LAND USE GOVERNANCE
IN THE
GEORGIAN BAY
UNESCO BIOSPHERE RESERVE
AN INSTITUTIONAL ANALYSIS
AND RECOMMENDATIONS
KENDALL FLOWER
LAND USE GOVERNANCE IN THE GEORGIAN BAY UNESCO BIOSPHERE RESERVE

AN INSTITUTIONAL ANALYSIS AND RECOMMENDATIONS

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Submitted to the School of Environmental Design and Rural Development as a component of the Masters in Planning Degree

Graduate Thesis

Completed under the co-advisorship of Dr. John FitzGibbon and Dr. Nathan Perkins

ISBN 978-0-9950159-0-6

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2016 UPDATE

At the March 2016 4th World Congress of Biosphere Reserves in Lima, Peru the Lima Action Plan for UNESCO’s Man and Biosphere (MAB) Programme and its network of Biosphere Reserves was prepared and issued. In alignment with this report, the Action Plan further clarified that:

(A3.1) Biosphere Reserves are to be recognized in legislation, policies and programs at national and/or subnational levels, and integrated into national and regional development, territorial planning, environment and other sectoral legislation, policies and programmes.

The Action Plan also strives for alignment with UNESCO’s 2030 Agenda for Sustainable Development, which outlines goals for natural ecosystem, biodiversity and ecosystem services conservation along with sustainable and resilient cities and communities, industrial and economic growth and innovation.


ACKNOWLEDGEMENTS

I am particularly grateful to Professor John FitzGibbon and Professor Nathan Perkins with the University of Guelph, School of Environmental Design and Rural Development. The support and advice that you have each provided through both my undergraduate and graduate years at Guelph have been invaluable. Thank you most of all, for your patience, and the freedom and autonomy that you provided by allowing me to follow my passion for the Georgian Bay Biosphere Reserve area through this research.

I am blessed to have highly supportive, albeit appropriately critical parents, who have instilled a deep affinity, but also a sense of responsibility for the natural environment that I grew up immersed within. Thank you both for a magical upbringing on Georgian Bay, and for my inspirational outdoor writing space within the biosphere reserve, where most of my writing for this project took place.

The Georgian Bay Land Trust, the GB5 and the work of Dr. Patricia Chow Fraser each exemplified responsibility to the local environment and community, providing an influence on my life at the time when I was determining which directions to pursue academically and professionally. The mandates and work that you pursue are meaningful, and have inspired me to focus on those things that I believe are important.

Thank you to the King Family for the bursary support provided for this project. The selection panel’s interest in my chosen research topic had the collateral benefit of providing informal encouragement to seek relevance, applicability and integrity for this work.

This paper would not have been possible without the high quality and extensive work of ecologists, geologists and sociologists who have focused their research along the eastern shores of Georgian Bay.

Last, but not least; thank you to the many individuals within the Georgian Bay Biosphere Reserve who generously contributed their time and knowledge through guiding discussions, directing me to additional helpful resources, connecting me with other knowledgeable individuals and providing basic encouragement. This paper is more comprehensive and locally relevant due to significant suggestions for consideration from Peter Koetsier, Cale Henderson, Rebecca Pollock, Greg Mason, Taylor Elgie, Jennifer Mabee, and Melissa Rio.
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<th>Full Form</th>
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<tr>
<td>CA</td>
<td>Conservation Authority</td>
</tr>
<tr>
<td>CAA</td>
<td>Ontario Conservation Authorities Act (1991)</td>
</tr>
<tr>
<td>CBT</td>
<td>Clayoquot Sound Biosphere Trust (NGO administrative authority)</td>
</tr>
<tr>
<td>CEPA</td>
<td>Canadian Environmental Protection Act (1999)</td>
</tr>
<tr>
<td>COA</td>
<td>Canada Ontario Agreement (2014)</td>
</tr>
<tr>
<td>CONE</td>
<td>Coalition on the Niagara Escarpment (NGO)</td>
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<tr>
<td>EBR</td>
<td>Ontario Environmental Bill of Rights (1993)</td>
</tr>
<tr>
<td>EC</td>
<td>Environment Canada</td>
</tr>
<tr>
<td>ECO</td>
<td>Environmental Commissioner of Ontario (Independent Environmental Oversight of Provincial Government)</td>
</tr>
<tr>
<td>FA</td>
<td>Fisheries Act (2012)</td>
</tr>
<tr>
<td>GB5</td>
<td>A collaborative group of five non-governmental, environmentally focused organizations, active in the GBBR</td>
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<tr>
<td>GBBR</td>
<td>Georgian Bay Biosphere Reserve</td>
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<tr>
<td>GBBR INC.</td>
<td>Georgian Bay Biosphere Reserve Incorporated (NGO GBBR administrative authority)</td>
</tr>
<tr>
<td>GFI</td>
<td>Geographically Focused Initiative (pertaining to the GLPA)</td>
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<tr>
<td>GLPA</td>
<td>Ontario Great Lakes Protection Act (2015)</td>
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<tr>
<td>GLCWCI</td>
<td>Great lakes Coastal Wetland Consortium Index</td>
</tr>
<tr>
<td>GPNO</td>
<td>Growth Plan for Northern Ontario (2011)</td>
</tr>
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<td>GSL</td>
<td>Geographically Specific Legislation</td>
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<td>IJC</td>
<td>International Joint Commission</td>
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<td>MAB</td>
<td>UNESCO’s Man and the Biosphere Programme</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>MMAH</td>
<td>Ontario Ministry of Municipal Affairs and Housing</td>
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<td>NEC</td>
<td>(Ontario) Niagara Escarpment Commission</td>
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<td>NEPLAN</td>
<td>Niagara Escarpment Plan</td>
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<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
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<td>OBC</td>
<td>Ontario Building Code</td>
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<tr>
<td>OMB</td>
<td>Ontario Municipal Board</td>
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<tr>
<td>OMNR</td>
<td>Ontario Ministry of Natural Resources and Forestry</td>
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<td>OMOE</td>
<td>Ontario Ministry of the Environment and Climate Change</td>
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<tr>
<td>OP</td>
<td>Official Plan (of a municipality)</td>
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<tr>
<td>ORMIC</td>
<td>(Ontario) Oak Ridges Moraine Conservation Act</td>
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<td>OWRA</td>
<td>Ontario Water Resources Act (1990)</td>
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<td>PPA</td>
<td>(Ontario) Provincial Planning Act</td>
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<td>PPS</td>
<td>(Ontario) Provincial Policy Statement (2014)</td>
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<td>PSW</td>
<td>Provincially Significant Wetland</td>
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<td>TURA</td>
<td>(Ontario) Toxic-use Reduction Act (2009)</td>
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<td>UN</td>
<td>United Nations</td>
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<td>UNEP</td>
<td>United Nations Environmental Programme</td>
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<td>UNESCO</td>
<td>United Nations Educational Scientific and Cultural Organization</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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(General GBBR location context within Ontario and the Great Lakes system)
INTRODUCTION

The UNESCO Man and Biosphere Programme provides an approach to solving what may well be the most complex and important engineering, design, biological, and sociological problem of our time:

How do we reconcile the human use of Earth’s finite natural resources, including economic development and protection of cultural values, with the protection, management, and conservation of the natural functions of ecosystems surrounding those resources, in perpetuity, for future generations?

The act of designating the eastern coast of Georgian Bay as a UNESCO World Biosphere Reserve suggests a willingness on the part of the Canadian Federal Government and the Province of Ontario to pursue and study approaches toward achieving sustainable social and economic growth along this coastline, free from environmental degradation (1). Land use decisions and designations have been identified as the single most powerful tool available to us, right now - to combat and prevent further climate change on Earth (2). Future approaches to land use planning within the Georgian Bay Biosphere Reserve have either the potential to profoundly advance or to undermine the purpose of the UNESCO Man and Biosphere Programme. The way in which land use, growth, and development are approached and managed moving forward will determine whether this bioregion becomes a part of the problem, or part of the solution to the most complex challenges facing continued quality of human life.
**METHODOLOGY & PURPOSE**

The purpose of this institutional analysis project is to develop recommendations for a governance approach to land use planning in the Georgian Bay Biosphere Reserve, contributing to the long-term desired outcome of aligning land use planning practices with the UNESCO Man and Biosphere Programme purpose and goals.

Recommendations are based on:

- A literature review on the Georgian Bay Biosphere Reserve: what makes this area deserving of special consideration in land use planning, and what are the top threats to preserving the integrity of those things that make it special?

- An institutional analysis outlining the roles of existing governance bodies and legislation relevant to land use planning in the Georgian Bay Biosphere Reserve, and an assessment of how this current approach does or does not address the bioregion’s top threats.

- A Case study review of how other biosphere reserves or similarly environmentally prioritized areas have approached land use planning governance.

- The Issuance of a Draft Version Report to select, relevant personnel for review, comment, and additional considerations.
THE UNESCO MAN AND BIOSPHERE PROGRAMME

The UNESCO Man and Biosphere (MAB) Programme was launched in 1971 as an intergovernmental, ecologically focused, scientific, initiative. The MAB Programme has evolved since the first designations of biosphere reserves in 1976, from its original conservation mandate, into present-day form: focusing on achieving a sustainable, long-term balance between society, economy, culture and the environment (3)(4). The 2015 planet-wide network of biosphere reserves includes 631 designated sites distributed across 119 countries, including 14 trans-boundary sites (4). Biosphere reserves include terrestrial, marine and coastal systems, each identified as an ideal location within which to test interdisciplinary management approaches between human use and ecological systems. Potential sites are nominated by their national government(s), with the intent that MAB Programme initiatives will be recognized and supported through appropriate government structure and legislation. Although the Biosphere Reserve designation is internationally recognized, sites and their management remain under the jurisdiction of the countries where they are located (5).

Functionally, each biosphere reserve is intended to fulfill the three balanced primary purposes of:

- *Conservation* of ecosystems, ecosystem services, archetypal landscapes and biodiversity;
- *Development* of sustainable human uses, including economic development and responsible management of natural resources; and
- *Support* including environmental and sustainable development research, education and promotion of biosphere reserve goals (6 p. 6).

Physically, each biosphere reserve has three designated zones:

- *Core* zone(s) with fully protected ecosystems, including species, diversity and services supported by those ecosystems, allowing only for minimally disruptive monitoring and educational human uses;

- *Buffer* zone(s) surrounding core area(s), allowing for limited, sustainable human
uses and interventions that are compatible with ecosystem conservation, including research, education, eco-tourism and non-destructive recreation;

- And *Transitional* area(s) where sustainable and cooperative economic and social development are permitted and fostered when compatible with the eco-region’s ecology (6).

The 1996 MAB Seville Strategy outlines recommendations and indicators for how biosphere reserves should be managed at the international, national and regional/individual site levels. Every ten years, each biosphere reserve is assessed against these recommendations and indicators, based on a *Self-study Periodic Review Report* completed by the administrative organization responsible for management of the site. It is not necessary that all recommendations be successfully addressed in order to maintain a Biosphere Reserve’s designation. The UNESCO International Co-ordinating Council (ICC) must however, determine that the status and management of the biosphere reserve is either satisfactory, or has noticeably improved from the time of last review. If the ICC finds that a biosphere reserve is not adequately satisfying the qualifying criteria, and the site does not improve immediately thereafter, the site’s designation may be revoked or alternatively, the site may be pulled from the program by its national government. To date, 16 former biosphere reserves within Europe and Australia have voluntarily withdrawn from, or have lost their recognition under the MAB Programme (5).

A common approach of classical conservationism has been the attempt to preserve ecology as a static, isolated sample of how our world is, or once was. Biosphere reserves in contrast, present an exciting opportunity to protect ecological systems and the services that they provide, upon which both local communities and greater society rely. These areas are a limited-time opportunity for humans and communities to attain real, long-term, multi-generational sustainable health and prosperity; where communities become immersed as functional, contributing components in their surrounding natural ecosystems.

**WELCOME TO THE GEORGIAN BAY BIOSPHERE RESERVE (GBBR)**

Located along the eastern coastline of Georgian Bay, the GBBR extends from the Severn River outlet in the south to the French River outlet in the north, including 347,000 hectares of land within the world’s largest ‘30,000 Island’ freshwater archipelago (7).

As with the Rocky Mountains in the west, and the vast central prairies; the windswept pines and wave-smoothed Canadian Shield of Georgian Bay have become ingrained in public perception as a typologically ‘Canadian’ landscape. The famous Group of Seven captured the Bay’s rugged, unforgiving beauty in paintings that have extended the artists’ affinity for the region throughout the world (8). Georgian Bay and the GBBR continue to inspire the visual arts today,
supporting a strong network of professional and hobbyist artists throughout the eco-region. The visual arts are one of many examples of how ecology and landscapes of the GBBR function as cultural instruments, informing our national, social and community identities, and contributing to the ‘Great Lakes Heritage Coastline’ title that the north and south coastlines have received (9) (10).

The Group of Seven’s painted portrayals of this landscape as pristine, untouched wilderness, has been one of their greatest criticisms (10). The northern and eastern coastlines of Georgian Bay have a long, rich history of human inhabitation and an environment-reliant economy long predating western colonization.

The eastern coast of Georgian Bay achieved recognition as a UNESCO World Biosphere Reserve in 2004, largely due to the efforts of a concerned group of citizens and researchers, intimately familiar with the eco-region. 2014 was the GBBR’s first ten-year periodic review point, for which GBBR Inc. volunteers prepared and submitted a detailed self-study.

Established in 1998, Georgian Bay Biosphere Reserve Inc. is a non-profit organization, run by a handful of staff combined with the efforts of many volunteers. The organization has no dedicated, permanent source of government funding, and has been supported to date with short-term grants, sponsorship, membership fees and fundraising event proceeds. The organization pursues a mission “to facilitate cooperative action in support of the conservation of biodiversity and sustainable development through education and public outreach that will foster a shared responsibility for the Georgian Bay Biosphere Reserve for the next seven generations” (7).

Although they are not a registered charity, which would prevent the organization from engaging in political matters, GBBR Inc. maintains a neutral position on all government related community planning and development issues. Instead, the organization focuses on promoting and building relationships between community and stakeholder groups toward sustainability in conservation, education, development, and research within the biosphere (7).

Each of the six municipalities, three districts, and five First Nations Reserves within the GBBR limits, separately manage their local planning matters, including development approvals, and the provision of services to residents and associated budgets. In order to fully grasp the exceptional importance of land use planning governance, policies and practices for the GBBR, a basic understanding of the bioregion’s geological and ecological value is necessary.

**THE NATURAL HISTORY OF THE GBBR** is a work in progress. While human intervention now has the potential to cause change at a rapid, destabilizing rate - ecosystems of the GBBR have always been in a constant state of change driven by Earth’s natural processes, including climate variability and plate tectonics.
The Ecosystems that we see within the GBBR today have established on remnants of the Grenville Mountain range, the largest mountains ever to exist in the world, rivaling the Himalayas in size (11). Approximately 1.76 billion years ago, the three distinct gneiss belts began to assemble, driven by tectonic plate movement. Between 1.18 and 1.16 billion years ago, the Central Metasedimentary Belt collided with the Central Gneiss Belt in a mass orogeny, forming the Grenville Mountain range (12). As an example of the magnitude of movement that occurred, one identical rock composition found in the GBBR is also found in Peru, deposited when the plate that is now South America collided with southern Labrador (13).

![Image Modified from: (14)](image)

The rocks that we now see throughout the GBBR are the remnant ‘roots’ of the Grenville Mountains. Once buried beneath several tens of kilometers of mountain, today’s rock landscapes were exposed by the erosion of hundreds of millions of years of time, glacial forces and earth rebound. These rock formations now provide researchers with a rare view of Earth’s geological formations, usually buried deep within the Earth’s deep crust, contributing valuable information in research areas, including climate variation and the effects of dramatic water level changes on ecosystems (11)(12).
Ecosystems of the GBBR are products of this rich and volatile geological history. Georgian Bay makes up the most easterly portion of Lake Huron, the third largest freshwater lake in the world with the longest shoreline and largest quantity of islands. Although the two share distinctly separate bathymetry, and were once separated by a waterfall higher than Niagara Falls, the formerly named Manitoulin Lake (now Georgian Bay as we know it), is an accepted appendage of Lake Huron (15). Remnant bedrock of the Grenville Mountain Range now makes up the world’s largest freshwater archipelago within the GBBR known as the 30,000 Islands.
The GBBR falls within the Province of Ontario’s eco-region 5E and loosely follows the limits of eco-district 5E-7, with the exception that the GBBR uses highway 400 as its eastern boundary rather than the eco-district’s natural transition points along watershed limits. Eco-district 5E-7 contains seven main physiographic regions based on landform types and geological underpinnings; six of which are found within the GBBR. Based on biota, topography, geological origins and soil deposition, each physiographic region has been further subdivided into biophysical units (17)(18).

In very general terms, the six greater physiographic regions found within the GBBR can be described as:

**COASTAL GNEISSIC ROCKLAND ISLANDS AND BACKSHORE** include the 95,000+ documented islands and islets throughout the archipelago and areas immediately adjacent to the Georgian Bay coastline. These areas are predominantly composed of low-lying gneissic rocklands, inhabited by rock-barren vegetation, scattered forest blocks, and wetlands. High variability in rock formations and exposure create microclimatic conditions that support a vast number of flora and fauna communities within this zone.

**INTERIOR BARREN GNEISSIC ROCKLANDS** are the gently rolling rock uplands occurring throughout the GBBR. Open rock-barren vegetation communities dominate with scattered forest blocks, shrub thickets, marshes, and peatlands. Among the significant plant species and communities supported are those typical of the Canadian Atlantic Coastal Plain.

**INTERIOR TILL-MANTLED ROCKLANDS** have a deeper profile of sandy ground-moraine tills over bedrock than other physiographic zones, combined with a rolling terrain. Vegetation communities have more closed-canopy forests, thickets, marshes, and peatlands than the Barren Gneissic Rocklands.

**SAND PLAIN INLIERS** include five sites located on the eastern edge of the GBBR. These are sand and clay basins typical of postglacial spillways. Vegetation communities include well-established forests, thickets and marshes, however these areas tend to have experienced substantial disturbance from agriculture and resource extraction.

**THE PARRY SOUND COASTAL SAND PLAIN** is a deltaic sand deposit over Precambrian bedrock, supporting deciduous forest, sand grassland, and marsh plant communities.

**THE SIMCOE UPLAND** is a very thick, sandy till plain with well-developed mixed deciduous forest cover. The physiographic region contains ancient shoreline features.
including sand bars, terraces, and boulder lags. Most of the Simcoe Upland area located within the GBBR is included within the Beausoleil Island National Park, a Provincially Significant ANSII site (17).

Between 2002 and 2003, the Nature Conservancy of Canada (NCC) partnered with the Province of Ontario and multiple non-governmental organizations to complete a natural heritage inventory of this eastern coastline of Georgian Bay. The study did not cover the full extent of the GBBR, excluding the northern French River and Henvey Inlet northern portions of the biosphere reserve, two associated, distinct biophysical units of the GBBR and one un-categorized area. Over 150 distinct vegetation community types were identified within 14 of 16 GBBR biophysical units that fell within the NCC study area (19 p. vii).

The NCC study speaks to the north-south orientation of the linear eco-region, climate, and effects of Lake Huron along with the variability of its physiographic features and comparatively un-fragmented expanses that all contribute to support the vast range of habitats found within the GBBR. Habitat types range from those reminiscent of boreal plains found in Southern, Western and Northern Ontario, and the Atlantic Coastal Plains. Along this single coastline, habitats typical of Southern Ontario, including Tilia americana (Basswood), Acer saccharum (Sugar Maple), Sciurus carolinensis (Grey Squirrel) can be found next to northern-type habitats supporting Abies balsamea (Balsam Fir), Pinus banksiana (Jack Pine), Martes pannanti (Fisher), and Lynx Canadensis (Lynx). Within the Archipelago, over 95,000 islands and islets have been documented, supporting habitats and species typical of Arctic, Western Ontario, Atlantic Coastal Plains and Southern Canadian locations (19).

**FLORA OF THE GBBR** inventoried within the limited NCC study area include approximately 1340 vascular plant taxa, 1020 of which are native to central Ontario and 320 of which are introduced. Several biodiversity ‘hot spots’ exist throughout the study area, including the Severn River corridor, McRae Lake corridor, Potato Island provincially significant wetlands, and Beausoleil Island National Park. The Severn River Corridor has been identified as one of the most biologically diverse locations in Ontario, supporting 81 distinct vegetation communities and over 600 vascular plant taxa of which 90 percent are native (19). Many native flora found in the GBBR are provincially uncommon or rare, and a number of species have highly restricted geographic ranges (19).

**FAUNA OF THE GBBR** are directly supported by habitat types that the geology and flora of the eco-region create. Birds, mammals, fish, reptiles, amphibians and invertebrates all contribute to the identity, health and quality of GBBR ecosystems.
Forty-four mammal species have been documented within the NCC study area, including Black Bear (Ursus americanus), Eastern Canadian Wolf (Canis lycaeon), Moose (Alces alces), Lynx (Lynx canadensis), and the Northern Long-eared Bat (Myotis septentrionalis) (19). Many of these mammals are synonymous in the minds of Canadians with the archetypal Ontario wilderness. The Eastern Canadian Wolf, distinct from the Timber Wolf found elsewhere in Canada, has been classified as Special Concern by COSEWIC due to hybridization with Coyotes. It is believed that hybridization began to occur as a response to agricultural and development encroachment into formerly natural areas west of the eco-region (19).

Eighteen reptile species have been documented in the NCC study area, over half of which are designated as species-at-risk, each in decline as a result of human activity, incompatible development or persecution (19). Sixteen species of amphibians have been documented within the NCC study area, placing the GBBR as the area in Canada with the highest concentration of reptiles and amphibians species (19).

Eighty-five species of fish have been documented within the eastern Georgian Bay watershed, ten of which are introduced, and five of which are exotic (19). Pickerel (Stizostedion vitreum), Smallmouth Bass (Micropterus dolomieu), Largemouth Bass (Micropterus salmoides), Northern Pike (Esox lucius), Muskellunge (Esox masquinongy) and Lake Trout (Salvelinus namaycush) all contribute to the region’s strong traditional First Nations, sport fishing tourism, and commercial freshwater fisheries.

