



Trying hard to adapt to a chaotic world: How complex challenges overwhelmed best intentions[☆]



Christopher J. Orr^{† a}, Kathleen C. Williams^{† b,*}, Katrina L. Laurent^c, Kathryn B. Friedman^d, Gail Krantzberg^e, Donald Scavia^f, Irena F. Creed^c

^a Department of Agricultural & Environmental Sciences, McGill University, Macdonald Campus, Quebec H9X 3V9, Canada

^b Department of Geography, University of Wisconsin-Milwaukee, Milwaukee, WI 53201, USA

^c Department of Biology, Western University, London, Ontario N6A 5B7, Canada

^d University at Buffalo Regional Institute, State University of New York, Buffalo, NY 14203, USA

^e Centre for Engineering and Public Policy, McMaster University, Hamilton, Ontario L8S 4L7, Canada

^f School of Natural Resources and Environment, University of Michigan, Ann Arbor, MI 48109, USA

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ABSTRACT

In this future, citizens of the Great Lakes-St. Lawrence River basin recognize their dependence upon and became united around a common vision for a thriving Great Lakes basin. However, in 2063 the environment and economy are out of balance; citizens are constantly forced to make difficult trade-offs. Climate warming, geopolitical pressures such as environmental refugees, an aging population, and a sluggish economy have overwhelmed the region's efforts to find a balance that would have ensured human prosperity without diminishing the integrity of the Great Lakes basin. This narrative illustrates the time period 2013 to 2063, depicting how the collision of multiple drivers of change cause declining social and environmental conditions, and force a gradual transformation in societal values. While society was initially complacent, the groundwork for social transformation was laid over three decades. Impacts of education programs, opposition to environmentally degrading natural resource extraction, and widespread effects of both failing social services and physical infrastructure galvanize grassroots mobilization of communities around "iceless hockey rink" meetings. These meetings act as a catalyst, translating this social movement into governance that works towards a common vision based on shared values. However, despite innovative technologies and cohesive efforts, it becomes obvious that attempts to oppose the complex and interrelated forces driving changes in the Great Lakes region are limited. These efforts come at huge economic costs, and the harsh reality forces people in the region to make difficult decisions that threaten some facets of economic, social and environmental well-being while protecting others.

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Introduction

The Great Lakes-St. Lawrence River basin is of vital importance to millions of Canadians and Americans because it provides for their social and physical well-being. However, planning for the future is challenging because envisioning future conditions is complex and uncertain. Scenario analysis provides a structured approach to explore highly uncertain future conditions through plausible narratives (Schwartz, 1996). Narratives that describe scenarios allow readers to suspend their disbelief in alternative future conditions and enable them to consider how

present decisions may affect the future. Careful consideration of these decisions and their potential long-term impacts enables us to better formulate informed and effective policies. The purpose of this future history is to present one of four plausible scenarios of the Great Lakes region from 2013 to 2063 as part of a collaborative process to inform policy.

This future history, "Trying Hard to Adapt," represents the scenario that occupies the lower-right quadrant of a two-dimensional coordinate plane, with the horizontal x-axis representing the human capacity for change and the vertical y-axis a balanced environment and economy (Laurent et al., 2015). We present a plausible narrative of how the Great Lakes region came to be characterized by a strong imbalance in the desired mix of environmental and economic conditions, while society in 2063 is able to adapt, having developed a strong human capacity for change. Imbalance between the environment and economy, as defined by society, manifested in diverse ways throughout the region: society is degrading ecological services, it is trying to improve environmental conditions by limiting economic growth, or both socioeconomic and

[☆] The Great Lakes Futures Project brought together graduate students and expert mentors from universities and institutions in Canada and the United States. Each paper required collaboration between a number of authors with many of them sharing co-leadership that we denote using a [†]

* Corresponding author at: Department of Geography, PO Box 413, Milwaukee, WI 53201-0413, USA. Tel.: +1 414 303 3078.

E-mail address: kcw2@uwm.edu (K.C. Williams[†]).

environmental conditions are relatively degraded. This narrative illustrates the social and environmental transformation experienced by residents of the Great Lakes region in five chapters.

Scenario overview

The global context within which the Great Lakes region is situated evolved rapidly in the 50 years since 1913; human civilization needed to be agile and adaptable to keep up. Globally, climate change and human actions wreaked havoc on the world. In 2063, a struggling global economy is only one of many worries. Global sea levels rose and extreme events devastated several major coastal cities, inundating the Great Lakes region with environmental refugees. Poor living conditions and a lack of basic needs, such as food and clean water, have exacerbated geopolitical tensions and contribute to instability in an interconnected world. Global society has risen to these challenges. A restructured United Nations (UN) created the United Nations Environment Organization (UNEO), endowing it with the necessary capacities and institutional structure to initiate unprecedented global cooperation and action, something its predecessor had been incapable of achieving (Ivanova, 2005). However, these efforts have not been enough to resolve social pressures from increasing population and consumption or to allow peoples of the world to find a balance that will ensure human prosperity without diminishing the integrity and vibrancy of the world around them.

