in gestation. These dikes, dams, and islands created room for the larger ships, even as they created new landforms. Ironically, in the name of compensation, Crystal Island and Bay recreated the pre-Livingstone Channel section of the river, attempting to bring stasis and calm to a section of the river forced through a deeper waterway. Creation and compensation were two sides of the same coin. This new river adapted to the rhythm of these changes, flowing past and through them more polluted than ever. The hell gate was now a highway.

Conclusion

In November 2021, Michigan Radio's Dwayne Dwyer stood at the Cleveland docks, waiting in the wind for the ship Happy Rover to dock.[1] During its forty-day journey from Shanghai, the ship brought more than its cargo.[2] It was the realization of a long-standing investment in Great Lakes shipping. In the last decade, the port of Cleveland has invested millions of dollars in developing requisite facilities to handle container ships and is the first of its kind in the Great Lakes to do so. Thanks to the global supply chain issues of the last two years, the arrival of the Happy Rover held promise. Today, Great Lakes shipping is still dominated by raw materials such as iron ore, grain, and fertilizer. The Happy Rover's containers point to what could be. To be sure, the Happy Rover and similar ships, are not as large as the Panamax Ocean liners that traverse the Panama Canal. And will never be. Smaller container ships in the Great Lakes might help alleviate the stress on the coastal ports. The St. Lawrence Seaway is underutilized for a series of historical and technological reasons.[3] Ships like the Happy Rover will mean greater utilization of the waterway and achieve the economies of scale through containerization that has thus far "just skipped over the Great Lakes."[4] That this would also mean a "relief valve for these [induced by the pandemic] global supply chain pressures" is an added relief.[5] As the planet warms up, allowing a longer navigation season, the limitations nature has long put on shipping, such as ice during the winter, might soon be surpassed.

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[1] "Inland Port Priority," The Indicator from Planet Money, accessed January 10, 2022, https://www.npr.org/transcripts/1071932095.
[2] "Two Indicators: Supply Chain Solutions," The Indicator from Planet Money, accessed January 26, 2022, https://www.npr.org/transcripts/1075879342.
[3] In *Negotiating a River,* Macfarlane argues that because the St. Lawrence Seaway's locks were tied to the Welland Canal, the Seaway was obsolete the day it was inaugurated, much like the Welland itself. Macfarlane, *Negotiating a River*, 2014; see also Styran and Taylor, *This Colossal Project*.
[4] "Inland Port Priority."
[5] "Inland Port Priority."

Duluth is now the second Great Lakes port after Cleveland to be able to accept container ships.[6] That the most inland of the Great Lakes ports can now accept ocean liners is perhaps indicative of the next set of changes that might greet the region's waterways. Readying a port for receiving ocean liners is a big undertaking requiring a multi-year transformation, employing thousands of people, and therefore particularly alluring in the hollowed-out industrial heartlands of the Midwest.

In the last decade, as talks about a new bridge across the Detroit River were underway, letters to the editor from Metro Detroit residents advised the creation of a "mid-America container ship port" in the river that would serve "both the United States and Canada."[7] Even as such calls were being made, the overall tonnage at the port of Detroit has only reduced.[8] Even with tonnage loss, Detroit continues to be an important port, ranked third (in tonnage) amongst Great Lakes ports and forty-second among U.S. ports in 2019.[9] The Port of Detroit in 2019-20, provided over 14,000 jobs, generating $1.5 billion in business revenue with a short-term goal to enable the growth of the "international cargo business for Michigan manufacturers."[10] Much of this is dependent on the Corps maintaining and servicing extant channels—natural and humanmade. Since its heyday in the late nineteenth century, shipping in the lakes has slowly declined. That has not meant that shipping and shippers do not continue to be important as there

[6] "Inland Port Priority."
[7] "Ship Port Could Be Valuable Addition to the Detroit-Area," *The Ann Arbor News*, September 20, 2012, http://www.annarbor.com/news/opinion/ship-port-could-be-valuable-addition-to-the-detroit-area/.
[8] According to the Port Authority of Detroit, waterborne commerce (in short tons of 2,000 lbs.) went down from 17, 352,000 tons in 2006 to 13,953,000 tons in 2017. "Detroit Shipping Guide Serving Port of Detroit & International Community," Fourth Coast Publishing Co., Inc., 2019, 6, https://cloud.3dissue.com/24811/25654/216499/DetroitOceanShippingGuidePortofDet/index.html.
[9] US Army Corps of Engineers, "Detroit River, MI" (US Army Corps of Engineers, August 2021), https://lre-ops.usace.army.mil/OandM/factsheets/DetroitRiver.pdf.
[10] "Detroit Shipping Guide Serving Port of Detroit & International Community," 10–11.

are new plans resembling old ones that resurface every so often based on expansion, creation, and compensation.