Native birds and insects, combined with the sounds of wind and water, provide the natural acoustics of the GBBR. More than 170 species of birds have shown evidence of breeding within the GBBR, while many more use the eco-region as stop-overs along their spring and fall migration routes.

Data on aquatic invertebrates and insects is largely incomplete for this area, yet these fauna are a fundamental food source for birds, fish and mammals alike, as well as functional ecosystem contributors. Insects and anthropods make up over 50 percent of the world’s known animal diversity, and it is believed that 30 percent of the world’s insects are at risk of extinction. Aquatic invertebrates are often considered to be the proverbial ‘canary in the coal mine’ for aquatic ecosystem wellbeing, yet research on the effects of land use and human activities on both aquatic invertebrate and native terrestrial insects has only just scratched the surface of understanding (20).

**NATURAL SERVICES** are the rational, human-centric reason why strong, environmentally prioritized land use planning policies and approaches are needed for the GBBR. These are the benefits that we rely on from natural ecosystems, which can be divided into four types: provisioning services, regulating services, cultural and support services. Without adequate
wilderness area and the natural services that ecosystems provide, human life on Earth would not be possible.

An ecosystem is a functional unit, where living organisms interact and depend upon one another, and on their nonliving, geological and climatic environment. Ecosystems can be of any shape or size, with many tiny ecosystems existing within larger units. Similarly, natural services or ecosystem functions can be relevant at varying spatial and temporal scales. The benefits of some ecosystem services are experienced at varying scales, including by those who live in immediate proximity, such as the natural filtration of source or recreational waters. Other ecosystem services have long range or even global consequences, including contributions to the sequestration of cumulative, global atmospheric carbon dioxide, and maintenance of overall genetic diversity on Earth (21).

The Millennium Ecosystem Assessment (MA) is a UN framework to study and identify the effects of changes within ecosystems on human wellbeing. In the main MA studies, the GBBR was not one of the areas covered, and to date no overall ecosystem services assessment has been completed for the GBBR (22). By examining the MA Framework and considering available data on the GBBR, we can see in general terms how the natural services that healthy, whole ecosystems provide are necessary for human wellbeing and prosperity.

In 2009, perceived natural services provided by the GBBR were listed by Professor George Francis of the University of Waterloo (23). The figure below was created to visually organize Francis’ identified GBBR natural services into a cause and effect, relationships diagram for the purposes of this assessment. The diagram maps the many, and often shared connections between (broad) GBBR ecosystem types and characteristics, natural services provided, and finally, to Maslow’s hierarchy of human needs which are addressed by these services.
Ecosystem Services & Products:
- Biological Diversity
- Food
- Cultural Diversity
- Recreation & Encouragement
- Knowledge & Education Systems
- Cultural Heritage
- Inspiration & Aesthetic Value
- Sense of Place

Basic Human Needs:
- Physiological: clean air to breathe, clean drinking water, inhabitable climate conditions
- Safety: health, safety, economic stability, employment resources, family
- Belonging/Love: connection to places, community and people
- Esteem: self-esteem, respect for self, respect for others, confidence
- Self-Actualization: morality, creativity, problem solving, acceptance effects

If: Our actions are limited to those that are compatible with protecting and sustaining the ecological integrity and services of the GBBR...

Then: Ecosystems of the GBBR may continue to provide these services in perpetuity

Sustainable balance between environment, economy, culture and community
ECOSYSTEMS OF THE GBBR: Each broad ecosystem type or feature is discussed in the remainder of this chapter, with a focus on the human-importance of natural services that an ecosystem type supports, with the intent to provide insight and justification as to why the Georgian Bay Biosphere Reserve is deserving of special consideration in land use planning.

UN-FRAGMENTED AREAS are large, intact tracts of land. Over 70 percent of Earth’s forests already suffer the repercussions of fragmentation; existing within one kilometer of a human disturbance such as development, roadways, nautical channels and utility corridors (21). With respect to forest habitat, the only two remaining continuous, large and intact forests on Earth are the Amazon and Congo Rainforests, both of which are sought after for resource extraction and agriculture. Although many early studies in habitat fragmentation focused on forests, fragmentation deleteriously affects all natural ecosystem and plant community types, and is a significant contributor to global climate change (21). The known, documented impacts of fragmentation include loss in biomass, diminished carbon and nitrogen stored in the nutrient cycle, reduced pollination, and reductions in rates of biodiversity of between 13 and 75 percent. Harmful effects of fragmentation intensify as the size of a natural habitat decreases, as length of edge of habitat type increases, as distance between remaining areas of a habitat increases, and/or as time from initial fragmentation passes (21).

By following the ecosystem feature ‘un-fragmented areas’ through the web of connections in the diagram below, it quickly becomes apparent that un-fragmented areas contribute both directly by support of ecosystem services, and indirectly by linked ecosystem services to all levels in Maslow’s hierarchy of human needs. It is in humanity’s best interest for self-preservation, continued health and prosperity to protect and conserve remaining un-fragmented areas.
Habitat fragmentation within the GBBR has received minimal research focus to date. The NCC Ecological Study included a high-level, manual analysis to identify large tracts of intact habitat at an offset of 2km from roadways and water bodies greater than 200m in width. Major unfragmented areas were identified by the NCC Study, with the largest in the south end of the GBBR along the Severn River including a section of the Gibson River Provincial Nature Reserve at approximately 20,000 hectares. A second large tract of approximately 18,000 ha along the Georgian Bay coastline extends from McRae Lake north to the Twelve Mile Bay Road area, and includes a mix of public and privately held lands (19).

From a research standpoint, large gaps in knowledge remain pertaining to habitat fragmentation in the GBBR. The NCC Study, for example, did not consider railways or hydro/utility corridors or island seasonal vehicular lane-ways as fragmentations, suggesting a primary focus on fauna rather than both flora and fauna. Habitat fragmentation is most often studied with consideration for terrestrial habitat, whereas the GBBR contains networks of pristine wetlands, shoreline natural habitat and the near-shore aquatic environment. These areas hold and support vast amounts of biodiversity and contribute substantially to ecosystem services. The 30,000 islands region contains numerous high-quality wetlands existing in such proximity that they can be considered as a single, functional unit (19). As an example of how significant this oversight can be; the image below shows a boat channel in the Township of Georgian Bay widened and deepened in 2011 to accommodate a new 200 boat marina from what was formerly a narrow, shallow channel serving a small accessory docking area for a trailer park. The expanded channel, and its intensified boat traffic fully dissect and fragment the Potato Island Provincially Significant Wetland, identified as one of Ontario’s greatest biodiversity hot-spots (19).

(Image modified from Google Earth to highlight approximate wetland area vs. marina/ channel area in the Potato Island Provincially Significant Wetland)
On a positive note, the GBBR is one of the two most ecologically in-tact coastlines in the Great Lakes Saint Lawrence Basin. The second most contiguous area lies along the north side of Lake Superior which, due to its more northerly location and horizontal alignment, does not support the same high levels of ecosystem diversity (19).

Google Earth Engine is an online environmental monitoring platform providing a dynamic, digital model of our world that is updated daily. High-performance analysis tools are incorporated into Earth Engine, where additional datasets can be uploaded that support complex calculations. The images below represent a small portion of a pre-calculated dataset completed by Google showing ecosystem fragmentation throughout the planet. Map (A) below shows how the relatively minimally fragmented state of forests in the GBBR is non-existent throughout similar eco-zones within the Great Lakes Saint Lawrence Basin. Map (B) provides a close-up view of the GBBR at the same 1km offset from roadways, railways and navigable waterways. Maps (C) and (D) illustrate that even this seemingly intact state of the GBBR does not provide the 10km offset that researchers believe is necessary to protect species that are most sensitive to habitat disruption.
(B) UNESCO Georgian Bay Biosphere Reserve, eastern coastline of
Georgian Bay at 1km offset from fragmentations

(C) Great Lakes at 10km offset from fragmentations – Eastern coastline
of Georgian Bay encircled

(D) UNESCO Georgian Bay Biosphere Reserve, eastern coastline of
Georgian Bay at 10km offset from fragmentations
**ROCK BARRENS** are often thought of as the ideal place to develop in order to minimize destruction of ecosystems. In actuality, these features provide key habitat for breeding reptiles and amphibians and support often slow growing, fragile, alpine-type moss and lichen plant communities. Rock Barrens represent the earliest stage in GBBR meadow and forest succession and primary production, where depressions capture water, supporting the slow growth of moss and lichen, which over time decompose, gradually building a base of soil that will support successive plant communities (24).

The GBBR’s rock is a consumable product in itself, with both operational and historic, abandoned quarry sites in the eco-region. Rock and other aggregates sourced from the GBBR are a non-renewable resource. The late stage Georgian Bay rocks, once located deep within the Grenville Mountains are extremely low in mineral composition, as rock with high mineral content is generally located within younger, surface mountain rocks. Soils that establish upon the gneiss rock base are similarly low in mineral and nutrient content, contributing to health and water quality of the eco-region’s naturally oligotrophic aquatic systems (25).

GBBR rock barrens provide the near-exclusive habitat type for the Five-lined Skink and the primary nesting habitat for many of the region’s snake species (19).

**ISLANDS** and islets of the GBBR are characteristically composed of extensive barren rock areas. Larger islands often support well-developed forest, wetland and meadow type vegetation communities. Many islands consisting of predominantly un-vegetated rock barrens support breeding colonies of birds as well as individual breeding bird species including the Common Loon (19).

**FORESTS** as a general ecosystem type are believed to contain between 60 and 90 percent of our Earth’s terrestrial biodiversity. Forest deadfall gradually decomposes to build soil cover, while both leaf canopies and established root systems protect soil from erosion, contributing to the protection of upstream headwaters as rainwater is filtered and slowed as it move toward lakes and rivers. Watershed and sub-watershed catchment areas that have high levels of forest cover result in cleaner source waters, with their ability to remove contaminants and slow the natural filtration process (26). Forests also contribute substantially to climate regulation by trapping moisture and cooling the Earth’s surface (27).

Meadows and shrub-lands likewise contribute to water quality, climate regulation, biodiversity and pollination, and are affected by human land use and resource extraction.

Deforestation is responsible for more greenhouse gas than all combined vehicle emissions in the world today (28). Forests are phenomenally efficient carbon sinks, with nearly 40 percent of all terrestrial-held carbon dioxide (CO2) currently stored in Forests. When destroyed or degraded, boreal forests become a significant contributing source of CO2 (26). Conversely,
environmentally prioritized approaches to land use planning have the obvious potential to minimize deforestation, thereby maintaining forest area as a carbon sink and acting as a tool to mitigate climate change.

Causes of deforestation include development and the extraction of timber and aggregate as a commodity. Currently, rates of forest replanting in North America create a net carbon sink when compared with deforestation rates however, the opposite is true in South America and Africa (26). Concerns surrounding deforestation and timber harvesting remain in particular, with relatively un-fragmented and mature forest stands where watershed-wide water quality, soil destabilization and biodiversity loss are all likely to result.

First Nations People have relied on the forests, meadows and shrub-lands of the GBBR as traditional hunting and gathering lands for food and materials. More than 400 plants found throughout Ontario’s terrestrial and aquatic ecosystems have documented traditional First Nations uses, many of which remain important to present-day First Nations way of life. Traditional spiritual and medicinal cultural customs are often still in practice today, and continue to depend on the sustained biodiversity of natural ecosystems (29).

The vast majority of modern, mass produced pharmaceuticals are also plant-derived at some level, including chemotherapy drugs, Aspirin/pain relievers, laxatives and antibiotics, contraceptives, hormone controls and blood sugar controls (29). First Nations plant-based medicinal traditions are receiving more and more respect and interest from academics and scientists seeking solutions to present day health concerns (27). Pharmaceuticals and treatments still to be discovered are just as likely to be dependent on plants. Seventy percent of plant species word-wide are now threatened with extinction, and potentially only 10 percent of all living species on Earth have been documented to date. The protection of our terrestrial and aquatic ecosystems alike is an investment in future medicinal research and human wellbeing (30).

**WETLANDS** represent integral ecological bridges between aquatic and terrestrial biotopes, supporting the flora and fauna of both. They are one of the most biologically diverse ecosystem types on Earth, comparable in importance to the great rainforests in the natural services that they provide (31).

Wetlands are an archetypal component of the Canadian landscape, with Canada having over 25 percent of Earth’s wetlands, covering over 14 percent of the country’s total area (9). Many ecosystem types are generally classified as wetlands including near-shore emergent vegetation areas, bogs, and fens. The two widely recognized, high-functioning wetland types are mineral wetlands, with less than 40cm depth of organic base, and peat-lands with over 40cm depth of organic base-matter (peat), also known as organic wetlands (27).

Historically, wetlands were viewed as providing minimal value to humans and were systematically
drained and filled to accommodate agriculture and development. It is now estimated that between 50 and 90 percent of wetlands across the planet have been lost or severely degraded due to human activity (31). Today, researchers have a basic understanding of the many ecosystem services that wetlands provide, including water purification, air filtration, groundwater recharge and food production.

The eastern and northern coastlines of Georgian Bay contain some of the most pristine, unique, abundant and biologically diverse wetlands within the Great Lakes Basin, to the extent that researchers believe that this coastline should be considered a reference point for healthy wetlands within the Great Lakes (9). The relatively low levels of industry, agriculture, and development within the bioregion provide necessary habitat for many of the aquatic species most sensitive to human disturbance, nutrient disruptions and pollution. The region’s thin, low-nutrient soils over a gneiss rock base causes soft water runoff to blend with alkaline waters within Georgian Bay, creating geochemical water conditions that support high levels of biological diversity in aquatic flora and subsequent fauna (9).

Until recently, large tracts of wetlands in the GBBR remained un-inventoried, with efforts by the Great Lakes Coastal Wetland Consortium Index (GLCWC1) and Herdendorf resulting in a severe underrepresentation of ecologically significant wetlands and linked wetland-groupings within eco-region 5E-7, including the eastern coast of Georgian Bay. In 2012, Dr. Jonathan Midwood and Dr. Patricia Chow-Fraser developed the McMaster Coastal Wetland Inventory (MCWI), delineating and categorizing wetlands along the full extent of Georgian Bay’s northern and eastern coastlines, and providing the first complete and consistent inventory of the eco-region’s coastal wetlands. The MCWI increased total inventoried wetland area within Lake Huron by 47.6 percent. The MCWI system was the first to use satellite imagery consistent across the eco-region by year, where challenges with wetland delineation due to annual water level fluctuations are addressed (9).

Other systems for wetland identification and assessment exist, including the ongoing/formative Ontario Ministry of Natural Resources (OMNR) Wetland Evaluation System (OWES), with its most recent dataset released in 2013, and the Great Lakes Coastal Wetland Consortium Index (GLCWC1), completed in 2003 (32). Differences between the systems are the result of the scale of satellite imagery available, the minimum mapping unit recognized by each system, and whether complete annual sets of imagery are used to achieve regionally consistent water levels at each pass of the analysis. Where the OWES only recognizes wetlands greater than 2 ha, and the GLCWC1 followed this standard; the nature of the Georgian Bay archipelago is that many wetlands, often less than 2ha in area are situated in such proximity that they function as one, continuous habitat. Although more research is needed to understand how small wetlands, and wetland complexes contribute to ecosystem services, the OWES recognizes that small coastal wetlands can be grouped to form complexes if ecological rationale supports this (33)(9).
Inland wetlands at the headwaters of rivers and streams within the GBBR are major source water contributors; infiltrating to aquifer groundwater, which is hydrologically connected to forests, meadows, inland lakes and releasing surface water downstream to outlet directly into Georgian Bay. Inland and river/stream corridor wetlands along the route out to Georgian Bay provide critical and efficient, yet often overburdened water purification services; removing many pollutants including pesticides, nitrates, and phosphates that human activities and land uses impose upon the natural system. With over 8.5 million Canadians dependent on the Great Lakes as their primary source of water, the hydrological connectivity of inland wetlands to groundwater, rivers, and coastal waters alone warrant special consideration for human land use and development practices within the GBBR. Wetland filtration of pollutants, pesticides, bacteria, and sediments provide direct benefits to the overall ecosystem as well as for human health, enjoyment, and prosperity (27).

Coastal wetlands of the GBBR similarly contribute to Great Lakes water purification (a primary source of drinking water for more than 80 percent of Ontarians), while also providing critical habitat within the ever-increasingly scarce and degraded Great Lakes Basin, supporting spawning fish, aquatic invertebrates, insects, breeding birds, and mammals (35). Clean water, fresh air, and the high levels of native plant and animal biodiversity that wetlands facilitate are the fundamental underpinnings of the GBBR’s primary tourism and recreation-based economy including boating, hunting and fishing, camping, hiking, snowmobiling, and seasonal residency/cottaging.

Wetlands of all types are believed to contain up to 40 percent of terrestrial carbon, providing valuable global climate regulation services. Organic matter stored in wetlands, and particularly in peatlands, can provide scientists with an archive of hydrological and atmospheric indicators linked to how the local region has responded to climatic change in the past. Conversely, peat is a limited natural resource that is often extracted at considerable environmental cost for use as fuel in electrical and heat generation, biochemical applications and more typically in Canada as a horticultural product. Within the GBBR, Parry Sound area peatlands have been assessed as having potential for mining as a fuel source, while other deposits have in the past been drained for agricultural land use (34).

**SHORELINE** and near-shore aquatic zones are the link between terrestrial and aquatic ecosystems, and the first point of human interaction with the waters of Georgian Bay. Ecosystem types that make up the GBBR shoreline include recognized coastal wetlands, but also upland and emergent, aquatic wetland vegetation communities that are often of a scale not inventoried and delineated as a wetland. Natural shoreline vegetation communities function as protective buffers from what would otherwise be damaging effects of the interaction between human development, land, and water (36).
Natural, unaltered shoreline and near-shore aquatic vegetation communities provide protection from flood, wind, wave and storm erosion, and allow both terrestrial and aquatic ecosystems the necessary spatial flexibility to recover from normal fluctuations in annual water levels. Spawning fish, amphibians, reptiles, invertebrates, birds, and mammals all rely on the near-shore and shoreline ecosystems for habitat, contributing to a complex food web in which we take part (35).

Shoreline and emergent aquatic vegetation slow the flow of rainwater runoff, causing sediments, bacteria, nutrients, and pollutants to settle out of the water column. High rates of productivity from plant growth take up and decompose these contaminants, functioning as a naturally efficient filter between our wastes and our drinking waters (35).

**OPEN WATERS** of the GBBR are a part of the greater Laurentian Great Lakes freshwater aquatic ecosystem, shared and heavily relied on by Canada and the United States. The health of the Great Lakes and purity of the water directly affects the well-being of 40 million people and determines the viability of the municipal, agricultural, and industrial practices that consume 56 billion gallons of Great Lakes water each day (36).

Sport, commercial and first nations fisheries rely on the habitat that open water aquatic systems provide for fish and the complex food webs that healthy fish populations are sustained by. Commercial shipping, recreation industries, power generation, heating, and cooling are all supported by the quantity and quality of Great Lakes waters (36).

Accumulated sedimentation in both near-shore and open water aquatic zones provide an opportunity for paleolimnologists to understand how historical system disruptions such as climate change or human land use patterns have impacted aquatic ecosystems.

The Causal Web Diagram can be used to trace any single GBBR ecosystem type to the various ways in which it provides for our human needs at all levels of the hierarchy, while also supporting adjacent and downstream ecosystems. In the four billion years that Earth has existed, humans have been only a blip in time, yet have had an alarmingly significant impact on Earth’s ecosystems. Natural services are necessary for human and community health, happiness, and prosperity, yet in raw form, they are not sufficient to meet human needs. We clear land for agricultural practices and development, cage-farm and net fish for consumption, we engage in recreation/leisure activities for well-being, and extract resources for development, shelter, transportation, and commodities. All of these actions take from the natural ecosystems that we depend on, but ecosystems are resilient and capable of adapting and self-repairing if taking is limited to sustainable methods and quantities within the ecosystem’s threshold of resiliency.
THREATS TO THE GBBR

Threats to the GBBR are ever-increasing, cumulative and compounding. Human driven pressures are combining with natural stressors and together, they have the real potential to out-pace the capacity limits of natural ecosystems. A threshold for resilience and stability exists within each ecosystem’s network of biological diversity. Within this threshold, shifts in species or habitat types may be tolerated without major damage. If threats eliminate or degrade keystone ecosystem components or conditions, this threshold for stability can be exceeded, leaving the ecosystem in a vulnerable state, where once-managed threats can cause irreversible degradation or irreversible shifts in ecosystem composition and services – the tipping point, beyond which no recovery to a stable, and familiar state is possible.

Compared with overall Great Lakes data on the cumulative stress on specific areas supporting recreation and fisheries industries throughout the system, the eastern and northern shores of Georgian Bay so far remain in a relatively lower state of stress (37). Considering the enormous societal capital being invested to remediate degraded ecosystems throughout the Great Lakes, the current lower levels of stress on the GBBR provide a prime opportunity to conserve and nurture healthy conditions before they are significantly degraded.
Researchers have identified the most significant threats facing the GBBR as: invasive species, nutrient pollution, chemical pollution, lowering water levels, climate change, and incompatible types or levels of human use (38)(39). Actions contributing to GBBR ecosystem threats have also been identified, clearing the path to begin threat mitigation through proactive land use planning, at a bioregional and watershed-scale. Enacting good policy with priority given to ecosystems protection, practicing sound planning in following those policies, and achieving the basic societal acceptance that we do have the capacity to prosper while protecting ecosystems and natural services, are the basic foundation blocks necessary for effective management of the GBBR.
INVASIVE SPECIES, often referred to as invasive alien species (IAS), are plants or animals, existing outside of their natural range where a lack of natural predators or habitat limitations lead to a rapid population expansion in an introduced ecosystem (40).

The devastating potential for far reaching consequences from invasive species is often unimaginable to those outside of the scientific community. While scientists are all too aware of the imperative to maintain ecosystem integrity and balance, they are often unable to predict precisely what the extent of impact from a given IAS will be. As invasive species become established or naturalized in an ecosystem, secondary and long term effects begin to compound with those of other IAS and system stressors, adding to the complexity in predicting outcomes (41). Too often these realities have led to individuals, government and industry failing to follow guidelines, protocols and regulation intended to prevent the introduction, damages, and spread of invasive species.

