



Demographics and societal values as drivers of change in the Great Lakes–St. Lawrence River basin



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ABSTRACT

The footprint left by development in the Great Lakes–St. Lawrence River basin is fundamentally linked to the size, structure, and distribution of the human population across the region. Regional demographic conditions and trends over time provide insight into both why the basin looks as it does today and how it might change in the future. We present analyses of population size and distribution, age structure, immigration, and urban land use within the Great Lakes basin, and across six sub-basins, for the period 1960 to 2011. Since 1960, the population within the basin has increased (reaching 48.5 million people in 2011), become older (a result of both decreasing fertility and increasing life expectancy), and more diverse (as immigrants make up a higher share of the population). A booming population on the Canadian side stands in stark contrast to low growth or even population decline on the US side. Urban sprawl continues to outpace population growth in many areas, even for major US cities experiencing population decline. Looking toward the future, we present three scenarios of change for population, land use, and societal values in 2063 and highlight the role that societal values play in shaping the state of the basin. Ultimately, the state of the Great Lakes basin will be the outcome of many complex drivers of change, where demographics are only one entry-point to understanding potential future states.

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Introduction

As a binational basin, the Great Lakes–St. Lawrence River basin includes eight states in the United States (Illinois, Indiana, Minnesota, Michigan, New York, Ohio, Pennsylvania, Wisconsin) and two Canadian provinces (Ontario and Quebec). The Great Lakes basin is home to several major cities including Chicago, Detroit, and Cleveland on the US side, and Toronto, Ottawa and Montréal on the Canadian side. Several indigenous territories are also woven throughout the landscape. In turn, these political boundaries are overlain across a unique hydrologic system that includes the largest group of freshwater lakes on Earth. These lakes – Superior, Michigan, Huron, Erie, and Ontario – and the St. Lawrence River that drains them to the Atlantic Ocean, are precious natural resources that have attracted people in search of a better life to the basin for centuries (Botts and Krushelnicki, 1988).

As popularized by Ehrlich and Holdren (1971), the human impact on the environment (I) can be considered as the product of population (P),

affluence (A), and technology (T), where $I = P \times A \times T$. Over the last 50 years, the population of the Great Lakes basin has grown (P), the average consumption – or affluence – per capita has grown (A), and the intensity of resource extraction (T) has also, in many cases, grown. As our population increases, our activities leave a footprint on the landscape, whether through urban sprawl, farming our food, or manufacturing our cars and gadgets (Allan et al., 2013). Recognizing that social–ecological systems, especially ones as large and complex as the Great Lakes basin, are dynamic and shaped by multiple human and natural drivers (Dawson et al., 2010), a better understanding of human drivers, namely changes in demographics and societal values, can help explain changes in the natural environment, particularly with respect to land use. In turn, understanding land use change can give us insight into potential “downstream” effects or externalities – including, for example, infrastructure capacity, environmental quality, and social cohesion.

The primary purpose of this article is to highlight the core demographic changes that have occurred within the Great Lakes basin since 1960 and to explore how these and emerging trends may shape the future state of the basin in both the US and Canada. Specifically, we respond to the following research questions: (1) How have societal values in the US and Canada changed since 1960? (2) How has the binational population within the Great Lakes basin changed in size, distribution, and other key characteristics since 1960? (3) How has land use, particularly urban land use, changed with population?

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In the following sections, we first discuss the relevance of societal values and urban land use management as important drivers of change in the Great Lakes basin. We then analyze demographic trends in the Great Lakes basin over the past 50 years, including trends in population size, fertility, life expectancy, immigration, and age structure. We use US and Canadian census data and other secondary data sources to investigate trends across multiple scales (see Fig. 1 for study area). Thereafter, we analyze recent changes in urban land use within the basin and discuss trends in land use management. We link these analyses by summarizing key interactions between societal values, demographics, land use, and other important drivers of change in the basin. Once we have established historical trends and patterns, we shift our focus from the past and into the future, and present three scenarios that combine trends in societal values, demographics, and land use for the year 2063. We conclude with a summary of challenges facing the Great Lakes basin and provide recommendations for moving forward.

Literature review

Societal values

The state of the Great Lakes basin is fundamentally shaped by societal values, in that societal values strongly motivate how we live our lives (de Vries and Peterson, 2009; Rokeach, 1973). Rokeach's (1968) classic definition describes a value as "an enduring belief that a specific mode of conduct or end-state of existence is personally and socially preferable to alternative modes of conduct or end-states of existence." Although values are often seen as immutable, they may evolve over time (de Vries and Peterson, 2009; Hitlin and Piliavin, 2004), driven by a variety of social, economic, and environmental trends

(Lawrence, 2004). Importantly, societal values are not necessarily predictors of behavior, because behavior may contradict values.