This is not the first-time old ideas have reappeared in the last century. Over sixty years ago, when the Seaway was finally coming to fruition, the troika of expansion, creation, and compensation was in action in the Detroit River again. In preparation for the long-awaited Seaway, the Corps began a series of deepening and widening projects, including one involving Crystal Bay and Island. On May 28, 1957, the Corps touched off "a dynamite blast in the [Detroit] river's Amherstburg channel on the Canadian side of Bob-Lo island, sending up a geyser 200 feet high" thus starting the five-year project to deepen Great Lakes connecting channels.[11] The day included much pageantry with speeches and ship rides and included a marine parade featuring "several of the largest vessels now traversing the Great Lakes."[12] Newspaper reports of the event highlighted the shipping lobby's claim that annual traffic in the Great Lakes was greater than "the combined traffic of both the Suez and Panama canals."[13] In a statement read at the ceremonies, Canadian Prime Minister Louis St. Laurent claimed that "the deepening of the Great Lakes connecting channels and completion of the St. Lawrence Seaway will bring the realization of a dream long-held by Canada and the United States."[14] This project, although not a direct part of the then-in-construction St. Lawrence Seaway, was an important ally.[15] Without deeper channels throughout the Great Lakes navigational channels, the Seaway—which extended from Montreal to the eastern end of Lake Ontario through the length of the St. Lawrence River—would not be as profitable as projected. The deepening and widening would

[11] "Detroit River Is Blasted to Deepen Link to Sea," 3.
[12] "Detroit River Is Blasted to Deepen Link to Sea."
[13] Damon Stetson, "Great Lakes Channel Work Starts: Vast Dredging Job on 4 Links Will Take 5 Years to Finish Notes from President and St. Laurent Are Read at Ceremony Other Projects Planned Final Link in System," *The New York Times*, May 29, 1957.
[14] Stetson.
[15] Larson, *Essaysons: A History of the Detroit District U.S. Army Corps of Engineers*, 202.

help the Seaway. A compensatory dike running about 6000 feet, at the southern tip of Bois Blanc Island gave it a peculiar-looking tail.[16]

There was a strong economic rationale for this work. In 1953, the total waterborne commerce of the United States was 923.5 million net tons of which about 27.7 percent or 256 million tons was Great Lakes traffic.[17] It was "general knowledge" according to the Corps that "mass movements of bulk, heavy tonnage" could take place on the Great Lakes "at unusually" low transportation costs.[18] That same year, the Detroit River handled over a hundred and fifty-four million net tons, "the largest amount through any one segment of the connecting channels."[19] The Seaway, claimed the Corps, would bring greater benefits for the region, provided channels were deepened and widened in preparation. The time had "now come to preserve and maintain the inherent advantages of this main artery of transportation by deepening the connecting channels."[20]

Until 1952, the deepening and widening of connecting channels to a uniform depth of 27 feet "was included" in the Great Lakes-St Lawrence Seaway project as part of the joint seaway project under the 1941 treaty. Under the treaty, the United States would pay for deepening the connecting channels to a depth of 27 feet. However, in December 1951, Canada "unanimously adopted legislation authorizing construction of the St. Lawrence seaway entirely within the boundaries of Canada, if the United States did not see fit to participate" thus effectively

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[16] Larson, 205–6.
[17] "Great Lakes Connecting Channels: Hearings Before the Subcommittee on Rivers and Harbors of the Committee on Public Works House of Representatives," Pub. L. No. 84th Congress 1st session on H.R. 158, H.R. 462, H.R. 660, H.R. 2182, H.R. 2552, H.R. 2589, H.R. 4629 (1955), 86.
[18] Great Lakes Connecting Channels: Hearings Before the Subcommittee on Rivers and Harbors of the Committee on Public Works House of Representatives, 86.
[19] Great Lakes Connecting Channels: Hearings Before the Subcommittee on Rivers and Harbors of the Committee on Public Works House of Representatives, 87.
[20] "Great Lakes Connecting Channels: Hearings Before the Subcommittee on Rivers and Harbors of the Committee on Public Works House of Representatives," Pub. L. No. 84th Congress 1st session on H.R. 158, H.R. 462, H.R. 660, H.R. 2182, H.R. 2552, H.R. 2589, H.R. 4629 (1955), 90.

abrogating the 1941 treaty. The following year Canada formally notified their neighbor of the abrogation. In threatening to construct the Seaway on their own, the Canadians opened an opportunity for addressing "the problem of deepening the connecting channels," through dredging projects and piecemeal infrastructure creation. According to the Corps, for "many years, advocates of the improvement of these channels had felt that this project [the deepening] should be divorced from any legislation providing for the construction of the seaway." This was because "many interests" across the U.S. were "sympathetic to channel improvement" but had "already taken a position of either neutrality or opposition to the seaway."[21]