The primary cause of introduction for GBBR aquatic invasive species to date has been ballast waters, containing non-native organisms discharged from foreign vessels as they ply the Great Lakes. Ballast water IAS entry accounts for up to 75 percent of all invasive aquatics in the Great Lakes, including the quagga mussels (*Dreissena rostriformis bugensis*), zebra mussels (*Dreissena polymorpha*) and round goby fish (41). The infestation of zebra and quagga mussels throughout the Great Lakes Basin delivered a hard-learned lesson in how quickly and extensively an IAS can upset the balance of an established native ecosystem.

Zebra and quagga mussels (dreissenids) arrived in the Great Lakes during the mid-1980s and quickly spread throughout the basin. Both dreissenids are highly efficient filter-feeders, out competing native mussels (Unionoida) and dramatically reducing the shrimp-like organism (*Diporeia*), the primary food source of native fish species. The extreme efficiency of filter feeding allows both IAS dreissenids to intake high levels of chemical pollutants, which move up the food chain as fish and waterfowl consume the mussels. While zebra mussels have inflicted immense cost and damage upon the bottoms of our feet and the industries that source water from the Great Lakes alike, quagga mussels have caused fundamental and irreversible changes in aquatic ecosystem composition and function. Unlike zebra mussels, quagga are not limited to the near-shore environment and have expanded across lake bottoms to the deepest points, while maintaining a much longer feeding season. Filter feeding by the dreissenids increases water clarity, allowing sunlight to reach greater depths. Nutrients removed from the water are then expelled by the IAS dreissenids, overly enriching lake sediment beds with nutrients - particularly phosphorus and ammonium. These conditions in turn favour invasive aquatic plant species that die back seasonally, washing into near-shore and shoreline areas, rotting en masse. Nutrients deposited into shallow water lake sediment beds are particularly easily disturbed, counteracting water clarity effects and causing nutrient-driven, algae blooms and health risks, including outbreaks of botulism. Zebra mussels have been an ecosystem game-changer – quagga are game over for Great Lakes ecosystems as we know them, driving fundamental shifts in food webs,
plankton, and fish populations, aquatic plant community composition, water chemistry, and strength of native mussels(42)(43)(44).

The invasion of zebra and quagga mussels throughout the Great Lakes Basin were long-predicted as a possibility, and warned against by scientists, yet government policy on ballast water sterilization remains lax. Take a moment to consider the immense scale of damage inflicted on the Great Lakes Basin when the average number of international shipping vessels entering the basin is only two per day (42). Surely this outcome could have been avoided with preventative policy, regulation and oversight.

The second most frequent form of IAS entry are intentional human introductions. One well-publicized example is the Asian Carp, introduced by farmers and the U.S. government to irrigation canals for the purpose of algae reduction. Having spread into the Chicago Sanitary Canal System during floods they are now making their way toward Lake Michigan via this man-made water diversion route (45). Preventative measures are in place with the hope of blocking Asian Carp from entering the Great Lakes Basin; however, Asian Carp were recently discovered in a contained Toronto public parks pond, and multiple shipments of live Asian Carp intended for human consumption have been intercepted at the U.S. Canada border (46). It is estimated that if reproductive Asian Carp reach the Great Lakes, Lake Michigan, Lake Huron and Georgian Bay will be irreversibly overrun within five years, causing irreparable damage to the economy, native ecosystems and fisheries (45).

Invasive plants and plant-damaging invasive pests pose similar threats to sensitive ecosystems. Common reed (Phragmites australis) is a tall emergent aquatic or wet meadow species originally from Europe. Lowering water level trends and rising air temperatures associated with climate change that have persisted in recent years are favourable conditions for the rapid colonization and spread of Phragmites (47). Phragmites initially colonize a new area by seed, and then expands by rhizome. Roots of the grass can reach six feet in depth, outcompeting native flora and eliminating habitat for native fauna. The dense nature of the plant forms a monoculture, unsuitable as habitat for native species and a physical barrier that turtles and even deer have been found trapped within, unable to escape. Phragmites identification and removal/management programs are being run by various, not for profit organizations throughout the Great Lakes and the GBBR. More focus is placed on the removal and management of phragmites spread by coastal communities and organizations, leaving large inland tracts of the IAS intact. Phragmites is particularly well suited to roadway and highway ditches that provide clear, easy paths to water bodies including the GBBR through regions where no removal programs are in place.
NUTRIENT CYCLE DISRUPTIONS including nutrient loading from malfunctioning or undersized waste treatment and septic systems, aquaculture operations and golf course and agricultural fertilization practices all have the potential to degrade water quality, causing eutrophic conditions and algae blooms in freshwater ecosystems. Every year billions of litres of waste water are outlet into the Great Lakes from municipal sewage and stormwater runoff. Each municipality maintains permits to release untreated sewage into water bodies when systems run over capacity, releasing mass dumps of harmful nutrients, pathogens, viruses, pharmaceuticals and other chemical toxins into lakes and rivers. These are regular occurrences for many municipalities, and more frequently so in the many old urban centres that still maintain combined sewage and stormwater systems (48).

In most aquatic ecosystems, the main nutrient limiting plant growth is Phosphorus, measured as Total Phosphorus (TP). The waters of Georgian Bay within the GBBR are naturally oligotrophic systems (low in nutrients and TP) due to relatively low levels of human use and shallow, acidic, low mineral content soils (49). When the amount of nutrients and TP are high, water-bodies can enter a eutrophic state, where plant growth increases, often including algae blooms that carry health risks to humans such as cyanobacteria and botulism. High nutrient levels diminish water clarity and deplete oxygen in fish habitat as excessive plant growth decomposes (49).

Monitoring programs for Total Phosphorus (TP) throughout the Great Lakes are conducted by the Ministry of Environment (MOE) (Canada) and include Georgian Bay; however, TP values are applied as an overall reading for lakes, and large regions within lakes (50). With this broad-brush approach, MOE readings for TP in Georgian Bay have been documented at 5.0 ug/L; well within the oligotrophic range (41). During a similar study period, research specifically focused on the GBBR coastline published in the 2013 State of the Bay Report, tested GBBR waters at an average of 8.0 ug/L. (41). This can be explained simply through the process of dilution, where MOE averages focus on deep water, mid-lake testing while GBBR research is concentrated in the near-shore areas of the north and eastern Shores of Georgian Bay (41). Also contributing to differences in TP averages are the various tributary waters entering along shorelines, blending with the offshore/open waters of Georgian Bay. The offshore waters of Georgian Bay tend to have a higher dissolved solids content and differing density from those of the tributaries feeding the bay. This results in localized and situationally lowered seasonal mixing rates between the two water types, slowing the process of TP dilution to the open-waters of Georgian Bay(51).

While the 8.0 ug/L average rating of TP within the GBBR is in the oligotrophic range, localized problem areas exist in the bioregion where TP levels are well above the eutrophic threshold with readings of up to 31.0 ug/L. Sturgeon Bay near Pointe Au Baril for example, experiences persistent, seasonal algae blooms and accompanying cyanobacteria outbreaks on an annual basis as do numerous other deep embayment areas along the intricate shoreline (41). Historical TP and other water quality issues such as high E-coli counts within the Severn Sound area were once
within the eutrophic range and have dramatically improved through extensive monitoring and remedial works addressing both point source and non-point source nutrient loading (51).

Overall TP readings in the GBBR have experienced a lowering trend since the mid to late 1980’s (41). That trend has likely slowed or reversed in many embayment and tributary areas that have seen increased development, human land use and access (51). The above TP data is exclusive to the Georgian Bay portion of the GBBR, whereas the biosphere reserve also contains many small inland lakes and tributaries. Many of these have shores and drainage basins well-populated with cottages, seasonal resorts, recreational and agricultural activity and, therefore, likely experiencing elevated TP levels far above those that would exist under the exclusive influence of natural processes (41).

Total Phosphorus as its name implies is a reading taking into consideration multiple sources and types of the element including inorganic phosphorus, particulate organic phosphorus and dissolved phosphorus (52). Sources of phosphorus in freshwater bodies come from both natural processes and human activities. Natural phosphorus loading occurs when phosphorus contained in rock erodes and is carried in sediment form with overland flows through undeveloped/natural areas or as atmospheric particulate within precipitation (41).

Significant gaps exist in the data available on Total Phosphorus, including readings for inland lakes and tributaries, for many of the less-accessible embayment areas in the northern reaches of the biosphere reserve, and also for baseline data-sets with the potential to identify change patterns (25). It is also unclear precisely what portion of overland-flow phosphorus loading is the result of human use and disturbed landscapes, verses natural areas and what portion may be due to outdated, malfunctioning, or damaged septic systems and waste water treatment facilities (25).

**CHEMICAL POLLUTANTS** entering the Great Lakes are remarkably persistent in lakebed sediments over time and are regularly disturbed by ship propellers, bottom foraging aquatic species, and dredging activity, causing pollutants to re-enter the food web. Toxic chemicals can be categorized as: biomagnifying toxic metals (ex. Mercury), non-biomagnifying toxic metals (ex. copper), biomagnifying toxic organics (ex. PCBs, Atrazine, neonicotinoid pesticides) and non-biomagnifying toxic organics (ex. PAHs).

Although much progress has been made over the last 20 years toward dramatically reducing the blatant use of the Great Lakes and tributaries as a dump for chemical waste, some industries still maintain permits to pollute, while old toxins persist in the system. Toxins continue to enter the lakes with chemicals of emerging concern originating from discarded products that waste water treatment facilities are incapable of removing. Non-point source pollution including agricultural and golf course pesticide applications leeching through soils, and air-born mercury
continue to plague the Great Lakes, and remain a top challenge (53).

United States and Canadian governments have a long history of attempting to address chemical pollution in the Great Lakes beginning with the 1978 Great Lakes Water Quality Agreement (GLWQA). More recently signatories to the 1997 Binational Toxics Strategy agreed “that the discharge of toxic substances in toxic amounts be prohibited, and the discharge of any or all persistent toxic substances be virtually eliminated” (48). Unfortunately, actions and agreements on the part of both governments have been reactive, end-of-pipe, limiting, and remedial in nature whereas, the International Joint Commission has repeatedly promoted a proactive approach focused on eliminating and banning the production of persistent toxic substances (48).

While industry was once the top Great Lakes polluter and remains problematic, contaminants making their way through municipal and individual septic waste treatment systems are proving to be a much greater challenge to address. Viruses, pathogens, hormones, antibacterial agents, pesticides, flame retardants and pharmaceuticals have all been documented in measurable levels within both U.S. and Canadian streams and rivers. No municipal waste water treatment facilities have the full capacity to test for or remove all of these chemicals of concern before discharging treated effluent. Waste water is also regularly discharged without treatment under Municipal permits to pollute when systems exceed capacity or during periods of infrastructure repair. Treatment facilities utilizing only primary or secondary treatment levels, and those with combined storm water and sewer systems, have little to no capacity to remove chemical pollutants. The process of municipal waste treatment effectively removes the natural barriers that would otherwise prevent toxic chemicals from reaching rivers and lakes (48).

Designating and regulating toxic chemicals currently falls under The Canadian Environmental Protection Act (CEPA). The process for designation is exceedingly long, often taking between four and ten years of review before regulations are applied. Unless a substance has been placed on the ‘Schedule 1’ list of CEPA-Toxic substances, it may be used and discarded with little regulation (48).

Based on available information at the time and the criteria that CEPA-Toxic Schedule 1 substances need to be either bio-accumulative or persistent as well as either inherently toxic to humans or aquatic organisms, 4300 of 23,000 reviewed chemicals met the criteria, requiring further evaluation for regulation.

Gaps in the CEPA-Toxic categorization process have been identified including:

- Substances that are one or both of bio-accumulative and persistent, yet do not (yet) have data proving inherent toxicity to aquatic organisms, are not considered for further screening or regulation. Most emerging chemicals fall into this category for a
varying time frame until and unless research in long-term and cumulative toxicity is completed.

- Qualifying requirements for designating a substance as bio-accumulative or persistent are much higher than other jurisdictions, where many more chemicals would have qualified for regulation and;

- Endocrine toxicity, and in many cases persistence, were disregarded by Health Canada when determining a substance’s inherent toxicity to humans (48).

**SUSTAINED LOWERING WATER LEVELS** driven by man-made diversions, shoreline, and lake bottom alterations, combined with climate change and natural geological processes present a top threat to coastal wetlands and near-shore ecosystems (54)(50).

It is estimated that up to 90 percent of wetlands within Georgian Bay may already have experienced degradation and substantial loss in area due to sustained low water levels. Natural high and low seasonal water level fluctuations maintain the balance between wet meadow, emergent, and aquatic wetland plant communities, preventing any one species or vegetation type from becoming too dominant and thereby maintaining biodiversity (38). The persistent lowering water trend of over more than fifteen years has favoured upland, wet meadow and emergent species, including the highly invasive Phragmites. Aquatic plant communities along with the primary fish habitat that they provide have suffered as a result.

As the middle lakes of the Laurentian Basin, Lake Michigan, Lake Huron and Georgian Bay act as one continuous hydrologic unit with the Saint Clair River at the southeast end of Lake Huron as their primary, shared outlet (54). Lake levels on the middle lakes are subject to natural short-term, seasonal and long-term fluctuations within a two-meter historic range. Levels in recent years reached the very lowest recorded point within the recorded two-meter range of fluctuations, yet the duration of the downward trend where water levels remained below the historical average was even more alarming (54)(55). Climate change and lakebed rebound models are mixed in their projections for future GBBR water levels, with some anticipating that levels will remain within the historical range and others suggesting a drop of more than one meter below these averages (54)(56).

Human intervention in the form of engineered, structural shorelines at the Saint Clair River outlet have limited sediment flow into the river and dispersion of river flows - placing the river bed into a state of constant erosion. In a three-year period of study between 2002 and 2005, the Saint Clair outlet capacity increased by approximately 31,700 cubic meters, with these patterns remaining unchecked since that time (54). Solutions to mitigate and prevent further increase in the size of the Saint Clair River outlet have been identified and proposed to Canadian and
U.S. government agencies. No proposed solutions have been implemented to date, due to high implementation costs, and the potential for property damage to residents along the Saint Claire River in times of high water (54). Researchers who are focusing on the issue of lowering water levels believe that if this pattern continues unmitigated, there will be devastating impacts on wetlands throughout the middle lakes, including those pristine wetland ecosystems located within the GBBR (38). The loss of ecological functions in these wetland areas will certainly have an impact on the greater Ontario economy, and also on the land use and access of local residents and cottagers, however, the full extent of resulting impacts are not presently understood (38).

A strong link exists between land use zoning designations, planning practices and the protection of wetland systems - where the planning process attempts to identify when development will impact on wetlands. Lowering water level trends present a very real challenge, where areas that were once high-functioning wetland systems may no longer be readily recognizable and defensible as a wetland ecosystem under the land use planning system. If a wetland designation and associated policy protections are no longer recognized, and development occurs within that area, the opportunity for the wetland to migrate and regenerate in times of higher water levels may be permanently lost (9).

The question of whether to intervene with an engineered solution for regulating lake levels has been raised at times of both extreme high and low water levels in the Great Lakes. Early studies by the International Joint Commission (IJC) completed in 1964 and 1973 concluded that an engineered regulating system for Great Lakes water levels would be too costly. In 1993, the IJC’s most recent review of the subject concluded that before considering further water level regulation, the potential effects of regulation on environment, recreation, shipping and hydroelectricity generation should be identified and a set of guidelines developed to protect these assets (36). Subsequent reviews of the Great Lakes Navigation System (GLNS) were completed by the U.S. Army Corps of Engineers (57) and jointly by Transport Canada and the U.S. Department of Transportation (58). Both studies concluded that the GLNS remains a viable transportation system, worthy of maintaining current infrastructure. The USACE 2012 report noted that it may be reasonable to implement water level regulations with an economic growth perspective, as the GLNS is functioning at approximately half capacity (59).

High water levels are beneficial for both recreational boating and the shipping industry while hydroelectricity generation benefits from stable water levels. In order for GBBR fish spawning habitat and wetland ecosystem biodiversity to thrive, natural fluctuations are required. From the perspective of the Georgian Bay Biosphere Reserve, where the local economy is so fundamentally reliant on ecosystem health and function, the questions remain: would a human engineered system for regulating water levels be able to mimic natural processes and help to relieve ecosystems from the stress of ever-lowering water levels? Or would water level regulation efforts follow traditional engineering approaches toward strict stabilization of water levels, which support relatively short-
term economic benefits over the needs of natural ecosystems for fluctuating times of both high and low water levels?

**CLIMATE CHANGE** is an ocean of unknowns at the localized level, making it intensely complicated to predict specific impacts on GBBR ecosystems and natural services. We know, based on resounding certainty within the global scientific community, that anthropogenic climate change is both a real and significant threat to our present way of life (60).

The Intergovernmental Panel on Climate Change (IPCC) developed a set of six, equally probable scenarios based on potential variables in future population growth, economic activity and energy use for how climate change may affect various regions across the planet (61). The Union of Concerned Scientists (UCS) ran the latest three-dimensional climate models (HadCM3 model and the Parallel Climate Model (PCM)) with IPCC emissions scenarios for the next 100 years. They also ran historical data from the last 100 years and found that projections of climate change modeling for the region were both consistent with historical inputs and actual temperature and precipitation readings and that there was a general consistency between the various modeling systems (62). The UCS found the following likely climate outcomes for the Great Lakes region for greatest and least probable temperature increases:

By 2099, the highest anticipated increase in average temperatures for the GBBR will be 12°F higher in the winter and 13°F higher in the summer (two left-side figures below).

By 2099, the lowest likely increase in average temperatures for the GBBR region specifically will be 7°F higher in the winter and 6°F higher in the summer (two right-side figures below).

Temperature increases were also calculated for the interim period of 2025 to 2035, with GBBR winter average temperature increase modeling ranging from 0°F to 0.5°F, and summer average temperature increase modeling ranging from 1.75°F to 2°F.

Precipitation was similarly modeled; however, precipitation modeling is believed to be less accurate and more regionally sensitive than temperature modeling.

Average precipitation for the period between 2070 and 2099 in the greater region is anticipated to increase by 20 percent and 30 percent in winter with summer ranges between 10 percent less and 10 percent more precipitation.

Interim precipitation modeling shows projected changes in precipitation for the average between years 2025 and 2035 to drop by 5 percent to 10 percent during winter seasons and rise by approximately 5 percent during summer seasons (62).

Changes to climatic temperature and precipitation are driving a number of threats to human
and ecosystem health and wellbeing. As climate change progresses, it is anticipated that energy needs, building standards, agricultural practices and economic welfare, will all suffer if current approaches to these challenges persist, which is now leading to remarkable innovations and adaptations in approaches. While the Union of Concerned Scientists believe that these modeling scenarios provide accurate predictions for future changes in temperature and precipitation, they acknowledge the real risk for abrupt changes along the way. In the worst-case scenarios, the rate of change may exceed the capacities of ecosystem compositions and functions to adapt and remain viable along with human way-of-life as we know it today (62).

By 2070 to 2099, the climate of the Georgian Bay Biosphere Reserve will more closely resemble that of New York State during summer months, and Northern Virginia during winter months, moving the GBBR from current USDA plant zones 5 into zones 6 or 7 (62)(63).

Frequency of extreme weather events are expected to increase with climate change, including more days of extreme heat and extreme cold per year, more extreme heavy rainfall events causing floods as well as extended periods of drought. A recent study has found that Great Lakes water temperatures are rising faster than atmospheric temperatures, identifying rising water temperature and increased wind speed on the Great Lakes as the cause of greater rates of evaporation, contributing significantly to recent declines in Great Lakes water levels (64).

What will the GBBR look like in 2099 when climate change has progressed to these foreseeable points in time? Invasive species are notorious first colonizers of disturbed sites - where native species are even slightly slower to establish or regenerate, their probability for successful establishment is drastically reduced. We know that storms, floods, drought, globalization, and human development will increase in frequency and severity, providing more opportunities and venues for invasive species to take hold and spread throughout the Great Lakes and the Georgian Bay Biosphere Reserve. One of the strongest tools available right now for use in adapting for and mitigating these predicted, devastating effects, is ecologically prioritized land use planning policy and governance.

**INCOMPATIBLE HUMAN USE** (IHU) can be viewed as the primary threat to the GBBR when considered at both direct and indirect scales. Direct IHUs are those occurring within, or immediately surrounding the GBBR. These include all forms of inappropriate development, economic and recreational activities that contradict the ultimate UNESCO Man and Biosphere Programme goal for long term sustained integrity, aesthetic, and health of biosphere ecosystems and natural services. Situationally inappropriate development such as road and water access route construction, cottage, resort, or infrastructure development are all direct IHUs. Economic and leisure-recreation IHU activities include polluting or otherwise ecosystem-damaging aquaculture or agriculture operations, tourism development, boating or even camping within and beyond the
carrying capacity of ecologically sensitive areas.

Indirect IHUs are those occurring at a distance from, yet inflicting negative repercussions on GBBR ecosystems. Here, incompatible human uses quickly begin to overlap and compound with other significant threats to the GBBR. Consider the greatest combined IHUs of all, being those that pollute Earth’s atmosphere and drive climate change at the global scale, toward ecosystem destabilization at local levels. The IHU of shoreline and river bed alteration at the Saint Clair River outlet from Lake Huron is contributing to lowering water level trends throughout Lake Huron, Georgian Bay and Lake Michigan, a trend that is further driven by climate change. IHUs including shipping ballast water practices and land disturbances further accelerated by climate change have been the leading source of invasive species currently present within the GBBR and those imminently threatening to advance along shorelines or into Great Lakes Basin waters. Mitigation against indirect IHUs may be best addressed at provincial and national levels of government, which will require strong advocacy on behalf of the interests of those localities that will suffer the consequences. Adaptation to best respond to both direct and indirect incompatible human uses can be pursued through education, establishing a thorough awareness and knowledge base within local communities, and through proactive land use planning policy and governance.
3

SUSTAINABILITY IN LAND USE PLANNING AND DEVELOPMENT

Incompatible human use is the antithesis to sustainable social and economic development. Humans will continue to populate, inhabit and partake in activities in pursuit of economic prosperity and enjoyment of life. All of this takes place on land or water that now has, or once had, the potential to function within a natural ecosystem. Inevitably, human use or presence of any form and extent will remove a footprint of area from its potential to function in its natural state. With understanding, and supportive land use planning processes and governance in place, this footprint can be contained to the physical extent of a building, activity or access route. True, deep-sustainability achieves net zero long term impact on Earth; requiring a thorough consideration of all inputs, operations, and end outputs (conventionally wastes but potentially useable products).