Within the Great Lakes region, citizens have been desperately trying to address economic and environmental problems in a rapidly changing regional and global context. They have been constantly trying to adapt to their changing social and physical context, but have been faced with new challenges much like the mythical Sisyphus, who was cursed to push a boulder up a hill only to repeat his toils when it would roll back to the bottom (Camus, 1955). The Great Lakes region has remained vulnerable to geopolitical, economic, demographic and climate pressures. Citizens have been unable to balance economic activity and environmental integrity within natural constraints, despite strong political will and human capacity to effect change. Citizens have been trying hard to adapt to environmental and economic changes, but the reality is that they have not been able to keep up (Fig. 1).

In this scenario, the year 2063 is characterized by a strong human capacity for change. Governments and stakeholders on both sides of the border support a binational vision of a healthy Great Lakes basin, recognizing it as the region's life support system and source for both social and economic prosperity. The result has been strong implementation of policies that further this vision. All levels of authority in both countries approach governance of the Great Lakes basin from the perspective of maintaining the ecosystem services that the lakes provide for society's physical, cultural and spiritual sustenance, rather than merely as a resource to be used and consumed for shipping, power generation, commercial fishing, agriculture and consumptive uses. Having learned from past difficulties implementing policies, the US and Canadian governments developed a cohesive approach to Great Lakes basin governance based on the need for adaptation strategies. These efforts were responsive to citizen demands, incorporating extensive consultations with local, tribal, and provincial governments.

While governance capacity has grown and matured, the economy and environment have remained out of balance. In 2063, large shocks to the economy and environment threaten to cause the entire socio-ecological system to sink further into a degraded state. Climate warming and human impacts have caused water level and growing season changes, accompanied by an explosion of invasive species (Appendix A). Degradation of the environment has created feedbacks that stress both the economy and the environment. Population pressures and increasing consumption have continued to exacerbate an already unbalanced system while technological and economic fixes have remained futile. Dedicated funding and careful planning have been insufficient for the plethora of new problems that continually emerge. These problems include the costs of adapting to the impacts

of climate change, which have been immense and have drained the economy. Severe floods and droughts, the disappearance of reliable winter snows, the drying up of harbors, and outbreaks of disease have impacted many economic sectors and features of life in the Great Lakes region. Changes have been too great and too rapid for human efforts to keep pace.

Scenario narrative

Cracks in the foundation: how the Great Lakes region's early warning systems failed (2013–2023)

"If you drop a frog in a pot of boiling water, it will of course frantically try to clamber out. But if you place it gently in a pot of tepid water and turn the heat on low, it will float there quite placidly. As the water gradually heats up, the frog will sink into a tranquil stupor, exactly like one of us in a hot bath, and before long, with a smile on its face, it will unresistingly allow itself to be boiled to death." — Quinn (1996, p. 258)

From the perspective of the year 2063, some might ask how we ended up in the world we live in today. Why did we not clue into what was to come fifty years ago? The answer to the second question provides some insight into the first: in 2013, we recognized that there were many problems, but we did not recognize their full extent, their interconnected nature, or the need to act. Politicians remained reactive, refusing to make policies to anticipate problems and prevent them. We kept hitting the snooze button in spite of the subtle signs of change that were all around us.

Citizens of the Great Lakes region ignored symbolic landmarks along with the rest of the world, including when the global population surpassed seven billion people and atmospheric CO₂ levels surged past 400 parts per million (NASA, 2013; PRB, 2012). Meanwhile, Earth's sixth mass extinction loomed like a foreboding cloud over many of the planet's diverse ecosystems, including the Great Lakes native fisheries, which threatened to disappear forever (Barnosky et al., 2011; Worm et al., 2006). Unsettling alarm bells kept going off, one after the other, but it always seemed as though we could get things back under control. For example, 2013 was a good year for maple syrup and wild rice causing us to quickly forget that both had failed in 2012 (Myers, 2012; WZZM, 2013). West Nile Virus was repeatedly found throughout the southern Great Lakes region, but was largely ignored because it affected birds far more than humans (Githeko et al., 2000; OSUE, 2008). Some places enjoyed extended skiing seasons only to be forced to plant crops a month late as a result of unseasonably late snows (Curtis, 2013). In 2017, lake water levels hit record lows for the second time in a decade (Fig. 2). Local governments began lobbying the International Joint Commission to implement a solution, although they failed to agree on what that solution should be (GLSLC, 2013). Shoreline property owners were inconvenienced but inactive, as *Phragmites* invaded the shores of the Detroit River, Georgian Bay and Green Bay, obstructing views and lowering their property values. Meanwhile, lake water levels retreated and beaches were exposed. Each time we hit the snooze button. Each time we went back to sleep.

Citizens remained unengaged while governance in the Great Lakes region was left fragmented and complacent. Although well-crafted policies held promise to protect the Great Lakes region's water resources, unfortunately, the care and attention that went into crafting policies were not translated into policy implementation. The political sensitivity and potential for failure of key policies such as the Great Lakes-St. Lawrence River Basin Water Resources Compact (the Compact) and the Great Lakes Water Quality Agreement (GLWQA) were overlooked or ignored until crises became apparent (JIC, 2012; USFG, 2008). For example, the first challenge to the Compact was an application for a water

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