Divorcing the two projects would allow the Corps to work on channel improvement without getting caught in the crosshairs of the Seaway's multiple controversies.[22] In separating improvement projects in connecting channels from the Seaway, incremental and submerged infrastructure had received a much-needed boost, reinforcing a long-established practice. The active maintenance dredging projects were slowly raising other issues—storage of extracted sediment. In the mid-twentieth century, the Detroit River, and its largest tributary the Rouge, were heavily polluted. As much as dredging helped maintain the waterways' commercial viability, it also raised environmental questions. All this dredged material had to be stored somewhere. Often this meant dumping this material in open waters or creating above water disposal facilities such as Grassy Island where the Corps diked off sections of the island and dumped polluted dredged materials from the Rouge River.[23] In the mid-1960s, the Corps moved

[21] Great Lakes Connecting Channels: Hearings Before the Subcommittee on Rivers and Harbors of the Committee on Public Works House of Representatives, 83.
[22] Great Lakes Connecting Channels: Hearings Before the Subcommittee on Rivers and Harbors of the Committee on Public Works House of Representatives, 83; Macfarlane, *Negotiating a River*, 2014.
[23]Bruce A. Manny, "Ecological Restoration of Grassy Island and the Wyandotte National Wildlife Refuge in the Detroit River," in *Great Lakes Institute for Environmental Research Occasional Publication No. 1*, ed. Lisa Tulen et al. (Rehabilitating and Conserving Detroit River Habitats, Windsor ON: Great Lakes Institute for Environmental Research, 1998),

away from disposing of dredged material in open waters and moved closer to creating Confined Disposal Facilities (henceforth referred to as CDF).

Towards the end of the 1960s, the Corps proposed creating a CDF in Crystal Bay and Crystal Island. Created out of dredged material and meant to regulate shipping traffic, the island and bay had been originally designed to house more dredged material, the Corps reasoned. Unfortunately for the Corps, the island and bay had become an emotional issue for the Canadians who opposed the CDF. Whereas the Detroit River was heavily polluted, the dikes of Crystal Bay and Crystal Island filtered water creating a bay that offered a haven for fish and birds. The Corps had not planned for a vociferous Canadian opposition, driven by local Amherstburg residents. Driven into retreat by the Canadians, the Corps built a CDF—the largest in the Great Lakes—across the political border at Pointe Mouillee, an in-lake island facility located on the northwest corner of Lake Erie at the mouth of the Huron River.[24]

Sediment had always been political as this dissertation shows. The Commission hearings as well as the Livingstone Channel construction had raised questions from Windsor and Amherstburg residents.[25] Dredging created sediment landscapes, yes. Unsurprisingly, it did more.[26]The use of dredging to channel the Detroit River meant that the river was no longer just a product of its climatological or topographical environments. If anything, dredging was a frontal

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http://athena.uwindsor.ca/units/glier/conference/HabitatConf.nsf/391878caff867c0185256a1100801cd8/e81c4f39470e60bc852569dd0018e707.

[24]US Army Corps of Engineers, "Confined Disposal Facility at Pointe Mouillee for Detroit and Rouge Rivers," 1974, 103, https://apps.dtic.mil/sti/citations/ADA107369.

[25] International Joint Commission, "Testimony in Re the Livingstone Channel, on the Reference of the Governments of the United States and the Dominion of Canada, under Article IX of the Treaty of May 5."

[26] By the mid-twentieth century however, environmental questions were far more pressing and regulatory institutions like the Commission were interested and invested in creating policy mechanisms to alleviate polluted water bodies. Over time, addressing water quality would also become a question of creating the right kinds of depositional structures to handle clean up: enter CDFs. The Corps had long dumped dredged sediment in shallow waters, until they started creating new and/or augmenting extant islands instead. Eventually, this dumping and diking made for another iteration, CDFs, which much like their previous avatars galvanized much political action. Stradling, "Dike 14, Cleveland, Ohio."

and aggressive fight against the limitations that topography and climate placed, treating natural sedimentation and deposition as a problem slowing down lake commerce. The continuous cycle of dredging and dumping reveals how heavily the Detroit River was engineered throughout the nineteenth and twentieth centuries, much like the Rhône and other heavily engineered river systems across the world, and therefore was an envirotechnical system.[27] Engineering did not render the river more compliant, as the crosscurrent revealed. Finding its level, the Detroit River shone as a historical actor, ironically, just wanting to achieve stasis where it was now forced to run through the walled sides of the Livingstone Channel's dry cut.