Consider site development for example. Sustainability requires appropriate site selection as well as appropriate scale and type of development. Deeply-sustainable building materials are renewable, produced with ecological and social responsibility, and either infinitely recyclable or biodegradable. Wastes are managed on-site or locally and responsibly processed to a clean, useable end state. Energy consumed by the development is 100 percent clean, environmentally non-destructive, renewable and ideally produced locally or on-site. Conventional development respects few, if any, of these considerations. Conventional site selection is based on access convenience, aesthetics, and land price, while building materials are selected for cost efficiency at time of initial purchase with no consideration for the complete life-cycle costs to Earth’s ecosystems. Energy is whatever the grid provides at the lowest price, and wastes are managed to the minimal legally permissible level with excess or overload washed by rainwater, or released directly into the water bodies that we collectively depend on as source waters.

In order to identify and prevent incompatible human uses, and instead support sustainable development and practices in alignment with UNESCO MAB Programme initiatives, we need to consider the probable negative effects on ecosystems and natural services that an activity or specific development initiative will carry. The goal is to strictly protect ecologically valuable and functionally contributing areas of the GBR, while requiring that approved development and activities seek out and implement innovative ways to dramatically limit the extent of ecological footprint consumed beyond what an activity or development’s physical in-situ form will occupy. Development and operational permits are often approved based on precedents, and so each individual application may need to demonstrate that multiple approved permits for similar instances would continue to sustain ecosystem integrity, aesthetic and health.
Communities throughout North America and internationally are showing leadership in sustainable land use planning and development through policy and measurable goal setting, such as Vancouver’s sign-on to the World Wildlife Fund’s ‘Earth Energy Report’ challenge for a 100% renewable energy world by 2050, and the City of Seattle’s policy support for sustainable developments seeking to achieve the International Living Future Institute’s ‘Living Building’ or ‘Living Community’ certification (67)(68).

The United Nations General Assembly resolution 66/288 defines the three dimensions of sustainable development as: economic, social and environmental. The United Nations Environment Programme (UNEP) is working at the international level, helping countries and regions to develop new science-based environmental laws and priorities toward achieving sustainable development. As a Member State of the UNEP, Canada has agreed to develop a set of sustainable development goals, targets and indicators that will follow the three basic guiding criteria of equity, achieving prosperity within ecosystems and Earth’s carrying capacities, and achieving greater security and resilience through investment in both natural and social capital. The UNEP believes that growth, resiliency, and prosperity can increase without environmental degradation, and while ensuring a clean environment for all of humanity (1). The United Nations Man and Biosphere (MAB) Programme is a tool through which the UNEP’s definition of sustainable development can be pursued and studied.

UNEP is currently providing support to regional and sub-regional governance to “promote increased coherence in the international decision-making process related to the environment and sustainable development”. The Regional Office of North America (RONA) is responsible for identifying regions of interest to UNEP for the post-2015 agenda (65). With its established UNESCO MAB designation, the GBBR may be in an ideal position to partner with the UNEP on determining a best path forward for bioregional governance, including policy and approaches to land use planning.
As is common with large-scale environmental challenges, the governance structure of the GBBR involves all levels of government and the civil sector along with a wide range of varied-interest stakeholders. Guiding information provided by MAB to biosphere reserve administration groups for preparing self-study reviews states that:

“A key role for the local biosphere reserve group is to learn about the governance system that they are in and explore ways to enhance its collective capacities for fulfilling the functions of a biosphere reserve”

Land use planning, including zoning designations and by-laws for conservation or intensification and development policies, has a crucial role to contribute in the function of biosphere reserves. Where land use policy and governance is not in alignment with, or supportive of MAB Programme, the potential exists for status quo governance to undermine the biosphere reserve designation. Conversely, a land use planning approach that is well aligned with the MAB Programme, and the needs of a particular biosphere reserve, forms a complete and ideal approach to sustainable development; harmonious with biosphere efforts for sustainable community capacity development and education.

**UPPER TIER GOVERNMENT INFLUENCE:** Several international agreements and commitments exist that identify Canada’s accepted responsibilities for managing the health and integrity of natural ecosystems, biodiversity, and natural services as they contribute to the global common resource base, including freshwater, genetic diversity, food web stability, and global climate regulation. Of these, the Georgian Bay Biosphere Reserve (GBBR) has the potential to contribute directly to commitments made under the Canada/United States Great Lakes Water Quality Agreement (GLWQA) to protect and manage Great Lakes ecosystems, biodiversity, and water quality.

Over time, the Government of Canada has downloaded responsibility and support for the UNESCO Man and Biosphere Programme to provinces and local communities. In 1974, a Canadian Man and Biosphere Committee was formed, including federal government agency representatives and largely self-funding members of the scientific and academic communities. The small amount of Federal funding designated to this group’s activities suffered from continuous cuts. After 1980, most committee was done on a volunteer basis, with some support from Parks Canada until
finally, all government funding and assistance for the committee ended in 1992. In 1998 the group reorganized into the non-profit Canadian Biosphere Reserves Association/L’Association Canadienne des Reserves de la Biosphere (CBRA/ACRB) which remains responsible for assessing applications and periodic reviews of existing Biosphere Reserves. No designated federal funding exists for the group however, one half-time administrative staff member continues to be supported through funding under Parks Canada limited-term grants (67)(68).

At the Provincial level, several legislative acts and their responsible provincial ministries guide the actions of municipalities in policy, planning and development decisions. In other locations where valuable, rare or sensitive natural ecology is facing pressures from development and human activity, the Ontario Provincial Government has ratified geographically specific legislation, giving precedence to ecosystem or hydrological protection over development. The GBBR is not presently subject to any special consideration under provincial policy, and so land use planning and policy is primarily guided by the Provincial Planning Act and the Provincial Policy Statement, which effectively prioritize growth and development over the protection of natural ecosystems.

THE PROVINCIAL PLANNING ACT & 2014 ONTARIO PROVINCIAL POLICY STATEMENT

The 2014 Ontario Provincial Policy Statement (OPPS) under the PPA expresses strong support for tourism development in general and specifically in rural communities throughout section 1.0 Building Strong Healthy Communities (69). Support for environmental protection which is likely to influence development and tourism planning within the GBBR is expressed in section 2.1 of the OPPS, which speaks to the “prohibition of development or site alteration in or on lands adjacent to provincially significant, coastal wetlands within the Great Lakes Basin”.

**GBBR Gaps:** This clause remains unchanged from the 2005 Provincial Policy Statement as does a follow-up statement, suggesting a broad workaround, and reading that this applies “unless it has been demonstrated that there will be no negative impacts on the natural features or their functions” (69 p. 22).

**Responsibility:** Implementation of the Provincial Planning Act and Policy Statement sits largely at the municipal governance level, where municipalities or townships are required to align official plans and by-laws with interests expressed in Provincial Planning Act (70). Where township governance does not exist for an area within a northern district, as with large areas of the GBBR within District of Parry Sound, planning and development is implemented at the provincial level, by Ministry of Municipal Affairs and Housing. Planning Boards operating at arm’s length from the provincial government manage land use planning matters, often guided
by general provincial policy only, with no locally specific planning protocols (70).

‘Annex One’ includes a detailed review of upper-tier government entities and legislation with relevance to the GBBR. The contents of ‘Annex One’ are also included in the governance and policy summary table in the next chapter.

LOCAL GOVERNANCE

Most policy and planning decisions in the GBBR are made by local lower, single-tier municipal governments or First Nations communities where a project or development will occur with minimal regulation, oversight or involvement from Federal, Provincial or Regional/District level governments.

Local governance and policy having the most relevance to the GBBR and the MAB Programme purpose are discussed here in greater detail.

FIRST NATIONS

Five First Nations communities (Reserves) are located fully or partially within the Biosphere Reserve with several additional communities located in the surrounding area.

First Nations Communities within the Biosphere Reserve Limits (71):

- Wasauksing First Nation/Parry Island
- Henvy Inlet First Nation
- Magnetawan First Nation
- Shawanga First Nation
- Moose Point Indian Reserve 79

Traditional hunting territories of First Nations Communities extend throughout the entirety of the GBBR, making these communities key stakeholders who have a right to be, but as of yet are only minimally involved in, the planning processes and policies of all governments acting within the region (72).

A recent, 2014 Supreme Court decision between the province of British Columbia and the Tsilhqot’in Nation has set a turn-point precedent in the requirement for government to both consult with and accommodate the continued traditional uses of lands beyond the limits of First Nations’ reserves. In this instance, the province had not adequately consulted with, and accommodated
for ongoing hunting and fishing uses of traditional lands when granting permits to log the area. This decision has been identified as a national precedent for First Nation’s land use rights across Canada, particularly in areas where a substantial documented history of traditional use of the lands by First Nations exists, and where the natural environment remains largely intact – both of which apply strongly throughout the Georgian Bay Biosphere Reserve. In this instance, the Tsilhqot’in Nation had long been in negotiations with government to have a land treaty and associated First Nations land rights recognized in this area, although no treaty had been established the time of the court’s decision.

This decision is potentially precedent setting in the context of GBBR First Nations. The Wiikwemkoong (Wiky) First Nation is currently in negotiations with the Government of Ontario on their long-standing land claim, which includes all islands along the eastern Georgian Bay and North Channel coastlines. In 1998, a reviewing Judge issued a statement that in the Court’s opinion, the Wiky have a legitimate interest in the islands of this area, and must be consulted on any land-ownership or use agreements until a final settlement of their Claim is reached. This effectively places all Crown-held Georgian Bay islands in the GBBR in a situation of uncertain future governance, where a substantial area of GBBR transition lands could theoretically shift from the policies and management approaches of the Provincial OMNR to those of the Wiikwemkoong First Nation. Negotiations between the Wiky and the Province of Ontario are however focusing on the land rights transfer of several Crown held islands and select mainland blocks in the North Channel area of Georgian Bay, along the northern-most boundary of the GBBR, adjacent to the French River Provincial Park (73). Regardless of the eventual land rights settlement, the Wiikwemkoong are among several First Nations with the right to be consulted and accommodated on land use decisions within their traditional hunting, fishing and gathering lands.

**MUNICIPAL**

Policy formation and planning and development within the Georgian Bay Biosphere Reserve are primarily implemented in a single-tier government review structure at the municipal level by Townships, with the Township of Georgian Bay and Muskoka District as the main exception. There are six municipalities with substantial areas in the Georgian Bay Biosphere Reserve, and one unorganized area (Britt) located toward the north end of Parry Sound District.
**District of Muskoka:**

Township of Georgian Bay

**District of Parry Sound:**

The Archipelago Township (South & North)

Town of Parry Sound

McDougall Township

Carling Township

Britt (Unorganized)

**Sudbury District:**

French River Township (regulated by the South-eastern Sudbury Planning Board)

Several towns and rural communities exist throughout GBBR municipalities of which Parry Sound, Mactier and Honey Harbour (when including for seasonal residents) are the most populous. These include:

<table>
<thead>
<tr>
<th>San Souci</th>
<th>Dillon</th>
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<tbody>
<tr>
<td>Honey Harbour</td>
<td>Woods Bay</td>
</tr>
<tr>
<td>Parry Sound</td>
<td>Mactier (Inland Lakes)</td>
</tr>
<tr>
<td>Snug Harbour</td>
<td>Port Severn</td>
</tr>
</tbody>
</table>

As the GBBR is not subject to any geographically specific provincial policy, municipal Official Plans and by-laws must align only with the Provincial Planning Act and Policy Statement. Municipalities with lands in the GBBR have acknowledged the Biosphere status and embraced the MAB Programme purpose (to achieve a balanced and sustainable existence between people, economy, and environment) from a land use planning perspective with varying degrees of commitment and clarity in Official Plan documents.
# The MAB Programme and GBBR in Municipal Official Plans

<table>
<thead>
<tr>
<th>Clearly addressed</th>
<th>Partially</th>
<th>Poorly</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>GBBR Designation Identified</th>
<th>UNESCO MAB Programme Explained</th>
<th>MAB Goal for Preservation Addressed by Policy</th>
<th>MAB Goal for Sustainable Development Addressed by Policy</th>
<th>MA9 supportive policies to address pressures facing GBBR</th>
<th>Indication of willingness to harmonize policies with others</th>
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</thead>
<tbody>
<tr>
<td>Georgian Bay Township</td>
<td>D.1.1.2</td>
<td>Partial with stated non-obligation in land use matters  F.5.10.2.2</td>
<td>F.5.10.2.2</td>
<td>B.2.2.4  F.5.10.2.2</td>
<td>Examples:  B.2.2.4  F.5.6.2  F.5.10.1.1  F.5.10.3.1</td>
<td>None</td>
</tr>
<tr>
<td>Town of Parry Sound</td>
<td>2.4.2</td>
<td>none beyond mention of designation</td>
<td>2.4.2, 2.4.5, 2.8.6.1</td>
<td>2.4.2, 2.1.3  2.2.5, 2.4.5</td>
<td>Examples:  2.8.6.1, 2.8.6.2, 2.8.6.4</td>
<td>2.2.11  2.4.4, 2.4.5</td>
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<tr>
<td>McDougall Township</td>
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<td>None beyond min. provincial policy</td>
<td>Partial &amp; unbalanced  3.01, 11.09.2.12</td>
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<td>Partial  11.09.2.21  11.09.2.30  11.09.2.31</td>
</tr>
<tr>
<td>Township</td>
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<td>(Partial Description 6.01)</td>
<td>22.02.6</td>
<td>22.02.10</td>
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<tr>
<td>Carling Township</td>
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</tr>
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<td>None</td>
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<td>Sect. 4 Objectives</td>
<td>5.15.2, 5.15.7 through 5.15.14</td>
<td>5.15.17 through 5.15.24</td>
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<td>None</td>
<td>None</td>
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</table>
Based on a review of municipal Official Plans, adoption of policies that support the Man and Biosphere Programme goal to achieve a sustainable balance between humans and the environment can be viewed on a sliding scale, illustrating the disconnect in approach to land use planning and policy that exists throughout the bioregion.

The UNESCO Man and Biosphere Programme seeks to:

“Engage fully with the international development agenda – specifically with the Sustainable Goals and the Post 2015 Development Agenda, and addresses challenges linked to scientific, environmental, societal and development issues in diverse ecosystems... “(80 p. 1)

And to:

“improve human livelihoods and the equitable sharing of benefits, and to safeguard natural and managed ecosystems, thus promoting innovative approaches to economic development that are socially and culturally appropriate, and environmentally sustainable” (80 p. 1)

The Official Plans of municipalities located toward the pro-development end of the spectrum may highlight MAB Programme support for economic development, but their policies do not convey the MAB Programme intent that development should occur only when environmentally sustainable, and where natural ecosystems and services are protected for future generations. Those municipalities located toward the pro-conservation policies end of the spectrum have Official Plans that are in better alignment with the MAB Programme. When development does occur within these municipalities, innovative and sustainable development solutions that correspond to the stringent environmental policies set in place to safeguard GBBR ecosystems are more likely to be adopted.
**GBBR Gaps:** Review of municipal Official Plan policies in alignment and support of the Georgian Bay Biosphere Designation suggests only the high-level intent of each municipality, and not the development decisions that result. The Township of Georgian Bay and the Town of Parry Sound are under more pressure from larger scale development applications than, for example, The Archipelago or Carling Townships and as a result, receive more pressure from development to sway from, and make exceptions to adopted policies and zoning (81)(82).

**DISTRICT LEVEL GOVERNMENT:** The GBBR spans the three electoral districts of Muskoka, Parry Sound, and the southern-most portions of Sudbury District. Parry Sound and Muskoka Districts are geographically both located within southern Ontario, however for policy; the District of Parry Sound is classified as a Northern Ontario District along with Sudbury, whereas in recent years Muskoka changed designation to a Southern Ontario District. The division between southern and northern classifications is important in that southern districts have dedicated county or district level governments with regionally specific Official Plans. Northern districts do not, and are managed at the provincial government level, guided by the Growth Plan for Northern Ontario (version 2011) and implemented at a single-tier township level, with applications often received and processed by regional planning boards (83).

**GBBR Gaps:** The division between northern and southern districts presents an additional challenge in coordinating planning initiatives at the watershed scale within the Georgian Bay Biosphere Reserve; further separating the planning and policy processes of the Township of Georgian Bay from those of the more northern municipalities.

**MUSKOKA DISTRICT CONSIDERATION FOR THE GBBR**

The Muskoka District Official Plan acknowledges the necessity to protect and preserve the natural environment in order to ensure a sustainable future for the tourism industry. The overriding priority seems to be on inland communities, supporting and encouraging development and intensification, particularly with waterfront-resort type development, and protecting natural ecosystems where development cannot occur (84).

The Township of Georgian Bay is the only municipality within Muskoka District having Georgian Bay Biosphere area and Great Lakes coastline. In land use planning matters, the role of the District includes; review and approval of Township Official Plans and amendments, review of Applications for Plans of Subdivision and Condominium Descriptions, approval of Area Municipal Part Lot Control By-laws, review of development applications for conformity to the Muskoka District Official Plan and provision of planning services to area municipalities when requested.
GBBR Gaps: Muskoka’s Official Plan makes no mention of the Georgian Bay Biosphere Reserve. In the Official Plan document, a designation for natural heritage special policy areas is outlined; however, the GBBR is not identified as a special policy area. No special consideration has been given to the GBBR or the Georgian Bay coastline at the District level (84).

Ecosystem types, the pressures facing ecosystems and economies of the area, and the character of planning and development challenges in the Township of Georgian Bay differ noticeably from the inland lake communities, centralized tourism centres and relatively altered shoreline conditions found throughout the remainder of Muskoka District. It seems that these unique characteristics attributed to the Georgian Bay coastline have received minimal focus from Muskoka District to date, with the District’s interests in economic and tourism development mostly focused inland (84).

PARRY SOUND AREA PLANNING BOARD

Under section nine of the Planning Act, the Parry Sound Area Planning Board has been formed to support the planning and development application processes for the municipalities of Parry Sound, Carling, McDougall, McKellar and Whitestone. Much like the relationship between Muskoka District and the Township of Georgian Bay, participating municipalities rely on the area planning board for advice and professional planning assistance in reviewing and processing applications for plans of subdivision, condominiums, severance applications, rights of way, easements and part-lot control.

GBBR Gaps: As each participating municipality maintains their own Official Plan, the area Parry Sound Area Planning Board does not serve to coordinate area planning policies – only to interpret and apply each of the separate Official Plans or provincially policies where Official Plans do not exist.

ARCHIPELAGO AREA PLANNING BOARD

Similar to the Parry Sound Area Planning Board outlined above, The Archipelago Area Planning Board provides professional planning services for The Archipelago Township and the unorganized townships of Wallbridge, Brown, Blair, Mowat and Henvey and a portion of
Harrison Township that is not in the Township of The Archipelago. Due to the unorganized status of the remaining townships, the Planning Board is heavily managed by The Archipelago having six of the eight Councilor seats. In the unorganized area of Britt, the Planning Board’s Minimum Standards By-law guides planning decisions, setting requirements for lot creation. No Official Plan exists for Britt at this time (85).

*GBBR Gaps: The Archipelago is the only municipality on the Archipelago Area Planning Board having an Official Plan to follow and implement. Otherwise, a most basic Minimum Standards By-law and general provincial policies guide land use planning in these areas.*

**EAST-SUDBURY PLANNING BOARD**

The East-Sudbury Planning Board is a committee comprised of politicians from the four communities, one professional planner as the Director of Planning, and administrative staff.

*GBBR Gaps: East-Sudbury Planning Board does not participate in and is not aware of any formalized collaborative approach to planning within the Biosphere Reserve. There are no policies or by-laws specific to the Biosphere Reserve that differ from the greater East-Sudbury Planning Region (86). No mention of the Biosphere Reserve is made within the 2010 Official Plan for the East-Sudbury Planning Area, prepared by MMM Group (87).*

**NON-GOVERNMENTAL ORGANIZATIONS:** The Georgian Bay Five (GB5) are an active group of well recognized and respected non-governmental organizations operating within the Georgian Bay Biosphere Reserve. Some organizations maintain charity status with associated policies against advocacy or lobbyist work and instead a focus on research and education while others are active in an oversight and advocacy-type role. While the GB5 maintain distinct priorities and approaches, their areas of interest often overlap which has led to both collaborations and the occasional identification of a best-suited lead organization on a particular issue. Examples of these relationships include the 2013 State of the Bay Report Card and Backgrounder document supported by all five NGOs, and the Honey Harbour Association and Georgian Bay Association’s current and ongoing opposition to the Proposed Trailer Park expansion at Macey Bay (38)(81).

**GEORGIAN BAY BIOSPHERE RESERVE INC. (GBBR INC.)**

Georgian Bay Biosphere Reserve Inc. is a non-governmental organization managing the Biosphere Reserve designation, completing self-studies for periodic review and pursuing initiatives of the
UNESCO MAB Programme. GBBR Inc. currently consists of six employees governed by a board of directors (7). The organization’s adept skills at collaborative relationship building with the GBBR Inc. volunteer network, municipalities and other organizations operating in the biosphere reserve, are allowing them to manage a scope of projects and initiatives far greater than the organization’s core size would suggest (23).

While GBBR Inc. is not a registered charity, the organization functions much like one in opting to remain neutral on all political, policy and specific development application issues. The focus has instead been placed on community capacity development; strengthening the community’s ability and knowledge of the MAB Programme, environment and sustainability through the support and facilitation of education, monitoring and research initiatives. In this role, the GBBR Inc. has been successful in engaging with, and establishing communication bridges between the divided views that exist between residents, businesses, cottagers and tourists in the bioregion on the ideal use of natural resources and value of natural ecosystems (23).

In land-use planning matters, GBBR Inc.’s involvement in policy development, such as an Official Plan Amendment process or individual development applications, is generally limited to providing educational information to decision makers on the intent of the MAB Programme and the special value of natural ecosystems and biodiversity in the GBBR (23).