Canada and the US share many similar values, yet important cultural differences remain. As neighboring democratic nations, both countries tend to place great importance on values of autonomy, openness to change, concern for others, and self-indulgence (Schwartz and Sagie, 2000). However, focusing on the similarities of value systems may mask key differences. In the book *Fire and Ice: The United States, Canada, and the Myth of Converging Values*, Adams (2003) argues that the value sets of Canadians and Americans are socio-culturally distinct, basing his conclusions on surveys of social values in 1992, 1996, and 2000. He argues that important historical, geographic, and institutional differences between the two countries have given rise to different value sets, and that, contrary to popular opinion, these value sets are diverging.

Overview of Canadian and American values

Historically, core American values have included economic individualism, equality of opportunity, and belief in the free enterprise system (Feldman, 1988). These are accompanied by strong values of individualism, support for private interests, and a general mistrust of authority (Adams, 2003). In Canada, group rights, public institutions, and deference to authority have shaped values (Adams, 2003), and Canadians typically uphold more collectivist values than their US neighbors (Steel et al., 1990). Of course, these trends are mere caricatures of societal values that vary by region and cultural group. For example, even within the Canadian portion of the Great Lakes basin, it cannot be assumed that there are shared values given the distinct value sets of Aboriginal peoples and Québec Francophones (Toye, 2007).

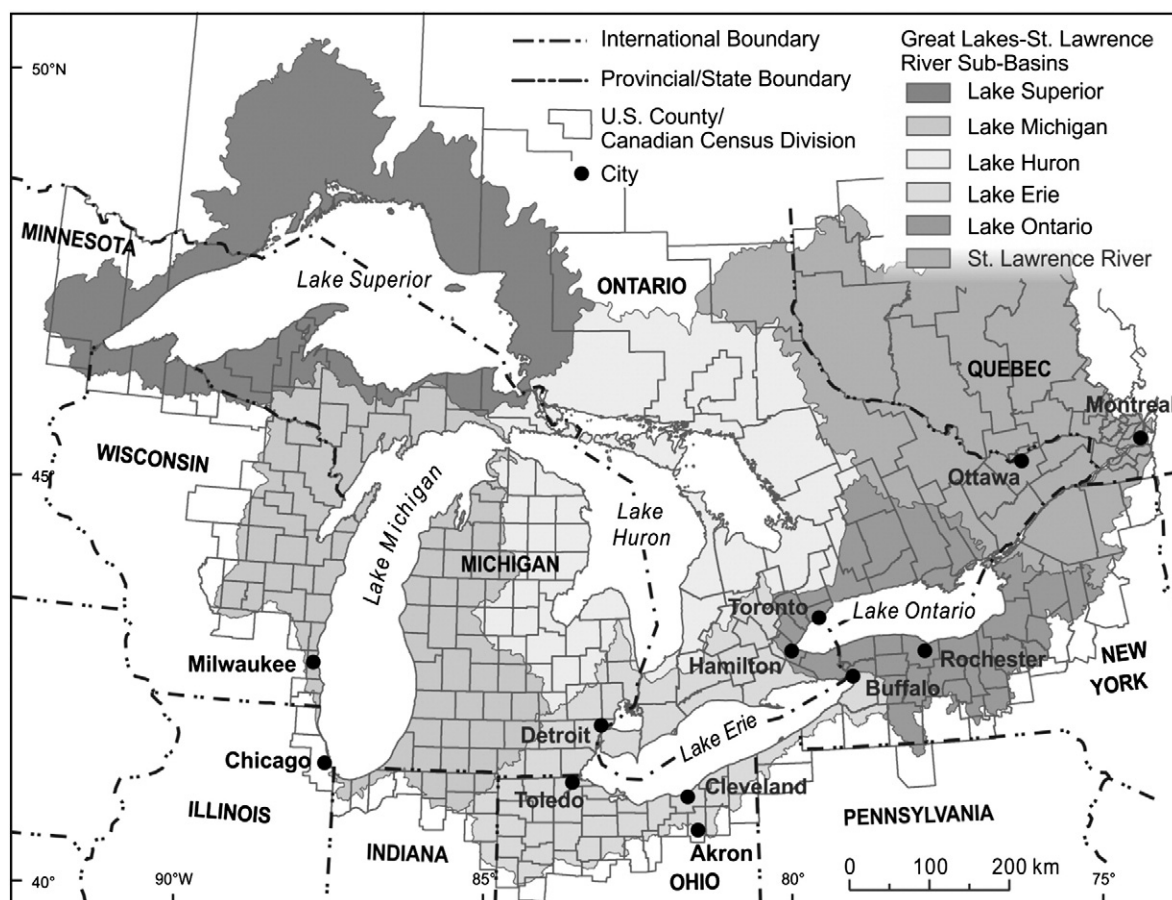


Fig. 1. The study boundary for the Great Lakes–St. Lawrence River basin, including six sub-basins: Michigan, Erie, Ontario, Huron, Superior, and the St. Lawrence.

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