The artificial waterway within the lower Detroit River, the Livingstone Channel, was necessary because of the "hell's gate" of the Great Lakes, the narrow but deep limekiln crossing.[28] One small misstep here could ground a vessel. This bottleneck represented a unique challenge on multiple fronts. Apart from being in international waters, the channel was unpredictable as it could go from deep to peppered with boulders in a matter of feet. Combating this treacherous segment of the river created an opportunity for the Corps to augment the river's carrying capacity for newer and increasingly larger vessels. In so doing the Corps initiated the process of "river training."[29] To effectively train the river, the Corps acknowledged the extant river channel which was curved at the limekiln crossing. Corp's engineers worked on bettering it by widening and deepening it. That was still insufficient because there remained rocks that vessels could still strike. A more effective training method, the Corps decided, was a straight

[27] Sara B. Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône* (Cambridge, Mass.: Harvard University Press, 2011); see also Mark Cioc, *The Rhine: An Eco-Biography, 1815-2000* (Seattle: University of Washington Press, 2002); Richard White, *The Organic Machine* (New York: Hill and Wang, 1995).
[28] "Marine: To Widen the Channels, Lake Carriers Asking Secretary Carlisle for it," *Detroit Free Press;* October 16, 1895, 3. ProQuest Historical Newspapers.
[29] According to the Applied River Engineering Center of the U.S. Army Corps of Engineers, river training "is a branch of civil engineering dealing with the design and construction of various structures to improve and/or restore rivers for both human and environmental needs." See Applied River Training Center, "Basics." Available at: https://www.mvs-wc.usace.army.mil/arec/Basics.html. Last Accessed: October 27, 2021

channel instead, which could easily be lit effectively benefitting the largely American-owned tonnage in the lakes.

The limekiln project was the first of its kind, augmenting the extant river channel to meet shipping demands. As the Corp's engineers iterated and incrementally changed the design of the shipping channel, they encountered Canadian officials who did not always see their point of view. In negotiating with their neighbors, Corp's engineers were active environmental diplomats. In a world before binational bodies like the Commission, these individual actors fashioned an evolving environmental and diplomatic regime premised on cooperation, co-optation, and in so doing, minimizing any possible cross-border conflicts.

Early attempts at river training raised design issues of two orders. The first order was those of the channel design itself, as in the case of the limekiln crossing. As Corp's engineers augmented the natural deep river channel, they ran into rocks and boulders on the sides—both literal and metaphorical. Aligning existent dredging technology with commercial American interests offered an easy solution to the literal problem: an artificial waterway in addition to the original curved deep-water section at the limekiln crossing. This new waterway, the Livingstone, was to impose impressive walls and channel the river into one that was over twenty feet where the river had hitherto slowed down in the shallow waters. Not only was this aesthetically pleasing but it also offered engineers the ability to expand without needing to keep the natural deep channel in mind.[30] The metaphorical problem: the political borderline, which was impressive on paper but invisible in the water, was thornier and more persistent.

As the first chapter showed, the Corps, in following international law and neighborly protocol, asked the Canadians for permission. This process usually went through the Privy

[30] Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape, 1865-1885*.

Council of the Governor-General since Canada was then, a dominion. This act of seeking permission, nominal as it may have been, did not go down well with some American politicians who questioned why the United States continued to invest millions of dollars in an endeavor so close to Canadian shores. What good was keeping a waterway viable, if it could easily be captured during times of strife, they asked? At a time when calls for Canadian annexation remained popular, American politicians questioned how Canada could be trusted to not usurp these important and narrow connecting channels of the Great Lakes.[31]

Even as fearmongering politicians and press pieces tried to destabilize the evolving engineer-led techno-infrastructural diplomacy, there also evolved a mutually beneficial and legible common language between the Corps and Congress that drew upon the other's vocabulary and acumen to justify infrastructural projects for both institutions. Whereas "Congressmen wrote of the size and capacity of watercourses; the engineers framed their projects in terms of economic benefits and political feasibility."[32] Premised in the ability of the Corps to seek and receive U.S. Congressional appropriations as well as the supremacy of American-origin cargo, engineers in both nations actively worked together in two ways. One, as the first chapter showed, preceding a binational policy framework, these engineers took on the task of being interlocutors between people, politics, and the growing shipping lobby. Over the course of three decades, these technocrats not just cemented a lexicon, they also secured large-scale appropriations as well as an almost blind belief in their abilities to mold nature. Given that these engineers were designing in the dark, in the absence of consistently reliable data, this enduring faith and political capital are important to note. Co-operative construction and dredging

[31] "Whose Is It? Is Part of the Detroit River in Canada? And Has the United States Government Been Improving the British Channel and Neglecting Her Own?" A
[32] Davis, *The U.S. Army Corps of Engineers and the Reconstruction of the American Landscape, 1865-1885*, 321.

kept the distrust at bay without dispelling the anxieties, which for the Corps were an important lynchpin in securing Congressional funding. An important Corp's ally in securing funding was the Carriers. While their origins may have been disparate, by the time the Livingstone Channel was a possibility, the Carriers had become one body. This umbrella body withstood the test of time and crosscurrent.