SIERRA CLUB

The Sierra Club Canada Foundation (Ontario Chapter) is a non-profit advocacy group, funding research, restorative environmental projects, public policy and environmental awareness initiatives (88). The foundation has a long history of support for the ecosystems and biodiversity of the Georgian Bay eastern coast, including research partnerships with McMaster University on the ecological and biodiversity impacts of sustained low water levels in Georgian Bay (89).

The Ontario Chapter of Sierra Club often acts in an informal, independent oversight role, reviewing and advocating on provincial policy matters. At the municipal level, the organization has been active in the past in commenting on environmental concerns with specific development applications.

GEORGIAN BAY ASSOCIATION (GBA)

The Georgian Bay Association is a volunteer collaborative of 20 cottager’s associations, representing landowners throughout the GBBR. The Association self-identifies as a policy watchdog, monitoring all levels of government activity and decisions affecting Georgian Bay (90).
The Associations priorities include ongoing communication, advocacy and collaboration with Municipalities, MNR, MOE, First Nations and other NGOs involved in the region to address issues related to water levels, water quality, fisheries, land and forest use/management and government affairs (91).

**GEORGIAN BAY FOREVER (GBF)**

Georgian Bay Forever is a registered charity, funding and supporting public education and scientific research to protect, enhance and restore Georgian Bay’s aquatic ecosystems.

Georgian Bay Forever and the Georgian Bay Association were once a single organization. The split has enabled GBA to better pursue government advocacy work while, as a registered charity, GBF offers political neutrality and tax deductible contributions for their supported scientific research; often on the same issues.

**GEORGIAN BAY LAND TRUST (GBLT)**

The Georgian Bay Land Trust acquires lands along the east and north coasts of Georgian Bay through both ownership transfer and easement agreements, to hold, protect and steward in perpetuity. Prioritization of property acquisition is guided by the Eastern Georgian Bay Natural Area Conservation Plan (EGB NACP), completed in partnership by the GBLT and Nature Conservancy of Canada. Since 1991, GBLT has accumulated 44 properties equaling 1,576 acres of owned and easement-conveyed lands (92).

Use of GBLT properties by visitors is allowed where appropriate, fostering the development of an appreciation for Georgian Bay wilderness and GBLT’s preservation initiatives. Use of the properties is monitored and controlled through stewardship in order to preserve biodiversity and preserve the natural state of the properties and their ecological functions for future generations.

GBLT lands are currently considered Transitional lands within the Georgian Bay Biosphere Reserve model of Core, Transitional and Buffer as their protected status is not a government designation. The permanent nature of GBLT’s land agreements combined with explicit limitations on use of the lands and the intent to protect, maintain and monitor the natural environment on those properties aligns with Man and Biosphere Programme’s core-area definition; in some instances the alignment is closer than that of recognized national and provincial park core-area management approaches and policies, that are heavily dependent on fee-for-use budgeting:

“(a) a legally constituted core area or areas devoted to long term protection, according to the conservation objectives of the biosphere reserve....” (49 p. 28)

GBLT land acquisition is the main mechanism by which protected wilderness area in the GBBR is increasing, as no apparent appetite exists at either level of government to further transfer crown lands into protected park or conservation reserve status.
IS THE STATUS-QUO SUFFICIENT?

The vast and diverse ecosystems of the Georgian Bay Biosphere Reserve have become a hotbed for environmental research on issues including biodiversity, climate change, impacts of invasive species, and the compounding relationships between these areas. Available research provides a strong base from which to predict what the leading stressors on GBBR ecosystems and natural services will be for the immediate future. With the MAB Programme focused on achieving a thriving human existence, including resilient economy in the context of protected and conserved natural ecosystems and services, the question can be asked:

*Is achievement of MAB Programme objectives possible and adequately supported under current governance organizational structure and legislation?*

In response to this question, the organizations and government bodies discussed in Chapter Four, and in ‘Annex 1’ can be viewed in an issue or threat-to-response summary analysis as:

The greatest shortfall of ‘status quo’ land use planning and governance in the GBBR is the fragmented, non-collaborative and uncoordinated management approach that exists at this present time, with multiple single-tier, smaller scale governments operating in a siloed state.

Setting aside the GBR purpose and goals under the UNESCO MAB Programme; without a qualified and appropriately mandated conservation authority, unified municipal single-tier or watershed-reflective regional second-tier government, the eastern and north coast of Georgian Bay are more poorly equipped than most regions to address planning issues from an ecological and watershed-wide perspective. Considering the value, sheer vastness and diversity of GBBR ecosystems, it would be unreasonable to expect the most well-intentioned, and eco-centric municipality to achieve MAB Programme objectives through land use planning with only the Planning Act as the primary supporting legislation. Given the current legislative environment, developers are in a position of easy advantage with personal interest most often prevailing over Official Plan policies when the development is (often inevitably or purposefully on the developer’s part) advanced to an Ontario Municipal Board (OMB) hearing.
**THREAT : RESPONSE MATRIX**

Organizations and government bodies actively playing a role in addressing the top threats facing the GBBR can be viewed in a threats-response analysis as follows:

<table>
<thead>
<tr>
<th>THREAT: INVASIVE SPECIES</th>
<th>RESPONSIBLE BODIES &amp; MAIN ACTIONS ADDRESSING TOP THREATS:</th>
<th>SUPPORTING LEGISLATION &amp; COMMITMENTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Government of Canada:</strong> Works with the United States to identify priorities for aquatic invasive species management. Department of Fisheries and Oceans (DFO) Monitors and combats against aquatic invasives that may cause harm to fish populations in recognized fisheries. Under the Canada Shipping Act, DFO and Transport Canada regulate the discharge of waters from shipping vessels.</td>
<td>Canada-U.S. Great Lakes Water Quality Protection Agreement (GLWQA) (2012)</td>
</tr>
<tr>
<td></td>
<td><strong>Province of Ontario:</strong> Approves and funds Geographically Focused Initiatives (GFI) under the Great Lakes Protection Act (GLPA), potentially to combat invasive species</td>
<td>The Canada Shipping Act (2001)</td>
</tr>
<tr>
<td></td>
<td>OMNR monitors attempts to prevent entry of new invasive species and manages established invasive species in partnership with National efforts by DFO</td>
<td>Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (COA) (2014)</td>
</tr>
<tr>
<td></td>
<td><strong>Non-Governmental Organizations (NGOs):</strong> In the GBBR, Georgian Bay Forever and the Georgian Bay Land Trust have run educational and financial/volunteer support programs to identify, and remove established invasive species, and teach best management practices (ex. Phragmites removal).</td>
<td>Ontario Great Lakes Protection Act (GLPA) (2015)</td>
</tr>
</tbody>
</table>

**GBBR GAPS (INVASIVE SPECIES):**

The newly ratified Ontario Great Lakes Protection Act provides a mechanism by which local municipalities or regions can identify the best on-the-ground response to Great Lakes threats to their local ecosystems, create a plan to address those threats and seek funding and support from the Province for implementation. Invasive species are one threat facing the GBBR where the GLPA may prove useful however lack of a regional-scaled, environmentally focused and capable body, such as a Conservation Authority, places the GBBR at a substantial disadvantage in leveraging and monitoring the implementation of GLPA GFIs.
Government of Canada: Environment Canada (EC) is addressing nutrient loading in the Great Lakes Basin with monitoring, research, regulation and through partnership with industry and provincial partners. EC has established a $16 million fund for the Great Lakes Nutrient Initiative (mostly focused on Lake Erie). EC has the authority to enforce regulations specific to pollution under the Fisheries Act.

The Province of Ontario: Ministry of Natural Resources is responsible for implementation of the Ontario Water Resources Act (OWRA), monitoring sewage disposal standards and practices and permits to take large volumes of water. OMNR also manages the Nutrient Management Act (ONMA), which has established best practices primarily for agricultural manure storage and field applications as well as cage aquaculture licenses.

The Ontario Building Code Act, 1992 (OBCA) sets standards for septic systems and provides regulatory powers that can be used by municipal governments or conservation authorities to re-inspect existing systems for compliance (93).

Municipalities: are responsible for providing sewage treatment facilities in urban areas and issuing permits for construction of septic systems in non-serviced areas. In the GBBR, Township of the Archipelago has an established septic re-inspection program and the Township of Georgian Bay recently began a new program for re-inspection.

The land use decisions that are made by municipalities in the GBBR have a significant impact on Georgian Bay nutrient loading. Golf courses and agricultural lands for example, receive regular applications of fertilizer, and the effectiveness of septic systems is limited by size of property available for the leaching bed, concentration of systems in an area and the number of persons using those systems.

Supporting Legislation & Commitments:

- Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (COA) (2014)
- Ontario Water Resources Act (OWRA) (1990)
- Ontario Great Lakes Protection Act (GLPA) (2015)
- Municipal Zoning, By-laws and application of Official Plans for land use designations
**GBBR GAPS (NUTRIENT POLLUTION):**

Cage aquaculture licenses in the GBBR are managed by OMNR and OMOE in its application of the Nutrient Management Act. OMNR classifies cage aquaculture in the Class ‘A’ category, placing this (marine) use of Crown Land as the lowest-environmental concern, not subject to public consultation processes (94).

Municipalities and First Nations communities of the GBBR are in the strongest position to mitigate and protect near shore water quality through nutrient management and land use planning decisions.

In the GBBR, septic re-inspection programs have been adopted by some but not all municipalities.

Agricultural land use being the top rural contributor to nutrient pollution is minimal in the GBBR, however, shallow soils and large exposed areas of bedrock create less opportunity for nutrients from other land uses to be filtered through soils. Land use zoning decisions, Official Plan policies and development approvals have the greatest potential to either increase or mitigate nutrient loading on the Bay, through the conversion of natural vegetation into developed land uses, and increases in the number of septic systems.

(An ongoing development application in the Township of Georgian Bay for the expansion of a trailer park is one example, where a local GBBR municipality has control policies in place to protect surrounding natural ecosystems, yet is actively seeking exemptions to their own policies. In this example, policies for septic system setbacks, future reserves for leaching bed replacement and fundamental land use designations permitted within the Township have been disregarded by Township Staff with the Township Council’s approval. In this instance a second-tier, bioregional or watershed scaled government entity, GBBR sustainability may have directed Council and Staff back into alignment with established policies.)
THREAT: CHEMICAL POLLUTION

RESPONSIBLE BODIES & MAIN ACTIONS

ADDRESSING TOP THREATS:

Government of Canada: Environment Canada regulates toxic substances through the Canadian Environmental Protection Act (CEPA), and has made commitments to control and limit toxic substances under the Canada-U.S. GLWQA. Qualifying federal and major natural resource type projects are subject to the Canadian Environmental Assessment Act. Federal involvement in chemical pollution is generally limited to federally regulated waterways, recognized fisheries and shipping routes. DFO and Transport Canada regulate the discharge of pollutants from ballast waters under the Canada Shipping Act (95).

Government of Ontario: both the Ontario Environmental Protection Act and the Water Resources Act grant OMOE and OMNR authority to investigate, control, stop and issue remedial orders, take preventative measures and to levy fines and penalties for incidents involving chemical pollution and spills.

Relevant to land use planning; OMOE issues licenses and permits and sets limitations for activities that may pollute (including aquaculture operations relevant to the GBBR), and sets restrictions on commercial transactions involving ownership transfer of contaminated lands.

OMOE administers the Environmental Assessment Act, requiring that qualifying major PUBLIC development, resource management, infrastructure, water and wastewater works have their likely impact on the environment assessed.

In order for a private development to be subject to the Environmental Assessment process, Conservation Authorities, Municipalities or any individual or group may submit a designation request to OMOE. Requests are evaluated based on type of project, potential for significant environmental impacts and level of public interest.

Municipalities: have the authority to mitigate the risk of chemical pollution through zoning by-laws and land use policies.

Non Governmental Organizations: (NGOs): including the Sierra Foundation and Georgian Bay Forever actively support research, much of which has focused on water quality issues including chemical pollution.
GBBR GAPS (CHEMICAL POLLUTION):

In the absence of a second-tier government entity with a mandate for ecosystems protection and sustainable development, municipalities are the single authority with the power to require that a development application be subject to an environmental assessment. Alternatively, if community members catch the application review process at the right point in time, they may submit a request to OMOE to have the development subject to the provincial environmental assessment process.

As the single government authority tasked with initiating the environmental assessment process, Municipalities are under a number of conflicting pressures including: pressure to avoid Ontario Municipal Board hearings and associated legal fees, user-pay/intensification pressures from the Provincial Government for water and waste water services, and budget balancing pressures that can be relieved by increased development fees and a larger tax base. An entity with a regional oversight mandate is needed to balance these pro-development pressures, against the need to ensure GBBR ecosystems, natural services and Ontarians’ common resources are respected in the planning process.

SUPPORTING LEGISLATION & COMMITMENTS:


Canadian Environmental Protection Act (CEPA) (1999)

Fisheries Act (FA) (2012)

Canadian Environmental Assessment Act (2012)

The Canada Shipping Act (2001)

Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (COA) (2014)

Ontario Environmental Protection Act (OEPA) (1990)

Ontario Water Resources Act (OWRA) (1990)

Ontario Pesticides Act
## THREAT: SUSTAINED LOWERING WATER LEVELS

### RESPONSIBLE BODIES & MAIN ACTIONS ADDRESSING TOP THREATS:

**Government of Canada/International:** The International Joint Commission (IJC) Great Lakes-Saint Lawrence River Adaptive Management (GLAM) Committee completes monitoring, modeling and assessment for ongoing regulation of water levels and flows throughout the Great Lakes Basin under the International Boundary Waters Treaty, Article III (96).

**Province of Ontario:** The Great Lakes Protection Strategy includes a commitment to work with the IJC on how to best respond to and manage lake levels, including how to adapt to lake level changes (97).

OMNR manages Shore Land Work Permits for dredging and blasting of lake beds to maintain water access to properties in times of low water.

**Municipalities:** must respond to the Provincial Policy Statement sections on projects within or adjacent to coastal and provincially significant wetlands. Wetland vegetation responds annually and over multiple years to water level fluctuations, making wetland extents mapping, verification and rationalization to property owners a difficult task for Municipalities when reviewing development applications.

**NGOs:** The Sierra Foundation has been persistent in its advocacy for meaningful action on the parts of government to mitigate sustained lowering water levels on the upper Great Lakes including Georgian Bay, and in distributing information and available research to affected communities.

### SUPPORTING LEGISLATION & COMMITMENTS:

- International Boundary Waters Treaty, Article III (1909)
- Provincial Policy Statement (PPS) (2014)
- Multiple Municipal Official Plans & By-Laws
GBBR GAPS (LOWERING WATER LEVELS):

Municipalities in the GBBR are beginning to respond to the Provincial Policy Statement (2014) on projects occurring within and adjacent to wetlands, undertaking efforts to map the extents of known wetlands in some townships (74).

Municipalities and planning boards processing applications for waterfront lot creation and site development must determine whether the waterfront of a proposed project falls within coastal or provincially significant wetland in order to comply with the Provincial Policy Statement. Sustained lowering water levels create instances where site works or structures may be permitted in an area where a wetland has not previously been documented and may not appear established at time of review, yet where one would naturally exist at a water level differing from that at time of application. This creates the potential for land use planning and development works to unintentionally contribute to loss of wetland area, thereby contributing to loss of ecosystem services, biodiversity and negatively contributing to climate change.
**THREAT: CLIMATE CHANGE**

**RESPONSIBLE BODIES & MAIN ACTIONS ADDRESSING TOP THREATS:**

**Government of Canada:** As a Conference of the Parties signatory, under the Copenhagen Accord (2009), Canada has committed to reduce greenhouse gas emissions by 17 percent from 2005 levels (98).

At the national level, climate change action to date has been largely centred on regulations for transportation and electricity sectors, many of which will come into effect after 2020 (98). Land use policy and designations have not been a component of the federal response to climate change.

The recent change in Canada’s federal government is likely to result in a new national direction on climate change. Liberal platform commitments include increased collaboration with provinces and territories on climate change mitigation approaches, implementation of a carbon pricing system and reduced carbon pollution (99).

**Province of Ontario:** Several climate change mitigation initiatives are underway relevant to land use planning: Ontario’s renewed commitment to protecting wetlands, the 2005 Greenbelt plan for the protection of agricultural lands, heavy investment in urban transit and clean energy as well as adoption of a cap and trade system for carbon emissions (100).

**Municipalities:** can play a meaningful role in climate change action through land use policy, planning and development approvals. While the Ontario Building Code sets minimum standards, Municipalities have the authority through zoning, by-laws and Official Plan policies, to encourage or require sustainable development practices. Areas that can be managed include site selection, building performance standards, low impact site design and construction methodologies. The City of Toronto’s Green Roof By-Law and Green Standard development performance measures are examples of municipal initiatives. Many municipalities now provide support for sustainable building rating systems and designations within their Official Plans (not within the GBBR).

**SUPPORTING LEGISLATION & COMMITMENTS:**

*United Nations Framework Convention on Climate Change (UNFCCC)*

*Copenhagen Accord (2009)*

*Provincial Policy Statement (PPS) (2014)*

*Multiple Municipal Official Plans & By-Laws*
GBBR GAPS (CLIMATE CHANGE):

Any development takes some piece of land out of its natural services functions including carbon sequestration. Traditional construction and site development methods result in the removal of land from a natural state, typically functioning to sequester carbon into a developed state; emitting carbon throughout the project’s life-cycle. Sustainable building methods are available, where combined with responsible site selection a net zero energy, water and emissions footprint is possible to achieve. These types of deeply sustainable development require policies, supports and incentives that are currently not present in GBBR municipal development application and review processes.

Municipalities are also tasked with responding to the Provincial Policy Statement toward protecting coastal and provincially significant wetland area from disturbance, development and site alteration, thereby maintaining these ecosystems as highly efficient carbon sinks. As outlined within the (Threat: Sustained Lowering Water Levels) section above, this can be a complicated task.

Within the GBBR, growth and intensification is now focused in compact settlement areas, however, within shoreline communities outside of these areas, opportunities exist for municipalities to encourage greater use of renewable energy sources.
THREAT: INCOMPATIBLE HUMAN ACTIVITIES & LAND USES

RESPONSIBLE BODIES & MAIN ACTIONS ADDRESSING TOP THREATS:


Province of Ontario: The Provincial Planning Act sets the ground rules for land use planning and recognizes the authority and accountability of municipal governments in the planning process. The Provincial Policy Statement provides policies for planning and sustainable development to which all municipalities in the province must adhere.

OMNR manages and provincial parks (GBBR Core areas), conservation reserves (Buffer areas) and crown land (GBBR Transition areas)

Municipalities: Maintain Official Plans to guide land use planning and development (in GBBR Transition areas) that are fully aligned with the policies of the Provincial Policy Statement.

NGOs: advocate for GBBR Ecosystems in policy and planning processes (GBA & Sierra Foundation)

SUPPORTING LEGISLATION & COMMITMENTS:


Provincial Policy Statement (PPS) (2014)

GBBR GAPS (INVASIVE SPECIES):

While the government of Canada has made platform commitments to expand national wildlife areas, migratory bird sanctuaries, provide better protection for freshwater ecosystems and to expand protected coastal areas, the lack of a second-tier environmentally focused planning entity in the GBBR leaves advocacy for with regard to these initiatives, wholly on the shoulders of NGO’s.

The Provincial Policy Statement (PPS) and Provincial Planning Act (PPA) largely support development over conservation. Where policies for conservation (provincially significant and coastal wetlands) do exist, Municipalities and developers have found ways to rationalize
and approve ecologically intrusive developments. This suggests that the PPA and PPS are not sufficient to protect GBBR ecosystems and services.

Municipal Official Plans are largely supportive of development over conservation. Municipal by-laws controlling site alteration (filling, excavating and tree cutting) are weak or non-existent within the GBBR.

No second-tier, bioregional or watershed-scaled authority exists for the GBBR such as a Conservation Authority or Planning Commission for the GBBR to provide policy and review services for land use matters with a clear mandate for sustainable development.

No legislation exists to prioritize conservation of GBBR ecosystems and natural services in line with MAB Programme purpose. Such legislation would have the potential to limit development to sustainable locations, land use types, scales and construction methodologies that would align with protection of GBBR ecosystems and natural services for future generations.

In the absence of a second-tier government entity with a mandate for ecosystems protection and sustainable development, municipalities are the single authority with the power to require that a development application be subject to an environmental assessment. Alternatively, if community members catch the application review process at the right point in time, they may submit a request to OMOE to have the development subject to the provincial environmental assessment process.

As the single government authority tasked with initiating the environmental assessment process, Municipalities are under a number of conflicting pressures including: pressure to avoid Ontario Municipal Board hearings and associated legal fees, user-pay/intensification pressures from the Provincial Government for water and waste water services, and budget balancing pressures that can be relieved by increased development fees and a larger tax base. An entity with a regional oversight mandate is needed to balance these pro-development pressures against the need to ensure GBBR development and conservation policies are fully respected in the planning process.

Where environmental impact studies are required, they are commissioned and funded by the applicant, raising the perception of bias toward a favourable outcome for the applicant. Once submitted, environmental studies are often reviewed by local staff, lacking appropriate qualifications and local councils may make their decisions based on the unqualified summary from planning staff, having never seeing or reviewed the actual Environmental Impact Study (EIS) document. A second-tier government entity employing the services of a qualified biologist familiar with the GBBR eco-region would be well positioned to ensure consistency in EIS quality and approaches, perform a peer review function, request additional reviews if necessary, and formally advise local councils of appropriate mitigations for any negative impacts.
EXAMPLES OF LAND USE PLANNING GOVERNANCE AND LEGISLATION IN THE GBBR:

The previous two chapters have explored the GBBR organizational and governance structure and policy, and examined the capacity of the current system to embrace the MAB Programme from a land use planning perspective. Regardless of the content of Official Plan documents, the rigor with which municipal Staff and Council interpret, implement and enforce the policies of their Official Plans and by-laws ultimately determines their adequacy. The following examples are the result of my personal review of either larger-scaled or higher-profile (from a GBBR perspective) planning and development decisions that have sparked public interest and involvement over the past ten years. The Township of Georgian Bay is overly represented as its location in the southern-most portion of the GBBR places it in easy proximity to larger Southern Ontario population centres, and attracts a larger share of development activity than more northerly or seasonal residency-based municipalities.