Funding was not everything. Despite having funded almost all the improvements and having the most to lose if developments stopped, the U.S government and the Carriers were questioned by the Commission. Try as they may, the Canadians were unable to bring the might of this binational body to bear on issues they thought important such as the Chicago diversion. Stemming from the way projects were funded, the Corps also operated in an explicitly project-specific manner, delegitimizing any questions about the Chicago diversion. In so doing, engineers revealed their strategy of isolation and creation. When talking about the Livingstone Channel—whilst being cognizant of the waterways' interconnectedness—Corp's engineers isolated the Detroit River from its larger context, arguing that while the Chicago diversion impacted lake rhythms, the changes to water levels especially in the Detroit River were minimal. After having isolated the river, they then suggested compensation.

Taking its bilateral origins very seriously, the Commission drifted towards bacteriological instead of infrastructural questions. Over the course of the hearings, the Commission was hemmed in by the narrow scope of the reference on the Livingstone matter. The Commission also took its regulatory role very seriously. Through the course of the hearings, chose pollution as the cross it would bear. And continues to do so. At the end of those hearings, the Commission emerged emaciated making way for the engineer-led conversations to revert to infrastructural questions about compensation and design.

The Commission's interest in pollution stemmed in part from the vociferous local opposition to the dry-cut expansion from Amherstburg residents. This small town and its people brought a lot of attention to themselves in a way that caught the Corps and the federal Canadian government unawares. Eventually, both nations—and through them, commercial interests—prevailed. In the brief pause in construction, however, local activism was not just questioning channel design, but also the hegemony of American-origin commerce. This local interest and opposition to improvements were unrelenting, even if eventually unsuccessful in stopping construction. However, stopping construction was never the intent of these protests. The primary aim of these protests was to bring some parity for Canadian concerns along with American ones.

The Livingstone Channel was also, an extreme form of river training with obvious pushback. No longer content with merely augmenting the natural U-shaped channel, the Corps had, in the service of and using the advice of commerce, advocated a straight channel, parts of which would have walled-up sides, carrying only downbound traffic to complement the natural deep-water section. The Amherstburg channel offered little room for expansion (its width has not increased since the 1890s) since it was wedged between the Canadian mainland and Bois Blanc Island. The Livingstone Channel, even though still surrounded by islands, could be far better managed through innovative construction and maintenance, the Corps opined. Whereas early forms of river training had tried to contain the river to its original channel, merely pushing it faster, the Livingstone Channel asked the waterbody to rethink its fundamental rhythms. Imposing a stronger human will and desire for movement where it was used to standing, the river responded with a treacherous crosscurrent—pure fluvial dynamics. Yet, the question at hand for the Commission, during the 1912 hearings, was more social and technological than fluid dynamics. The crosscurrent, an issue that divided both Canadians and Americans when it came

to measuring its strength and impact, was most directly a response. The Corp's response to the river's response to their original act of creation was more compensation through a dike. Isolation and compensation thus were two sides of the same strategy and evolving engineering lexicon. Ironically, whereas isolation created a movement, the compensation sought to recreate the primordial river.

The Commission should have, in theory, taken the mantle of diplomacy away from the engineer-diplomats from both the United States and Canada. However, since the Commission defined its scope of influence as pollution, it created room for the return of these engineer-diplomats. After 1913, in its second form, the engineer-led technocracy was more ambitious, quiet, and willing to assertively bypass the Commission to achieve its goals. None of this was out of malice, especially towards the Detroit River, but instead was a testament to the engineers' belief that they could effectively train the river into behaving more efficiently and profitably. Instead of the extractive regime set in place by the Livingstone Channel, in its second version, the techno-infrastructural diplomacy chased creation and compensation—advocating the construction of a system of dikes that would eventually become Crystal Island and Bay. Compensation was always political, especially so during the Great Depression because it created jobs. Even as employment in binational waters was an issue, it was quickly isolated to being a small one that was easily bypassed to continue the juggernaut of creation, compensation, and isolation.

The end goal was the creation of a system that was largely hidden —physically as submerged dikes, and metaphorically, as improvements that became a part of nature itself. The use of compensatory and storage structures—dikes, dams, islands—some of which were (and continue to remain) submerged was an attempt to make the sociotechnical system more

manageable and resilient to "the disruptions that will nonetheless inevitably occur."[33] These techniques might seem "mundane, even trivial in comparison to grand system-building efforts, but they are essential to producing the invisibility of the environment to the users of industrial infrastructures."[34] Today, this entirely human-made infrastructure of control—meant to increase water levels and thwart the crosscurrent—is considered a part of the river. Curiously shaped but overgrown with trees, to a person standing on the riverbank, these dikes look like everything else in the river. Without the invisible line of the political border or the contours on a map, these dikes are nature and vice-versa.

One could conceive of the political border being natural infrastructure much like the farms and forests of the Panama Canal watershed were seen as part of the canal's infrastructure.[35] The Corp's engineers were acutely aware that their constant strive for improvements was driven by a desire to beat the nonhuman forces such as the crosscurrent and lower water levels that were impinging on the Great Lakes as a whole, from the outside. Preempting demands for more dredging from the shipping industry as well as attempting to outwit the river, the Corp's engineers constantly augmented and 'improved' the Livingstone channel by widening and deepening it, as well as creating dikes, dams, and eventually islands with dredged material, as compensatory and/or storage structures. Unlike large dams that are hard to hide, small dikes, dams, and even artificial waterways within the lakes as well as islands are easier to hide, especially once they have been naturalized over time. Pushing us to see the

[33] Benson, "Generating Infrastructural Invisibility," 107.
[34] Benson, 107–8.See also Sara B. Pritchard and Thomas Zeller, "The Nature of Industrialization," in *The Illusory Boundary: Environment and Technology in History*, ed. Martin Reuss and Stephen H Cutcliffe (Charlottesville: University of Virginia Press, 2010), 85.
[35] Ashley Carse, "Nature as Infrastructure: Making and Managing the Panama Canal Watershed," *Social Studies of Science* 42, no. 2 (2012): 539-563.

lakes differently, this dissertation addresses an important lacuna that is often obscured in the trope of abundance.

Today, dredging is the "largest continuing maintenance activity in the Great Lakes navigation system."[36] Long and short-term processes and capitalism's unending march have periodically brought attention back to the Great Lakes. In as much as they attempt to respond to the call of transformation—whether the Welland in the nineteenth century or the Seaway or Cleveland's and Duluth's port expansions—these transformations have tried to jump on to a ship that has already pushed off the docks. Yet, as this dissertation shows, the end result is secondary to the process by which these transformations were ordered, fought, and ultimately created. What began as mislabeling a strait as a river was canonized through people, politics, and processes to ensure this watercourse today resembles a canal. Meanwhile, the river still runs through the dikes, occasionally reminding us that her memory is long, deep, and dark.[37]

[36] In a typical year, the Corps dredge about four million cubic yards of material spending about twenty million dollars in the bargain. United States Army Corps of Engineers (USACE),US Army Corps of Engineers and United States Environmental Protection Agency, "Great Lakes Confined Disposal Facilities," April 2003, 4, https://www.lrd.usace.army.mil/Portals/73/docs/Navigation/GL-CDF/GL_CDF.pdf.

[37] In December 2020, the Harvest Spirit, a 500-foot freighter ran aground in the Livingstone Channel, stopping traffic and raising fears about possible leaks. See Miriam Marini and Slone Terranella, "Freighter That Ran Aground in Detroit River Has Been Freed as Channel Reopens," *Detroit Free Press*, December 4, 2020, https://www.freep.com/story/news/local/michigan/2020/12/04/freighter-stuck-detroit-river-freed-channel-reopens/3816350001/.

APPENDICES

APPENDIX A

Bibliographical Essay

This dissertation tries to understand how different actors conceived of and acted upon their conceptions and perceptions of a river's ideal behavior and purpose. To do so, it uses a variety of sources. Beginning with technocrats, it utilizes the Corps' annual reports, all available on their website. The Commission records are available online as well as historical newspaper collections. Official correspondence, especially from the Library and Archives in Ottawa were instrumental in understanding the evolution of the prickly but civil North American improvement ethic.

Scholarship on newspapers in Canada has centered around media in larger urban agglomerations than Windsor. In his brief survey on the rise of the newspaper in Canada, Douglas Fetherling remarks that the medium evolved from being a tool of government to one of political parties to eventually freeing itself from these roles long before it was taken over by the television.[1] Newspaper coverage, especially relatively small, local publications, make a constant appearance in this dissertation. Following newspaper coverage serves a variety of purposes. First, newspapers offer a great vantage point to study what people felt and thought about engineers' ideas and deigns on transforming the Detroit River. In specific, local responses through letters to newspapers as well as local reportage are a sieve to study parallel processes of information dissemination and the rise (or the lack thereof) local action.