TOWNSHIP OF GEORGIAN BAY

The Township of Georgian Bay maintains a traditional approach to planning and development with respect to the Biosphere Reserve, with economic and land use development taking precedence over conservation, unless in direct and proven contradiction to the Planning Act (i.e. within or adjacent, and causing damage to, a provincially significant or coastal wetland). While the Biosphere Reserve is mentioned in the Township’s Official Plan, and the Township has recently initiated environmentally focused initiatives including wetland mapping, shoreline alteration controls and a septic re-inspection program; non-committal language toward the biosphere reserve designation remains in the latest 2014 version of the Official Plan. This is noted for example in section D.1.1.2. where it is stated that “the UNESCO designation does not have any effect on the Townships ability to regulate land use; however, the Township does have an interest in protecting the natural ecology of the GBBR” (74).

Sustainable development is identified as a goal in the 2014 Official Plan, however recent and ongoing planning and development decisions suggests that these goals and the above general interest toward protecting the natural ecology of the GBBR are not being achieved under the current Provincial Planning Act/Municipal Official Plan approval and review process.
EXAMPLE 1 | OAK BAY GOLF COURSE, MARINA & SUBDIVISION DEVELOPMENT APPROVAL (2006):

The Oak Bay Development (formerly Port Severn Village) was new residential/golf community on the shores of Georgian Bay comprising the southern-most extend of the GBBR with significant frontage on the provincially significant Potato Island and Oak Bay wetlands. The development received District of Muskoka subdivision approval and lands were rezoned by the Township of Georgian Bay in 2006 with final Development Agreement Approval in 2007. At that time wording within the 2005 Provincial Policy Statement read the same as today’s 2014 version, prohibiting development in or adjacent to Provincially Significant Wetlands (PSW). The PPS also included and still includes a clause reading “unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions” (102) (103)(69).

The resulting development included reduced buffer widths from the recommended 120 meters for PSWs down to a range of zero to ten meters adjacent to golf course and marina expansion portions of the development. When concerns about pesticide and nutrient runoff from the golf course were noted in statutory public meetings, developers initially claimed that runoff from greens would be directed to holding ponds and treated before excess would be returned to the Bay (PSW). The end built development was instead graded and sloped such that golf greens drain directly to the PSW with minimal to non-existent buffers, over shallow soil depths on top of bedrock offering no opportunity for ground filtration. Equally disturbing, the course’s signature 15th hole sends golf balls across an embayment of the coastal PSW, often ricocheting off of the opposite granite rock face to accumulate within the PSW. The Oak Bay Marina development remains on hold after sitting stripped and open to sedimentation of the PSW for the past three years. The marina expansion involved major blasting and dredging operations to increase the width and depth of an existing access channel to accommodate vessels up to 36 feet in length. The proposed facility includes in-water and dry-docking for up to 200 boats, up from a previous limit of approximately 30. The marina channel bisects the PSW, and boats exiting the marina must travel through the shallow waters of the PSW from the mouth of the marina channel to reach the main Georgian Bay boating channel. With Georgian Bay’s lowering water levels, it is quite possible Township planners have zoned a marina in what will soon become a large pond, though more likely application will be made to OMNR by the developer to dredge the PSW to maintain access (103)(102).

Particularly with recent research regarding the persistent and leaching nature of neonicotinoid pesticides that are regularly applied in increasing quantities on the Oak Bay Golf course, combined with the high sensitivity of aquatic invertebrates to neonicotinoids; it is highly plausible that this development will indeed have detrimental effects on the surrounding Provincially Significant, Potato Island and Oak Bay Wetlands, their food web systems, and potentially the overall biodiversity of the Georgian Bay Biosphere Reserve(104)(105). The Oak Bay Golf Course,
Marina and Subdivision Development Approval appears to be an example of municipal Staff and Council members overlooking the obvious natural limitations of a site for the purpose intended, in order to secure a major tax-revenue generating development.

EXAMPLE 2 | MACEY BAY TRAILER PARK DEVELOPMENT APPLICATION (2015)

A currently proposed development in Macey’s Bay, south of Honey Harbour, involves reinstatement and expansion of the formerly-existing Dreamer’s trailer park from the originally approved 30 trailers to 180 trailers. The subject property surrounded by provincially significant coastal wetland and is not serviced by municipal sewer and water. The property has a complicated history of prior land uses and disturbance. The current Township of Georgian Bay Official Plan does not permit the creation of any new trailer parks; however, while no trailers have existed on the property for more than ten years, the Commercial Tourist zoning allowance permitting a trailer park remains in effect. Community groups including the well-respected GB5, researchers working within the GBBR and local wastewater treatment experts have all expressed extreme concern with the proposed expansion, and have highlighted serious detrimental effects to environment and community that would result from a massive expansion supported by on-site waste water treatment. The Township of Georgian Bay is in support of the expansion, and has recently taken measures to expedite the approval process, by-passing the normal application process and associated public input opportunities, thereby making the community’s appeal process considerably more complicated and costly than it otherwise would have been. The Ministry of Natural Resources representing the Province has declined any interest in the development review and approval process, unless the Township or the Developer directly requests their involvement (81). An example of GBBR environmental sensitivities being ignored in favour of a form of development prohibited under the municipality’s Official Plan.

EXAMPLE 3 | ZONING BY-LAW AMENDMENT APPLICATION FOR A MARINA FACILITY (2015)

The Township of Georgian Bay’s approval process for this recently approved Zoning By-law amendment application included a Notice of Public Meeting for a project seeking to add “Marine Facility” as a permitted use for an existing commercial property (106). Many municipalities require that public meetings be held after 6pm on weekdays in order to provide citizens with the greatest opportunity to participate. This meeting, scheduled for 10am on a weekday was the only opportunity provided by the Township of Georgian Bay for the community to comment on the Zoning By-law Amendment application. In order to maintain a right to appeal the Township’s decision at the Ontario Municipal Board, concerned parties were required either to attend this meeting, or submit comments in advance. Reports to which the Planning Report
refers were not available through the Township’s website and interested parties had to obtain these documents during regular working hours from the Township office (107). The marine facility will include docking located where the only water access route to the property will require that boats navigate a very shallow, narrow channel (two feet depth of water at high water levels) bordering Provincially Significant, Coastal Wetland and Type 1 Fish Habitat. No mention of the provincially significant wetland is made within the Environmental Impact Study, notice of meeting or the Planning Department Report (2015-43) available on the Township’s website, despite the Provincial Policy Statement’s requirement to protect these ecosystems (107). This is yet another example of the current single-tier municipal lead planning system failing to consider or prioritize potential negative impacts on GBBR significant ecosystems at an ecosystems-scale in the decision-making process. Focus was instead placed on short term economic growth over seeking potentially more sustainable solutions to site development.

EXAMPLE 4 | UNORGANIZED AREA OF BRITT - LAND USE PLANNING PROCESS

Land use planning in the unincorporated area of Britt is managed by the Archipelago Area Planning Board which is largely comprised of planning staff members of The Archipelago Township. No Official Plan is in place for Britt, leaving the unorganized area still-further vulnerable than organized municipalities within the GBBR (90).

EXAMPLE 5 | MCDougALL TOWNSHIP SETTLEMENT AREA

The 2015 Municipality of McDougall Official Plan includes significant policies to promote increased settlement and development in areas along and in close proximity to the shores of Georgian Bay. The Nobel Settlement area has been significantly expanded in order to support further development where access to municipal servicing is possible. The significant expansion of existing, and establishment of new development-intense areas in the GBBR are obvious examples of land use planning policy and practices that would benefit from review and coordination at the eco-regional and watershed scales (83).
HOW HAVE OTHERS DONE IT?

GOVERNANCE DEFINITIONS: The term governance includes not only the top-down, formally recognized and vertically organized decision making processes of government, but also the decentralized participants dispersed throughout society and their contributions. Individuals and organized community groups monitor, contribute meaningfully and often participate directly in decision making processes (108).

Environmental governance is a term describing all formal government and informal institutional parties and actions contributing to decisions made about the environment. The United Nations Environment Programme promotes environmental governance in support of sustainable development (1).

The United Nations promotes both whole-of-government and collaborative governance to nations and regions in their pursuit of sustainable development, endorsing the following definitions for each (109):

Whole-of-government is defined as “agencies working across portfolio boundaries to jointly achieve integrated responses to the issues of policy development, program management and service delivery whereas Collaborative governance refers to a process of governing based on collaboration between government and non-government stakeholders” (109 p. 75).
PRECEDENT APPROACHES TO ECO-CENTRIC LAND USE PLANNING
GOVERNANCE: The following table provides an overview of generally successful “eco-
centric” approaches to land use planning which prioritize the protection of ecosystems and
natural services, and shows the range of intensity with which collaborative and whole-of-
government approaches have been incorporated into environmental governance scenarios.
Priority was given to selecting precedents within Ontario and Canada, and examples within
other UNESCO biosphere reserves or similar environmental jurisdictions readily applicable to
the Georgian Bay Biosphere Reserve.

<table>
<thead>
<tr>
<th>BIOSPHERE RESERVE</th>
<th>ADMINISTRATIVE AUTHORITIES</th>
<th>CORE VS. BUFFER AND TRANSITIONAL TOTAL AREA(S)</th>
</tr>
</thead>
</table>
| GEORGIAN BAY BIOSPHERE RESERVE (ONTARIO) (EST. 2004)   | Georgian Bay Biosphere Reserve Inc. | Total Area: 347,270 ha
|                                                        |                            | Core: 52,509 ha
|                                                        |                            | Buffer: 39,595 ha
|                                                        |                            | Transition: 255,166 ha |
| CLAYOQUOT SOUND BIOSPHERE RESERVE (BRITISH COLUMBIA) (EST. 2000) | Clayoquot Biosphere Trust Society | Total Area: 349,947 ha
|                                                        |                            | Core: 110,288 ha
|                                                        |                            | Buffer: 60,409 ha
|                                                        |                            | Transition: 179,250 ha |
| NIAGARA ESCARPMENT BIOSPHERE RESERVE (ONTARIO) (EST. 1996) | Niagara Escarpment Commission (Canada, Province of Ontario: eight regions/cities; 21 local municipalities) | Total Area: 194,555 ha
|                                                        |                            | Core: 66,136 ha
|                                                        |                            | Buffer: 114,488 ha
|                                                        |                            | Transition: 13,904 ha |
| OAK RIDGES MORAINE (ONTARIO) Not presently designated as a Biosphere Reserve | Province of Ontario in partnership with: Government of Canada, 32 Municipalities, 9 Conservation Authorities | Total Potential Area: 190,000 ha
|                                                        |                            | Or more if Greenbelt Protected areas or Watershed limits are included. |
| SEVERN SOUND ENVIRONMENTAL ASSOCIATION (ONTARIO) Not a Biosphere Reserve | Nine Municipalities & Partner community organizations | Not Applicable |
CLAYOQUOT SOUND BIOSPHERE RESERVE (BRITISH COLUMBIA)

Cloyquot Sound and the Georgian Bay Biosphere Reserve share a number of similarities, including near identical total biosphere area (~350 ha), a coastal context and a blend of municipal and First Nations settlements scattered throughout high value, natural ecosystems (110). The governance, organizational and legislative structure of Clayoquot Sound in place before the special focus on sustainable development and achievement of the biosphere reserve designation, was also fragmented across multiple jurisdictions, similar to current GBBR land use planning (111).

Clayoquot Sound is situated along the west coast of Vancouver Island. The area includes a rich and varied landscape of inlets, embayments, islands, inland lakes and dramatic topography. Ancient temperate rainforests along with managed logging areas, estuary, mud flat, coastal rock barren, alpine peak and wetland ecosystems support a wide range of biodiversity and ecosystem services. Eight communities are located within the biosphere reserve limits, including five First Nations, two organized municipalities and a regional level-2 government.

The economies of Clayoquot Sound communities are as equally dependent on the health and integrity of their natural ecosystems as those of the GBBR, with the dominant economic industries being resource extraction (logging and fishing) and a well-established and still expanding tourism, leisure and recreation industry (110).

Before the 1990s, natural resources and forests of Clayoquot sound were managed by the Province of British Columbia’s Ministry of Forests and Range under the Forest and Range Practices Act (FRPA) and the Land Act. Local First Nations, municipal and regional governments separately managed land use planning and development matters outside of provincial crown lands. Increasing development pressures on temperate rainforests around the world lead to the realization that Clayoquot Sound’s remaining ancient forested areas, untouched by logging, had become ecosystems of international significance. These forests along with other high-value ecosystem types were under increasing threat from conventional logging practices and development encroachment. In 1993 after years of discussions on forest and ecosystem protection, civil protests erupted in opposition to a Provincial plan for forest management that would have left only 14% of old growth forests with a protected status. The peaceful protests were at the time, the largest acts of civil disobedience in Canadian History (112).

In 1993, protests ended with the signing of an interim agreement allowing for First Nations review and input on the Provincial plans for logging, and the Independent Scientific Panel was established to identify best-in-world logging practices and alternatives to clear cutting for the Sound (112). The panel recommended an adaptive, sustainable ecosystems management approach that included industry-leading, sustainable best-practices in logging, land use
planning and development. The adaptive approach was to achieve a rigorous combination of research, monitoring and formative evaluation of management practices (113). In 1995, after issuing final reports and a framework for sustainable land management, the Scientific Panel was dissolved and the Clayoquot Sound Planning Committee and the Technical Planning Committee were established to implement framework recommendations, including the creation of Watershed Plans for land use, development and resources management (111).

Today, Provincial, Municipal and First Nations community planning decisions are reviewed by the Clayoquot Sound Technical Planning Committee for adherence to Watershed Plans and best management practices for ecosystem conservation and achieving goals for sustainable social and economic development. Development of the Watershed Plans followed a process outlined within Scientific Panel recommendations, which included: defining watershed planning units/boundaries, setting watershed specific objectives, assembling and acquiring baseline data on ecosystems, communities and economies, analyzing and preparing Watershed Plans, implementing and monitoring watershed plans (113). Eleven Watershed Plans have been completed, endorsed and agreed upon by all communities in the area. At time of initial completion, the plans were not legally binding and had no support under provincial legislation. In 2008, a Ministerial Order for an area-specific Land Use Decision was completed under section 93.4 of the Land Act, recognizing the commitment to sustainable development by the Province and all Clayoquot communities. The Act formalized the role of the Watershed Plans in guiding land use planning decisions, and required that all Provincial Forestry and Range plans and decisions conform to the contents of the Watershed Plans (114). Under this legislative structure, Watershed Plans have acquired a level of authority over land use planning and development that would be comparable to the Official Plans of Municipalities in the Georgian Bay Biosphere Reserve, or to a District level Official Plan with which Municipal levels plans must align in Ontario.

On a near-parallel timeline beginning in the early 1990s, community groups organized to form the Clayoquot Sound Biosphere Trust (CBT) and began the process of achieving UNESCO Biosphere designation for the area. This further formalized the local communities’ commitment to sustainable resource management, conservation, land use and development, and culminated with a biosphere designation in the year 2000 (110). The Clayoquot Sound Biosphere Trust remains the named administrative authority for the biosphere, much as the Georgian Bay Biosphere Reserve Inc. does in the GBBR. These two administrative organizations share similar approaches and mandates, acting as facilitators of education and collaboration among the many stakeholders existing within their biospheres, and fostering sustainable community capacity development. The CBT also maintains a neutral, non-advocacy position on land use planning and resource management issues much the same as GBBR Inc. (110).
The Niagara Escarpment (Escarpmnt) achieved the UNESCO biosphere designation in 1990, after several years of persistent lobbying by citizens concerned with the cumulative impacts of land use planning and development on Escarpment ecosystems. The UNESCO designation formally recognized a long-standing, area-specific approach to land use planning, which prioritizes the protection of the Escarpment’s remaining natural heritage, alongside sustainable development and regional economic growth. With the Niagara Escarpment Commission (NEC) as both the bioregional land use planning agency, and the administrative body responsible for managing the biosphere designation, the Escarpment’s land-planning, and sustainable development policies are one of the most closely aligned to the MAB Programme of any biosphere region in Canada (115).

Planning and development applications in the NEBR initially follow the standard process of submission to a local Municipality or Regional government with circulation, where relevant, to the local Conservation Authority. Municipalities and Regions in the NEBR are required to align their Official Plan documents with Niagara Escarpment Plan (NEPlan) policies and land use designations. Where a proposed project does not conform to the NEPlan, the project may apply to the Niagara Escarpment Commission (NEC) for a NEPlan Amendment (115).

The stated purpose of the Niagara Escarpment Plan (NEPlan) is:

“To provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment.”(116)

The objective of the NEPlan is:

“To minimize the impact and further encroachment of urban growth on the Escarpment environment”(116)

The Niagara Escarpment Commission (NEC) is a form of collaborative governance, consisting of seventeen appointed members, nine of whom represent regions within the NEBR, and eight representing the general public (115). The NEC is supported by a staff who process applications for development permits and Plan Amendments, and impartially assess the degree of conformance to NEPlan policies. Staff members provide professional recommendations to the NEC, and the NEC is similarly intended to impartially apply the NEPlan to the best of their
ability and to “exemplify leadership and environmental stewardship, sustainable planning and development” in forming their decision (115).

If an application is denied by the NEC, the applicant may appeal to the Ontario Municipal Board (OMB), or a Joint Board, consisting of OMB Members and a Vice-Chair of the Environmental Review Tribunal. The appeal is intended to consider both the Niagara Escarpment Planning and Development Act (and the NEPlan) and the Provincial Planning Act, with the legislation affording the strongest environmental protection prevailing. The OMB and Joint Board have been deeply criticized over numerous decisions made in opposition to the recommendations of the NEC, which questioned the interpretation of the applicable Acts and questionable decisions that have often accepted pro-development arguments of Municipalities and property owners over those of the NEC. The majority of decisions have, however, aligned with the NEC, suggesting that the Niagara Escarpment Biosphere Reserve model has made meaningful progress toward sustainable land use planning practices when contrasted with how this region would look today, had it not been subject to geographically specific, environmental prioritizing legislation and process (117). Although meaningful progress has been made, a review of OMB appeals shows that more often than not, municipalities have taken a position supporting the private development interest in opposition to the NEC and the sustainable development policies of the NEPlan, supporting the need for the second-tier governance that the NEC provides (117).
The broad process of having a planning matter that does not comply with the Niagara Escarpment Plan approved within any region or municipality in the Niagara Escarpment UNESCO Biosphere Reserve can be simplified as:

1. **Property Owner or Municipality (Applicant)** submits an application for land use designation amendments, lot creation/severance and development to both their local municipality and the Commission for review and consideration.

2. **NIAGARA ESCARPMENT PLAN (Plan)** acts as a land use designation map for the escarpment region, specifying areas as Urban Land Use, Rural Land Use and Natural Environment Protection Areas.

3. **Municipalities** also receive and review applications from Property Owners and either provide municipal approval or rejection based on conformance with their Official Plan and the Provincial Policy Statement.

4. **NIAGARA ESCARPMENT COMMISSION STAFF** receive application from Property Owner or Municipality, evaluate applications for conformance with the Plan and provide a recommendation to the Commission for approval or rejection.

5. **NIAGARA ESCARPMENT COMMISSION (Commission) receives and reviews recommendations from Staff and either approve or reject applications.**

6. **HEARING OFFICER (appointed by the Ontario Ministry of Natural Resources from the Environmental Review Tribunal) or a Joint Commission (ERT Hearing Officer(s), and Ontario Municipal Board OMB member(s) review and either support or reject the Commission decision by interpreting and applying the Plan and reconsidering applicant arguments and those of municipal and regional/district level government.**

7. **REJECTED BY COMMISSION: the Property Owner or Municipality may abandon the application or appeal the decision.**

8. **APPROVED BY COMMISSION: Amendment is made by the Commission to the Plan (END OF PROCESS).**

9. **Hearing Officers/Joint Commission DECISION IS FINAL and can override the Commission's decision, although one precedent exists where the Commission argued a decision at the Superior Court.**

The process is illustrated in a flowchart with various decision points and stakeholders involved.
For comparison, the process of having any planning matter approved within the Georgian Bay Biosphere Reserve, including those that do not conform to a Municipality’s Official Plan or Zoning (excluding First Nations planning matters) can be simplified as:

1. Property Owner or Municipality (Applicant) submits application for land use designation amendments, lot creation/severance and development to both their local Municipality or in northern areas, directly to the District.

2. Municipalities receive and review applications from Property Owners and either provide municipal approval or rejection based on conformance with their Official Plan and the Provincial Policy Statement.

3. APPROVED BY MUNICIPALITY: Rezoning, or Official Plan Amendment is granted & development proceeds (END OF PROCESS).

4. REJECTED BY Municipality: the Property Owner may abandon the application or appeal the decision at the Ontario Municipal Board.

5. Any interest group or individual can appeal the Municipal Decision to the LIMS.
The primary differences in process between the Georgian Bay and Niagara Escarpment Biosphere Reserves are:

- The stated priority to protect the natural environment within the Niagara Escarpment and the eco-regional scaled approach and oversight that the Niagara Escarpment Plan combined with the Niagara Escarpment Commission provide for and;

- The environmental expertise provided within the government-led approach that seven established Conservation Authorities contribute to the land use planning process.

As the administrative authority for the UNESCO Biosphere Reserve designation, the Niagara Escarpment Commission also manages programs to promote sustainable tourism, research and monitoring, education and general awareness on ecology and geology of the bioregion. In 2009, the NEC adopted a policy making it possible for non-governmental conservation organizations in the NEBR to secure and establish Nature Preserves. The Nature Preserve collaborative land management designation is currently under review by MAB for inclusion in the NEBR Core area. If the NGO ownership model is accepted by UNESCO, this would represent an increase in NEBR Core area from 34 percent to 69.5 percent, with NGO land acquisition programs proving to be a highly effective means of overcoming government funding limitations and interest for expanding conservation lands (118).