[1] George Fetherling, *The Rise of the Canadian Newspaper*, Perspectives on Canadian Culture (Toronto: Oxford University Press, 1990).

Between 1865 and 1935, as the region was fast growing, residents on either side of the border responded to these changes via newspapers. They used locally based newspapers as a means to reflect on their reservations. As the chapters that follow show, newspapers covered and commented on each other's reportage, especially those from across the border. For Canadian newspapers such as *The Amherstburg Echo* and the *Windsor Record*, reportage by the *Detroit Free Press* as well as the *Detroit News* were often counterpoints to the former's stance as well as an indication of U.S. hegemony. Standing up for local issues, rights, and against larger, international issues, following these newspaper reportage reveals more about local and regional politics than we might have first imagined—the second purpose. Between 1865 and 1930, many newspapers were born and died, especially in Ontario. Between 1901 and 1920, twenty-two newspapers died in Southern Ontario. One of the surviving newspapers was based in Windsor, as the town continued to grow, thanks in principle to its status as a railroad terminus and proximity to Detroit.[2]

The Windsor Record was first published as the *Essex Record* from 1861 to 1888. As the *Windsor Record* (and *Windsor Evening Record*) it was published until 1917 when the paper was bought, yet again, and renamed the *Border Cities Star.*[3] Today, the newspaper is known as the *Windsor Star*. Through the course of this dissertation, the paper then will change names, but not its focus on events relevant to Windsor. *The Amherstburg Echo*, in downriver Essex County, was born out of locals' need for a platform. Founded by liberal William Balfour and John A. Auld, the newspaper reflected the anxieties, opinions, and desires of the residents of Amherstburg, Malden, and Anderdon. Balfour, until his untimely death in 1896, was a liberal member of the

[2] John Michael Bolton, "Spread and Growth of Newspapers in Ontario, 1781-1977" (n.d.), 62, https://scholars.wlu.ca/etd/1488.
[3] Chris Van Doelen, "A Parade of Proprietors," *Windsor Star* December 1, 2012. https://windsorstar.com/news/a-parade-of-proprietors. Last accessed February 20, 2022.

provincial parliament and his political affiliations were visible in the paper's coverage.[4] Between 1865 and 1930, Canadian politics at the federal level swung between the Conservatives and Liberals. Whereas Ontario voted Liberal until 1900, from 1900-1930 (with the exception of 1921), it voted distinctly Tory.[5] Unlike the Liberals who supported reciprocity and greater cross-border connections, Conservatives were much wearier of such connections. [6] When it came to binational issues like dredging, where Ontario's opinions were routinely sought, the Tories tended to reluctant signatories, ever conscious of the province's economic and ecological well-being. Even during these phases, there were regional differences in the ways in which Windsor and Amherstburg voted. In border regions such as the Detroit-Windsor region, where much of the economy was tied to industrialization and shipping, newspaper coverage reflected regional and local aspiration and politics. These papers then, are a great medium to consider the overarching arguments of this dissertation.

On the American side, E.W. Scripps, one of the stalwarts of the modern American newspaper, founded the *Detroit Evening News,* a small elite challenging newspaper whose coverage of dredging reflected this commitment.[7] The *Detroit Free Press* was a well-known Democratic paper which underwent an ownership change in 1872 and continued to be partisan even as it was confronted with new entrants vying for Democratic audiences. In the second half

[4] Ronald G. Hoskins, "Balfour, William Douglas," in *Dictionary of Canadian Biography*, vol. 12, University of Toronto/Université Laval, 2003–, accessed February 19, 2022, http://www.biographi.ca/en/bio/balfour_william_douglas_12E.html.
[5] Randall White, *Ontario, 1610-1985: A Political and Economic History*, Ontario Heritage Foundation Local History Series 1 (Toronto: Dundurn Press, 1985), 206. See also election results https://results.elections.on.ca/en/data-explorer?fromYear=1867&toYear=1904&levelOfDetail=election
[6] L. Ethan Ellis, *Reciprocity, 1911: A Study in Canadian-American Relations*, The Relations of Canada and the United States: A Series of Studies Prepared under the Direction of the Carnegie Endowment for International Peace, Division of Economics and History. (New Haven: Yale University Press, 1941).
[7] Baldasty argues that Scripps has not received much attention from researchers. He shows that Scripps founded smaller newspapers as compared to other stalwarts like Pulitzer and Hearst. See Gerald J. Baldasty, *E.W. Scripps and the Business of Newspapers*, The History of Communication (Urbana: University of Illinois Press, 1999).

of the nineteenth century, there were a series of converging processes that should have transformed the press: decline in party and government patronage, increase in capital investment, as well as advertisers' rising influence. Examining Detroit based newspapers from 1865 to 1900, Richard Kaplan shows how market constrains and pressures confronted newspaper publishers and editors as well as their response in balancing party, advertisers, and audience.[8] Specifically, political, and economic forces pushed newspapers to break any vestiges of party affiliations. In a rapidly urbanizing environment and expanding city, political parties could no longer define the loyalties and identities of the populace. Thus, publishers recognized that "party fealty would only hinder, not help, [a] journal expand its market share." Instead, they adopted the Progressive Era ideology opposing pure partisan voting. In so doing, publishers created a new role for the press, bridging the gap between citizens and politicians. Much of this realignment had to do with changes in the business of producing newspapers bolstered by the rise of advertising as a primes source of revenue.[9] Newspaper coverage represented people's voices as much it was a barometer changing pollical and social spheres Paying attention to newspaper coverage of dredging then, opens our eyes to underlying political events and processes.

[8] Richard L. Kaplan, "The Economics and Politics of Nineteenth-Century Newspapers: Market Segmentation and Partisanship in the *Detroit Press*, 1865–1900," *American Journalism* 10, no. 1–2 (January 1993): 84–101, https://doi.org/10.1080/08821127.1993.10731501.
[9] Richard L. Kaplan, *Politics and the American Press: The Rise of Objectivity, 1865-1920* (Cambridge, U.K. ; New York: Cambridge University Press, 2002).

APPENDIX B

Glossary

Ballast Water: Water that is held on board in special tanks on board to provide stability and control, especially when the vessel is going to pick up cargo. When ships get to the port of call, they release ballast and pick up the cargo. Ballast Water is a major source of invasive in the Great Lakes like the Zebra mussels. *Also called ballast.*

Barge: A flat-bottomed boat that carries goods, usually propelled by a tow boat.

Boat: A small sailing vessel.

Cofferdam: An enclosure created with a system of dikes within a body of water. The water within the cofferdam is usually pumped out. A cofferdam is often used in reclamation activities as well as in dredged sedimental disposal.

Confined Disposal Facility: An area containing dredged sediment that can either be in-water or close to the shore.

Dam: a barrier in a flowing body of water.

Department of Public Works: The Department of Public Works (now called the Department of Public Works and Government Services) in the federal government in Canada is in-charge of building infrastructure.

Dewatering: To remove water from. In this dissertation, dewatering refers to the process of pumping river water from behind a dam during dredging.

Dike: an earthen mound/ bank used to restrict water.

Draft: the amount of water a sailing vessel draws.

Dry cut: A section of river encircled by dams, with water pumped out, to facilitate dredging in the dry.

Governor General: In Canada, as a constitutional monarchy and parliamentary democracy, the Governor General is the representative of the Queen of the United Kingdom and Commonwealth.

Order-in-Council: In Canada, a federal order-in-council is issued by the Governor General, acting on the Queen's Privy Council. It is a statutory instrument that indicates a decision. In practice, orders-in-council are drafted by the (Prime Minister's) cabinet and formally approved by the Governor General.

Privy Council: The Privy Council was established by the Constitution Act of 1867 to advise the Crown.

Provincial Parliament: Canadian federalism provides for sharing powers between the federal and provincial governments. Modeled along the British Westminster parliamentary system, provincial parliaments consist of a legislative assembly., from which the premier selects a governing cabinet.

Reference: The act of directing or sending to another, in this case, the International Joint Commission, for consideration.

Retaining Wall: A wall that holds back water.

Riding: An electoral district.

River Training: humanmade structures designed and constructed in a river to modify the flow of a river and its sediment load.

Ship: a large sailing vessel.

Shipping Channel: a navigational path within a watercourse like a river that may or may not follow the natural deep section of a waterway.

Spoil Bank: A pile or bank of excavated, dredged material.

Tugboats: a boat that tows and pushes a barge.

Weir: a dam in a river to raise its level or divert its flow.

APPENDIX C

A Note on the Usage of Some Terms

Dike and Dam: These terms are used interchangeably, just as the historical actors in this dissertation do so. For the Corp's engineers, a dike and a dam were not dissimilar because they both held back water.

Limekiln crossing: historical sources refer to the limekiln crossing area as the "Lime kiln," Limekilns," and "Limekiln." For the sake of consistency, I use limekiln crossing except when quoting primary sources.

St. Mary's/St. Marys River: The St. Mary's River is sometimes referred to as the St. Marys. Except when quoting primary sources, I use St. Mary's River.

Crystal Bay and Island: Crystal Bay and Island is uninhabited system of dikes in the lower Detroit River. Created to balance water levels, the dikes were given this name by locals. Throughout this dissertation, I will refer to Crystal Bay and Island as Crystal Bay.

Since this dissertation will use sources from both the United States and Canada, spellings remain unchanged in sources.

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