Several non-governmental organizations including the Bruce Trail Conservancy (BTC), Escarpment Biosphere Conservancy (EBC), Protect Our Water and Environmental Resources (POWER), Friends of the Greenbelt and the Coalition on the Niagara Escarpment (CONE) maintain active roles in the NEBR. The mandates of NEBR NGOs vary from policy and development watchdogs, policy advocacy groups, land-trust acquisition, research/education and monitoring, outdoor enthusiast and recreation clubs (118).

**OAK RIDGES MORAINE & ROUGE NATIONAL URBAN PARK (ONTARIO)**

*(Nomination/lobbying process now underway for biosphere designation)*

The Oak Ridges Moraine, including the newly recognized Rouge National Urban Park, is an area in Ontario with a focus on achieving balance between socio-economic development and environmental conservation that is strongly supported by geographically focused Provincial legislation. The Moraine is not currently a UNESCO Biosphere Reserve; however, the University of Waterloo, in partnership with the Rouge Valley Foundation, is currently pursuing designation of the Oak Ridges Moraine as a UNESCO World Biosphere Reserve. The Rouge
Valley Foundation is seeking letters of recommendation from organizations in support of the nomination (119). Supporters seeking the UNESCO biosphere designation believe that existing land use designations, policies and governance structure in the Moraine are in full alignment with MAB Programme purpose and objectives.

The Province of Ontario’s 2001 Oak Ridges Moraine Conservation (ORMC) Act legally recognizes the Moraine as a special interest area for land use planning, where core natural areas and linkage areas are identified and strictly protected, and only those land and resource uses that ensure the protection or restoration of the Moraines ecology and hydrology will be permitted throughout the plan area. The Act relies on the Oak Ridges Moraine Plan to establish and delineate land use designations to which Plan policies apply, and to which all Municipal Official Plans must conform. Section 7 (1) clearly states that the Oak Ridges Moraine Act takes precedence over the Provincial Planning Act and the Condominium Act, and any Official Plan or By-law, in all matters including Ontario Municipal Board proceedings, thereby legally prioritizing conservation of ecosystems and hydrology in the Moraine area. This is in stark contrast to the conventional preference that exists in broader provincial policy favouring development interests over conservation (120).

Under the ORMC Act, the Minister of Municipal Affairs and Housing (MMAH) may receive applications to have a land use designations under the Conservation Plan amended (120). The Minister’s decision on proposed amendments can be appealed to the Ontario Municipal Board, which is obligated to review the matter from the viewpoint of conformance with the intent of the Oak Ridges Moraine Act and Plan (121). Note that the Niagara Escarpment Planning and Development Act was originally the responsibility of MMAH, however this was identified as a conflict of interest, and has been re-designated to the Ministry of Natural Resources.

Just as the initiative to acquire the UNESCO biosphere designation for the Oak Ridges Moraine is being driven by dedicated, persistent and well-organized community groups, so too was the initial push for a strong conservation-focused policy specific to the area that would align and guide the actions of growth-focused municipalities. After ratification of the Conservation Act in 2001, initial implementation of policies in the Act and Plan on the part of the Ministry, local Municipalities and the Ontario Municipal Board, were slow and at times questionable. The 2003 provincial election made strict application of the ORMC Act on the part of the Province and the Ontario Municipal Board a platform priority (121). Groups including the Oak Ridges Moraine Foundation, the Oak Ridges Moraine Land Trust, and Save the Oak Ridges Moraine (STORM) maintain active roles in the area, working closely with Municipalities and the Conservation Authorities Moraine Coalition in an informal oversight capacity. Their continued work includes monitoring and reviewing development and policy decisions, supporting research and education initiatives, and increasing the area of protected Moraine lands through private conservation programs (122).
Should the Moraine achieve status as a UNESCO biosphere reserve, the official administrative authority remains to be determined along with geographic extents. Presumably, non-governmental organizations would continue to play an important role in ensuring the diligent application of very hard-fought-for land use policies and legislation.

SEVERN SOUND ENVIRONMENTAL ASSOCIATION

The Severn Sound Environmental Association is an example of a self-organized, non-biosphere reserve approach to managing environmental issues. Severn Sound is local to the GBBR, with the southern portion of the GBBR extending into the Severn Sound Watershed.

Severn Sound was one of 17 Areas of Concern (AOC) identified in the Great Lakes Water Quality Agreement (GLWQA) between Canada and the United States as a degraded area, with poor ecosystem functions and water quality. In response to the AOC designation, the SSEA was formed as a collaboration between nine municipalities in the watershed, with a mandate to create a Severn Sound Remedial Action Plan (SSRAP). As a direct result of SSEA initiatives, in 2003 Severn Sound was the second AOC on the Canadian side to be delisted, with water quality and beneficial uses restored to acceptable levels (123).

The Severn Sound Environmental Association has been deemed a success in tackling water quality issues largely related to municipal waste water treatment and agricultural land use practices throughout the watershed. The SSEA is engaged in the following activities:

- Completion of the SSRAP and ongoing water resource management plans
- Habitat Assessment and Management Plans including extensive recent wetland mapping
- Sustainability Plan for Severn Sound
- Source Water Protection (both ground and surface water) in partnership with Lake Simcoe Region Conservation Authority
- Rural programs to promote Best Management Practices
- Plan Input and Review
- Public consultation and education
- Monitoring, analysis and reporting (Open water, streams beaches, groundwater, benthos, fish, habitat health and quality) (124)
The achievements and the collaborative process of the SSEA have earned recognition from higher levels of government. Under Ontario’s Clean Water Act (2006) the SSEA has partnered with Lake Simcoe Region Conservation Authority to implement Source Water Protection Plan initiatives within the Severn Sound Watershed; a role that is typically assigned to conservation authorities in other areas of Ontario.

The SSEA receives funding from donations as a registered charity and from organizations identified as partners, as well as government grant funding largely under the Government of Canada’s Great Lakes Sustainability Fund. As of 2014, the SSEA had realized more than four million dollars in direct partner funding, and over two million dollar of in-kind donations.

The majority of SSEA funding comes in the form of annual grants from member municipalities, with a second large portion contributed by the provincial source water protection grant program. Currently the SSEA maintains a full-time, year-round staff of seven, with an organizational structure allowing for co-op and summer students, interns and special contracts (125). Administrative expenditures for the SSEA in 2013 were $727,398 – a lower operating cost compared with the Niagara Escarpment Commission at first glance; however, the SSEA is not a planning approval authority with the associated costs of maintaining professional planning expertise on staff and a decision review entity (125). When invited to participate, the SSEA will review and provide comment for development, but development approval authority remains with the municipal approval, by-law and official plan process under the Provincial Planning Act administered by the Ministry of Municipal Affairs and Housing (MMAH). Note that the Niagara Escarpment Commission originally functioned under and reported to the MMAH, which was identified as a conflict of interest to the Commission’s purpose and priority of environmental protection over incompatible development, in effect, the fox running the henhouse.

Could the Severn Sound Environmental Association model be successfully applied to the Georgian Bay Biosphere Reserve?

The SSEA has maintained support with all nine municipality members by essentially not rocking the development approvals boat, and treading lightly in matters of planning and development. While the SSEA has followed through with its mandate to consult extensively with the greater community including environmental groups, no decision making authority has been granted to those groups as this would mean a reduction in municipal authority, and the SSEA is not required to consider input received from the community on the same level as municipalities. The Municipal Member (decision maker) and community Partner (welcomed participant) two-tiered system of the SSEA is in sharp contrast with the Niagara Escarpment Commission Board of 17, split with nine community representatives and eight municipal representatives with equal votes on decisions.
Unlike the Niagara Escarpment Commission, SSEA member municipalities are not legislatively required to comply with the Severn Sound Remedial Action Plan, or any specific decisions or objectives of the SSEA. A 2004 review of OMB appeals to Niagara Escarpment Commission decisions showed that in many instances, municipalities continued to align with growth and development interests over provincially mandated conservation objectives for the region, suggesting that without the associated geographically specific legislation, participating municipalities would not voluntarily have pursued sustainability principles and objectives for the region in their land use planning decisions (117).

A Joint Board of representatives from municipalities and First Nations communities in the GBBR may serve to provide eco-region-wide oversight for planning and development in the GBBR, but it would not address the inherent conflict of interest that exists when municipalities are attempting to protect the best interests of environment while under extreme pressure to expand the tax base by encouraging potentially unsustainable or incompatible growth and development.
WHAT IS NEEDED?

CONCLUSION

In order to succeed in achieving a sustainable balance between land use planning, development and ecology within the GBBR, we require a shift away from single tier governance at the municipal level to a bioregional-scaled, collaborative model that engages community groups, First Nations and Municipalities. The watersheds and ecosystems of the GBBR are a common resource, facilitating natural services that provide for the health and prosperity of all Ontarians and global citizens, and their value goes well beyond the interests of local municipalities. For long-term, continued health and prosperity, at the most basic level, each of us requires clean fresh water, clean air and strength and diversity in our food web systems. No private or commercial interest should have the right to diminish these most imperative, shared, basic necessities, and no local government should have the right to permit development or land uses that over time will degrade our shared natural ecosystems.

The present structure of governance and authority for GBBR policy and land use planning decisions is a system where each proposed policy or project is considered in a contextual vacuum. Little regard is given to cumulative or secondary outcomes that may result at scales that surpass the human-imposed property and township lines that dissect ecosystem and watershed functions. The most obvious examples of this are illustrated in Chapter Five examples, where municipal government interest abruptly ends at the shore line when a common resource such as Georgian Bay exists in place of what would otherwise be a concerned neighbouring property owner.

Too many conflicts of interest, capacity limitations and skill-set inadequacies exist in municipal government structure for it to effectively function as the primary overseer of land use policy for extremely complex and valuable GBBR ecosystems. Upper tier governments have downloaded responsibilities to lower-tiers, and slashed budgets for departments responsible for managing Ontario’s environment. OMNR is a hollow shell of its previous incarnation and incapable of reviewing and overseeing anything but the largest developments. OMNR no longer engages unless invited by a municipality or a land-owner, and even then will not comment on individual zoning amendments. Under the pressures of upper-tier governments downloading responsibilities for the provision of services and amenities, municipalities have become increasingly corporatesque in seeking growth, development charges, and expanded tax bases - typically without any on-staff qualified ecologists to provide support and guidance. Immersed in the GBBR wilderness, it is all too easy for those seeking to balance budgets on land use and development to lose perspective, in that the seeming abundance and contiguity of GBBR ecosystems are an unprecedented rarity unto themselves.
RECOMMENDATIONS

1. ESTABLISH BIOREGIONAL, SECOND-TIER, ECOLOGICALLY-PRIORITIZED GOVERNANCE FOR THE GBBR

Overcome the siloed decision making model that planning departments of GBBR municipalities currently function within, to achieve an adaptive, ecosystem-wide approach to land use planning, involving true stakeholder collaboration inclusive of First Nations, community members and non-government organizations. The table below outlines three theoretical scenarios for how second-tier governance in land use planning could be organized in the GBBR.

2. DEVELOP A COORDINATED, ECO-CENTRIC BIOREGIONAL LAND USE PLAN FOR THE GBBR

One coordinated bioregional plan for planning and development across the GBBR is needed in order to establish an understanding and respect for the GBBR watersheds and ecosystems as they pertains to land use planning and development. A bioregional plan will address special policy areas for established settlement and intensification zones and provide tailored policies by watershed. This will set overall GBBR priorities and establish benchmark criteria for balanced and sustainable decisions and identify development best-practices.

Whether or not governance changes are implemented, the process of developing a bioregional plan provides an opportunity for stakeholder engagement and independent scientific review. The Clayoquot Sound collaborative Technical Planning Committee, which became responsible for preparing watershed plans and implementing recommendations of the independent Scientific Panel, provided a model approach for engaging both science and community in bioregional land use planning (113).

3. IMPLEMENT ECO-CENTRIC GEOGRAPHICALLY SPECIFIC LEGISLATION (GSL)

Of all the biosphere’s reviewed, including those summarized in this report, only those supported by upper government legislation supporting increased priority of sustainability and environmental protection were truly successful at achieving greater balance between ecological conservation, human activity and development. Provincial legislation specific to the Georgian Bay Biosphere Reserve will provide the critical, legal basis for a coordinated bioregional plan for the GBBR, and for a shift in legal priority toward ecosystem and natural services protection.

Without geographically specific legislation, any reconfiguration or redistribution of authority and priority for land use planning will be undermined when a project is appealed to the Ontario Municipal Board, where local decisions would continue to be measured against the presiding Provincial Planning Act and Provincial Policy Statement.
4. ENCOURAGE AND NURTURE ONGOING PUBLIC AND NON-GOVERNMENTAL INVOLVEMENT IN GBBR LAND USE PLANNING

For each successful attempt at environmentally prioritized planning in Ontario, there are (generally multiple) non-governmental organizations dedicated to participating in the process, either formally or informally. These groups perform essential monitoring to ensure that municipal and Ontario Municipal Board decisions respect and are aligned with the intent of the applicable environmentally focused legislation. They ensure that plans for sustainable growth, development and environmental conservation are actually implemented.

POTENTIAL SCENARIOS: Three scenarios for improved land use planning governance for the GBBR are outlined below. Differences are compared for initial and operational funding requirements, complexity of the restructuring process, citizen + provincial vs. Municipal buy-in, and the potential for meaningful change and improvement. The scenarios are described at a purposefully conceptual level, anticipating that achieving the necessary, substantial stakeholder support will likely require some hybrid version of these scenarios, or possibly an altogether new locally-grown approach.

GEOGRAPHICALLY SPECIFIC LEGISLATION AND A BIOREGIONAL PLAN: Each of the three scenarios for organizational structure and governance assumes pairing with Geographically Specific Legislation and a Bioregional Plan for land use planning and development in the Georgian Bay Biosphere Reserve, as outlined in the above recommendations.

A | AMALGAMATION: Existing townships amalgamate into a single, coordinated municipal government for the eastern coast of Georgian Bay, or possibly into two municipalities - one for the urban Town of Parry Sound and potentially McDougall Township, and one for the remaining more rural coastal communities. The resulting one or two municipalities would align Official Plan(s) with Geographically Specific Legislation (GSL), regulated by a ministry of the Province. Provincial planning decisions may be appealed to the Ontario Municipal Board, to be reviewed for conformance with the GSL. Non-governmental community organizations would function in an informal oversight role, monitoring implementation and application of the GSL.

Precedent: Amalgamation generally seeks efficiencies in municipal services and staffing, however evidence suggests that this often is not the outcome for rural communities - no known precedents based on environmental policy interests and alignment (126).
COST/BENEFIT: ANTICIPATED COST (MEDIUM), ANTICIPATED EFFECTIVENESS (MEDIUM)

Pros: This would serve to coordinate land use planning policies and approaches across the Eastern Georgian Bay region with the GSL providing consistent land use policies for the GBBR, while allowing for special policy areas by community as is typical within existing Official Plans.

Within this framework, municipal government may begin to consider all decisions from a watershed/ecosystem perspective.

Cons: Amalgamation was attempted in 2000-2001 when the Township of Georgian Bay applied for amalgamation with the Archipelago Township, citing aligned environmental priorities and coastal locations. Muskoka District opposed the amalgamation as it would have required that the Township of Georgian Bay be released from the District, and the application was eventually suspended its application “until such time as the Province of Ontario expresses a willingness to consider our restructuring” (82).

Amalgamation does not address the fundamental issue of municipal conflict of interest with regard to environmental matters and development.

This change in governance structure would not engage community organizations or First Nations in GBBR land use planning and development decisions.

B | BIOREGIONAL CONSERVATION AUTHORITY OR JOINT PLANNING BOARD: Municipal configuration remains unchanged. Municipalities within the GBBR collectively support creation of a Bioregional Conservation Authority with a mandate to review all development applications for conformance with provincial geographically specific legislation (GSL). Municipalities align Official Plans with GSL, regulated by a provincial ministry. Provincial decisions may be appealed to the Ontario Municipal Board, to be reviewed for conformance with the GSL. Non-governmental community organizations function in an informal oversight role, monitoring implementation of GSL. (Precedent: Majority of Ontario Municipalities have a Conservation Authority + the Oak Ridges Moraine)

COST/BENEFIT: ANTICIPATED COST (MEDIUM), ANTICIPATED EFFECTIVENESS (HIGH)

Pros: Maintaining the current municipal configuration is potentially most realistic as there is currently no Provincial mandate for further amalgamation.
A Bioregional Conservation Authority could be given a mandate by municipalities to review development applications from an ecosystems and watershed perspective to ensure conformance of policy and development applications with a Bioregional Plan.

This would be the appropriate agency to manage and oversee compliance with sustainable land use and development policies.

A Conservation Authority would elevate the GBBR to the typical standard for municipal planning in effect throughout southern Ontario. Combined with a Bioregional Plan and GSL for sustainable and balanced land use planning, the CA would provide the guidance and legal authority necessary to align land use planning with MAB Programme objectives and sustainable planning best practices.

Cons: The addition of a Conservation Authority would address the need for engagement with community organizations or First Nations in GBBR land use planning and development decisions.

This scenario requires that affected municipalities lead the reform process, advocating and supporting collaboration between municipalities, and supporting a partial shift in planning related decision making authority to the Conservation Authority.
C | COLLABORATIVE BIOREGIONAL PLANNING BOARD: Government of Ontario legislates authority to a Collaborative Bioregional Planning Board for municipal planning matters in the GBBR to ensure conformance with a Bioregional Plan and GSL, focused on achieving a sustainable balance of growth and development with protection of ecosystems and natural services. Comprised of representatives from each Municipality, each First Nation community and matched representation from environmental scientists and the GB5 non-governmental organizations. Collaborative Bioregional Planning Board decisions may be appealed to the Ontario Municipal Board, to be reviewed for conformance with the GSL. Non-governmental community organizations continue to function in an informal oversight role, monitoring implementation of the GSL.

(Precedent: Niagara Escarpment Commission & Clayoquot Sound Technical Planning Committee)

COST/BENEFIT: ANTICIPATED COST (MEDIUM-HIGH), ANTICIPATED EFFECTIVENESS (HIGH+INCLUSIVE)

Pros: A Collaborative Bioregional Planning Board could achieve coordination and collaboration between GBBR municipalities in their approaches to land use planning.

This change in governance structure would provide a mechanism to engage First Nations and community organizations in the planning process, and the potential to transfer a meaningful amount of decision making influence and authority from municipalities, to these stakeholders.

This would provide the potential to build in opportunities to engage with the scientific community on specific initiatives or planning applications and to have on-staff ecologist(s) and planner(s) providing consist, qualified oversight to planning processes across the GBBR.

Cons: This represents a simplified version of the Niagara Escarpment Commission, which has proven to be a reasonably effective yet fairly expensive model of governance for land use planning with environmental conservation as a priority. The existence of fewer municipal and First Nations communities to represent, and a much lower number and intensity of developments, should drive correspondingly lower operational costs for the GBBR.
**NEXT STEPS:** The Government of Ontario is notoriously reluctant to intercede in municipal planning affairs, yet has increasingly done so over the past ten to fifteen years in response to electoral pressure to protect the province’s ecological and agricultural land assets. Provincial interventions in the form of geographically specific legislation have occurred only as the result of persistent lobbying by well-organized community groups (121). Examples of this include the Niagara Escarpment Planning and Development Act, the Oak Ridges Moraine Conservation Act, Places to Grow Act and the Ontario Greenbelt Act, and now the present lobbying for an Oak Ridges Moraine and Rouge National Urban Park UNESCO Biosphere Reserve designation.

Based on all precedents reviewed, the push for reforms to legislation and governance structure must be driven by organized and unified, non-governmental entities. Lobbying for change in government structure and legislation is a marathon process, which can quickly become unreasonably expensive if not well planned and timed to a sympathetic (and ideally majority) provincial government. In the number of citizens represented, and the strong research base that exists within their collective membership, the GB5 group of non-governmental organizations are well positioned to begin this process compared with other organizations that have ushered in past environmentally prioritized planning systems in Ontario. More than sufficient quantity and quality of research and data on the importance of the GBBR, inventory of areas of ecological importance and priority already exist to begin to prepare for this next step.

Too often, organizations with an ecological, environmental or conservation focus remain removed from political and land use planning processes. There are valid reasons for this, such as maintaining charitable status by not engaging in advocacy activities, and wishing to remain neutral in order to not strain relationships within the membership base or the greater community. This becomes problematic when individuals or groups disengage from policy and planning discussions due to perceived, irresolvable, opposing priorities/beliefs/approaches, or unwillingness to compromise. The GB5 organizations share a strong focus on Georgian Bay’s natural environment as well as noticeable crossover in membership bases. Beyond advocacy vs. non advocacy policies, a significant limitation to what could be an incredibly powerful collaboration in governance and land use planning, may come down to nuances in the philosophical camps of each of the GB5. Considering, for example, Georgian Bay Forever’s separation from the Georgian Bay Association for advocacy vs. non advocacy reasons, it is possible that members with more academic, activist tendencies in the Environmentalist philosophical camp may gravitate toward participation in the research focused organization. Similarly, those in the Conservationist philosophical camp, being more sympathetic to compromise with human activity and other land uses, may gravitate toward participating in the organization with an advocacy mandate (127). The GB5 have an impressive history of cooperation and commitment to shared goals, but without a mandate and plan for collaboration, balkanization might easily take hold, limiting the potential of future successes.
Traditional planning practices present a shared environmental problem for all stakeholders in the GBBR. It will require pragmatism, cooperation, deep commitment and a willingness to compromise, and most importantly - political will, to address this problem. The Georgian Bay Biosphere Reserve is a truly unique place on this earth. It is well-deserving of the level of protection not presently provided by current land use planning policies and governance.
International agreements including the 1971 Seville Convention, under which the UNESCO Man and Biosphere Programme exists, and the 1972 Great Lakes Water Quality Agreement (GLWQA) between Canada and the United States are two examples which underscore the global significance of protecting the ecological integrity and meeting the intent of the UNESCO GBBR designation (128)(129). With functional land use planning governance, the GBBR designation has the potential to contribute to the global commitments of the Canadian Federal Government under several international agreements protecting biodiversity, freshwater and the environment including:

- 1971 United Nations Ramsar Convention
- 1916 Migratory Bird Protection Convention
- 1980 World Conservation Strategy

THE CANADA/UNITED STATES GREAT LAKES WATER QUALITY AGREEMENT (GLWQA)

Responsibility: The International Joint Commission (IJC), advised by the Great Lakes Water Quality Board (GLWQB)

The GLWQA is the most influential and substantial international agreement addressing threats facing the GBBR. In the most recent, 2012 reaffirmed agreement, additional annexes have added scope and objectives for both nations to pursue. The current list of annexes (challenges and issues to address) are:

1) Areas of Concern (poor water quality hot spots – of the original 43, only three have been removed to date, including Severn Sound)

2) Lake-wide Management (Great Lake-specific near-shore management plans)

3) Chemicals of Mutual Concern
4) Nutrients
5) Discharge from Vessels
6) Aquatic Invasive Species
7) Habitat and Species (ecosystem services and biodiversity)
8) Groundwater
9) Climate Change Impacts
10) Science (research)

Annexes 6, 7 and 9 were added in 2012, identifying a mandate to address the threats of aquatic invasive species, loss of habitat and species and climate change impacts.

Of the six top threats facing the GBBR identified herein, four (highlighted above) are directly identified in the GLWQA as applying to the Great Lakes overall with a commitment from both national governments to act (38)(39)(130). Incompatible human use as a fifth threat is indirectly addressed in GLWQA Annex 7, Habitat and Species (130).

Generally, implementation of the GLWQA falls to the provinces, states and local municipalities. The Canada Ontario Agreement has been helpful in clarifying the province’s role with implementation (131).

**GBBR Gaps:** While new areas of focus have been added to the 2012 GLWQA, much has also been lost including the goal to achieve ‘virtual’ elimination of harmful chemical pollutants. Ongoing issues remain with designation of responsibilities for implementation of the agreement, setting targets and committing funding (131).

**KEY FEDERAL ENTITIES**

**ENVIRONMENT CANADA**

*Responsibility:* Minister of the Environment

Several acts and agreements relevant to sustainable planning, conservation and development in the GBBR are regulate by Environment Canada including: the Canadian Environmental Protection Act (CEPA), Environmental Assessment and Enforcement Acts, Species at Risk Act, Migratory Birds Convention Act, the Canada Wildlife Act and sections of the Fisheries Act relating to water pollution. Environment Canada at a macro level, is responsible for mitigating climate change, environmental monitoring, implementation of the Environmental Assessment
Act, and for developing the Federal Sustainable Development Strategy document (132).

**GBBR Gaps: In a 2014 report, the Commissioner of Environment and Sustainable Development identified numerous shortcomings with Environment Canada meeting departmental responsibilities including (133):**

1. *Canada is not on track to meet its emissions reduction targets and key stakeholders, including two major government committees that haven’t met in three years.*

2. *Canada does not have a comprehensive monitoring program for environmental threats, including the Oil Sands as an example, where over two thirds of monitoring activities are undertaken by industries themselves and key environmental areas including ground water and wetlands are not being adequately monitored.*

3. *Environment Canada rationale to identify which projects should be subject to environmental assessment, and how decisions on those that are have been reached is ambiguous and inconsistent.*

**DEPARTMENT OF FISHERIES AND OCEANS CANADA (DFO)**

*Responsibility: Minister of Fisheries and Oceans*

The stated vision of DFO is to “advance sustainable aquatic ecosystems and support safe and secure Canadian waters while fostering economic prosperity across maritime sectors and fisheries” (134).

DFO is responsible for implementation of the Fisheries Act; prohibiting activities that would result in serious harm to fish that are part of a recognized commercial, recreational or aboriginal fishery (134).

**GBBR Gaps: under revisions to the Fisheries Act over recent years, DFO gained the highly controversial authority to issue exemptions, permitting activities that will cause harm to fish populations& overall protections for fish populations and most notably fish habitat were greatly degraded (135).**

**PARKS CANADA**

*Responsibility: Minister of the Environment*

Georgian Bay Islands National Park (GBINP), including 63 islands, shoals and the world renowned Beausoleil Island contribute 14 square kilometers to the GBBR core protected area.
The 2010 GBINP Plan identifies a need for ongoing protection of habitat, species and the archetypal landscape balanced with a goal to increase visitor numbers (136).

**GBBR Gaps**: A fundamental conflict exists in the GBINP and Canada’s National Parks in general, where the Federal Government strives to increase user-fee based revenues to offset the cost of park management while reducing National Parks dedicated budgets. Over the last five years, National Parks total budgets have been cut by more than 12 percent ($364 million), contributing to $11.5 million in maintenance deferrals (137). Inevitably, as more visitors are attracted to the GBINP, heavier use will require greater management efforts to maintain the quality and integrity of natural habitat and ecosystem services.

**KEY FEDERAL ACTS AND AGREEMENTS**

No existing legislation directly addresses the status or management of Biosphere Reserves in Canada, however the following statues are relevant in that they contribute generally to environmental protection, planning and development at the national level:

**CANADA ENVIRONMENTAL PROTECTION ACT (CEPA)**

*Responsibility: Ministry of Environment and Ministry of Health*

The stated purpose of the Canada Environmental Protection Act is to:

> “Protect the environment, and the health and well-being of Canadians”

CEPA is the main legislation monitoring and protecting Canadians from dangerous toxic substances, including their release into the environment. The Act works on a risk-based model, where listed chemicals controlled under the Act must be deemed ‘CEPA-toxic’ through a lengthy nomination and review process, when there is a known or likely risk to human or environmental health at the levels being released. CEPA works toward assessment and protection from existing and new toxic substances with the objective of preventing or minimizing impacts to the environment or human health from: marine pollution, vehicle/equipment emissions, fuels, hazardous wastes and environmental emergencies including accidental spills (138).

**GBBR Gaps**: The Canadian Environmental Law Association has identified numerous gaps in regulation of toxic substances under the Environmental Protection Act including (48):

The process for having a substance qualify as CEPA-toxic has been criticized as far too lengthy and far too limited in scope, where substantial research must exist to prove that the substance is highly harmful to human health or the environment rather than requiring manufacturers or users of the substances to provide reputable research proving that the substance is not harmful.
. Certain types of toxicity with less direct, known long-term or little understood harmful effects are not considered within the process, including micro-materials and reproductive/genetic disruptors.

. Substances that are both persistent and bio-accumulative yet do not have research proving an imminent threat to human health or the environment; do not qualify as CEPA Toxic.

. Other jurisdictions recognize toxicity at much lower levels than CEPA Toxic Regulation.

**FISHERIES ACT (FA)**

Responsibility: Department and Minister of Fisheries and Oceans

The Fisheries Act (FA) enables higher fines and more stringent regulation on the release of CEPA-Toxic substances where their release is proven harmful to species of fish on which commercial, First Nations and recreational fisheries rely (139). The FA was once the strongest piece of legislation relied on by Environment Canada to protect water bodies from toxic spills, sedimentation, alteration and dumping (135).

**GBBR Gaps:** Over recent years, the Federal Government has regrettively revised the Act to the point where it now applies specifically to fish species (not habitat) and there must have been proven harm to those species. In 2012, the Act was amended to give cabinet members and the Minister of Fisheries and Oceans the power to make regulations that exempt certain sources and instances of deleterious substance release. The Canadian Environmental Law Association (CELA) has described these changes as “ambiguous... ill-conceived and highly objectionable” (135).

**PROVINCIAL ENTITIES**

**CONSERVATION AUTHORITIES**

Ontario’s Conservation Authorities Act (1991) (CAA) enables the creation of a watershed-based natural resource management agency, representing groupings of municipalities on matters of natural hazard management and environmental protection. While the GBBR is not covered by
a Conservation Authority, this is not the norm. Currently, 36 CAs exist in Ontario, with over 90 percent of the provincial population residing within an area regulated by a Conservation Authority (140).

Conservation Authorities function as corporate bodies under the Act, guided by a board of directors made up of representatives from member municipalities and assuming the role of natural resource management which is otherwise divided between municipalities and the Province without a watershed-scaled perspective (141).

In land use planning, CAs often act in an advisory role for municipalities, working to minimize unnecessary delays to the planning approval process while ensuring that watershed best-management practices, stewardship and environmental protection objectives are met and are in alignment with the Provincial Planning Act and Policy Statement. This often involves review of development and planning applications and assessment for environmental impacts at both the local and watershed level. In matters of protection of public safety from natural hazards, CAs have been delegated authority by the Province (Planning Act section 3(1) and appendix (1)), whereas in matters of environmental stewardship CAs work to satisfy the express mandates of their represented municipalities (140).

Conservation Authorities also act as land owners, accumulating lands of existing or potential ecosystem value through mandatory land dedication requirements under the development approval processes.

**GBBR Gaps:** The Severn Sound Environmental Association (SSEA) has assumed some tasks typical of a Conservation Authority within the southern-most limits of the GBBR, including water quality monitoring and remedial programs, and wetland mapping; however most of the GBBR remains without any regional or watershed scaled environmental review body.

The lack of a CA within the GBBR has created a void of environmental vision and expertise in land use planning matters and most disturbingly, within the development approval review process. Where many municipalities have a mandate to acquire, manage, monitor and protect natural areas that are essential to maintaining the watershed’s ecological services though mandatory land dedication requirements during development approvals, this role is not effectively fulfilled in the GBBR. At best, it is a patchwork approach based on voluntary, philanthropic dedications to non-governmental land trusts.
In order for a Conservation Authority to come into existence, local municipalities must recognize the value of a watershed-wide approach to natural resource and environmental management, and agree to long-term collaboration between participating municipalities and the conservation authority on relevant matters. Conservation Authorities are created through application to the Ontario Ministry of Natural Resources and Forestry (OMNR) by willing, participating municipalities. Once designated, the environmental stewardship, monitoring and preservation roles of Conservation Authorities vary widely between agencies as each CA’s mandate is determined by its partner municipalities.

ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY (OMNR)

The OMNR is active in the GBBR with a district office located in the town of Parry Sound. The Ministry of Natural Resources manages Ontario’s natural resources, provincial crown land, Ontario Parks and protected areas, forests, waters, fish and wildlife, aggregates, salt, oil and gas. OMNR has the complex mandate to both protect the province’s natural areas and promote the resource sector; reviewing and issuing permits for aggregate and forestry resources (logging & quarry activities for example) (142).

In the absence of a Conservation Authority, OMNR provides technical advisory support for municipalities, reviewing development applications for adherence to natural hazard related policy statements outlined in the Planning Act (section 3.1).

GBBR Gaps: In order for OMNR to be included in most development application review processes, either the development applicant or the municipality must specifically request their involvement. When OMNR is active in the development application process, their involvement is specific to the protection of property and human health and safety from natural hazards, and does not extend to the environmental stewardship role attributed to most Conservation Authorities.

In recent years, OMNR has shifted to a broader landscape approach to natural resource management. The Environmental Commissioner of Ontario (ECO) has expressed concern that while a landscape approach would ideally result in a more inclusive, watershed-scaled consideration for ecosystem services, it seems that the OMNR may be using the new Framework primarily to trim costs, increase incidents of deregulation and sub-contracting (142). Criticisms outlined by the ECO suggest that OMNR does not have the funding or appetite to assume additional regulatory responsibilities (142).

Approximately 87 percent of Ontario’s land is publicly held and managed by the OMNR. Unless otherwise protected as a provincial park or conservation area, public lands are not necessarily to remain publicly held in perpetuity. The OMNR has a mandate to support the disposition of public lands to private land ownership, where applications align with the Ministry’s vision for sustainable development, land and natural resource management. While much of the land in the GBBR is
crown land, these areas do not qualify as Core areas of the GBBR, but rather transitional areas due to OMNR’s ability to grant permits for the harvesting or mining of natural resources and to dispose of public lands into private ownership for appropriate development purposes (143).

ONTARIO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (OMOE)

The OMOE administers and enforces much of Ontario’s environmental regulatory framework, often acting in an oversight role for activities that OMNR manages and monitors. OMOE is responsible for the abatement and enforcement of activities in order to achieve compliance with several environmental regulations including: the Environmental Assessment Act (EAA), Environmental Protection Act (EPA), Ontario Water Resources Act and the Safe Drinking Water Act.

The Ministry of Environment’s main responsibilities specific to land use planning include administration of the Environmental Assessment Act (EAA), overseeing planning adherence to environmental considerations outlined within the Provincial Policy Statement, and receiving comments and applications for investigation to the Environmental Registry under the Environmental Bill of Rights, 1993 (EBR).

As they pertain to addressing the top threats facing the GBBR, OMOE is responsible for regulating water quality and harmful substances in the Great Lakes Basin as a partner in the Canada Ontario Agreement, and will also be responsible for administration of the Great Lakes Protection Act if ratified.

GBBR Gaps: The Environmental Commissioner of Ontario has identified the activities of both OMOE and OMNR over the past twenty years as the continual de-evolution of a sustainable vision for Ontario’s natural areas. ECO notes that the wildlife monitoring role of OMNR is now essentially non-existent, while management and oversight of Crown forests has followed a trend of deregulation and loss of focus on what were once the primary goals for maintenance of biodiversity and ecosystem integrity (142).

As one example of the OMOE and OMNR relationship, the OMOE maintains an oversight role for OMNR management of Crown forests under the Environmental Assessment Act (EAA). In 2003, both OMOE’s oversight role and OMNR’s management role in forestry management were dramatically reduced along with more than 50 percent of the 1994 negotiated terms and conditions that OMNR is responsible for ensuring that logging companies meet. The 1994 Crown Forest Sustainability Act from which the original 115 conditions of which 55 now remain was considered to be a sophisticated vision to maintain Ontario’s public forest ecosystems and the biodiversity that they hold (142).
ONTARIO PARKS

Responsibility: Ontario Ministry of Natural Resources and Forestry (OMNR)

Under the Provincial Parks and Conservation Reserves Act (2006), Ontario Parks manages 51,246 hectares of provincial parks and nature reserves within the designated Core Area of the GBBR and 39,594 hectares of provincial conservation reserves within the transition area (23).

Ontario’s Living Legacy Land Use Strategy (1999) resulted in the creation of 378 new parks and protected areas, totaling 12 percent of Ontario’s land area, as recommended by the United Nation’s standard for protected land (144). Since this time, there has been little appetite for the protection of additional provincial lands, which can be seen in the unchanged size of core and transition areas of the GBBR from its initial designation to the 2014 Study for Periodic Review (23).

GBBR Gaps: While the first priority by law for Ontario’s protected Parks and Nature Reserves is ecological integrity, the OMNR has been deeply criticized for often directing Ontario Parks to seek a balance when managing these areas, where ecological integrity should by legal definition be prioritized in guiding decisions (145).

PROVINCIAL ACTS AND AGREEMENTS

CANADA ONTARIO AGREEMENT

Responsibility: Environment Canada & Ontario Ministry of Environment and Climate Change

The Canada Ontario Agreement (COA) on Great Lakes Water Quality and Ecosystem Health Guides cooperative and coordinated efforts between Canada and Ontario in meeting commitments made under the Canada/United States Great Lakes Water Quality Agreement (GLWQA), managed by the International Joint Commission (IJC).

Ten of fourteen annexes outlined in the COA align with the 10 GLWQA Annexes, while four additional annexes speak to engaging communities, first nations and Métis and to promoting innovation (146).

GBBR Gaps: The Canada Ontario Agreement’s approach to harmful pollutants has been criticized as an end of pipe, reactive response, rather than a full life preventative approach; where both Canada and Ontario should be focusing on preventing the production and use of harmful substances rather than their illegal and inappropriate application and disposal. Further criticisms of the COA have highlighted major shortcomings including; chronically insufficient funding, an unwillingness to set meaningful, measurable targets, the inability to respond quickly to new and emerging substances, and the lack of a bio-monitoring program to assess improvements or regressions in Great Lakes health (147).
Under the current approach with the Canadian Environmental Protection Act (CEPA), Fisheries Act (FA) and the Canada Ontario Agreement (COA), it’s likely that most instances of illegal polluting of harmful substances in the Georgian Bay Biosphere Reserve would either go unnoticed or un-prosecuted. Water quality testing is relatively limited in the number and locations of areas that are regularly tested, testing frequency and the substances that are tested for. In the case of one-off or sporadic pollution, the probability of identifying and proving the source is low. Where land use type and associated application or use of harmful substances is ongoing and regular, proving the source of certain substances in an area of lake water would generally require a permanent water quality monitoring station, the cost of which has made their use rare in both public and private research and monitoring programs (148).

GREAT LAKES PROTECTION ACT (GLPA) (2015)

Responsibility: (Ontario) Minister of Environment and Climate Chang

Various versions of the Great Lakes Protection Act have been tabled over recent years, with the current Bill 66 version ratified on October 7, 2015 (149).

The stated purposes of the GLPA are (149):

- “to protect and restore the ecological health of the Great Lakes-St. Lawrence River Basin; and

- to create opportunities for individuals and communities to become involved in the protection and restoration of the ecological health of the Great Lakes-St. Lawrence River Basin.”

The Great Lakes Protection Act is a framework to implement the Great Lakes Strategy, through which the province can establish and allocate funding, form collaborations with community groups and delegate responsibility for implementation and oversight to public bodies (municipality, conservation authority, region etc.) to address protection and restoration of Great Lakes ecosystems.

Although the GLPA is a stand-alone piece of legislation for the purpose of implementing the Ontario Great Lakes Strategy; it is aligned with, and supportive of, several Annexes in the Canada Ontario Agreement (COA) on Great Lakes Water Quality and Ecosystem Health and with the Canada-United States Agreement.

Under the Great Lakes Protection Act, the Province can direct public bodies to develop
geographically-focused initiatives (GFI) to address Great Lakes Basin issues within their localities. A GFI must contain a policy or recommendation that would have legal effect under the Bill. In the event that a conflict occurs with an activity in the GFI area that would otherwise fall under the Planning Act or the Condominium Act (1998), the GFI designated policy would prevail over an Official Plan and the Planning Act (149).

This Act and the regionally specific Niagara Escarpment Act are now the two pieces of legislation with the potential authority to prioritize preservation and restoration of the natural environment above that of development. Geographically focused initiatives may prove to be a valuable tool for the GBBR in pursuit of the MAB Programme objective to achieve balance between environment and humans.

**GBBR Gaps:** The GBBR would remain at a marked disadvantage when compared to other regions, in not having a regional, environmentally competent and focused public body, such as a conservation authority to represent the goals of the GLPA and guide the identification, implementation and oversight of GFIs.

Identification of clear, measurable targets has not been included in the GLPA at this time, and dedication of Canadian funding for implementation of GFIs is limited when compared with efforts being made by U.S. state level governments (149).

At the Provincial level, development and planning within the Georgian Bay Biosphere Reserve as is typical in other regions, is guided by the Provincial Planning Act (PPA) (2011) under the Ministry of Municipal Affairs and Housing and in Parry Sound District additionally by the Places to Grow Act (2005) by way of the approved Growth Plan for Northern Ontario (version 2011).

**ENVIRONMENTAL BILL OF RIGHTS (EBR) 1993**

*Responsibility: Ministry of Environment and Climate Change and Environmental Commissioner of Ontario*

The Environmental Bill of Rights legislates that Ontarians have the legal right to know of and have a say in decisions made by the Ontario Government that will have an impact on the environment. Under the EBR, government ministries publish information on environmentally significant proposals to the Environmental Registry. Ontarians can submit comments on these proposals which ministries are intended to consider. If Ontarians believe that an individual or entity is breaking an environmental act, they can apply to the Ministry of Environment to have the activity investigated (150)(151).
GBBR Gaps: Multiple occasions where Ontarians have applied to OMOE to have an issue or decision investigated by ECO have been identified, where OMOE has denied the application and investigation, and where ECO disagrees substantially with the rationale or grounds for denial. The ECO believes that OMOE should be making better use of their third party review and watchdog role, in order to affirm transparency and the EBR right for Ontarians to have a say in decisions and activities impacting the environment (142).

GROWTH PLAN FOR NORTHERN ONTARIO (VERSION 2011).

The most northern section of the GBBR, in the French River Township falls within the limits for the Growth Plan for Northern Ontario (GPNO).

GBBR Gaps: The Georgian Bay Biosphere is not mentioned or acknowledged as a significant area, or for any level of special consideration.

Generally, the GPNO appears to take a much less ambitious approach to protection of the natural environment in planning and development than the PPA. Throughout section 6.0 Environment of the GPNO; language used is passive and non-committal, including phrases beginning with “are encouraged to contribute to the protection of”, “should consider opportunities for” and “should identify objectives toward” consistently used throughout (152 pp. 36-39). In comparison to the Provincial Planning Act the Growth Plan for Northern Ontario has clearly placed development and growth objectives above protection of natural ecology and ecological functions.

ONTARIO WATER RESOURCES ACT (OWRA) 1990 V. 2011

Responsibility: Ministry of Environment and Climate Change

The OWRA speaks to protecting surface and ground water as a source water, for human and industrial consumption. The Act regulates municipal water services, well creation and abandonment, waste water treatment and disposal and prohibits or regulates the release of polluting substances with the potential to degrade water quality (153).

The OWRA also issues and manages permits to take volumes of water greater than 50,000 liters per day, providing OMOE with the opportunity to gather information and monitor the potential collective impact of industry and commercial water consumption on ecosystems (153).
GBBR Gaps: The Environmental Commissioner notes concern with a lack of clarification in the way that OMOE will implement the Act’s ecosystem protection provisions as well as ambiguity in the extent to which the permit applicant is responsible for providing environmental assessment information. The 50,000 liters per day threshold is thought to exclude numerous significant water takings which could contribute to stress on watershed ecosystems (154).

NUTRIENT MANAGEMENT ACT (NMA) 2002 V. 2009

Responsibility: Ministry of Environment and Climate Change

The Nutrient Management Act regulates agricultural fertilizer application and primarily, manure management best practices. Sections of the Act pertaining to cage aquaculture practices have considerable relevance for the GBBR (155).

GBBR Gaps: The Georgian Bay Association has long-advocated for the potential impacts of nutrient loading from GBBR aquaculture operations to be studied and considered for their combined and cumulative effects on natural ecosystems (156).

PESTICIDES ACT 1990 V. 2009

Responsibility: Ministry of Environment and Climate Change

Many pesticides are bio-accumulative in the environment, or persist for a very long time before break-down or mineralization occurs. Many have known harmful effects on human and/or environmental health and some are water soluble, moving easily through soils with rain and irrigation waters toward ground or surface water bodies. The Ontario Pesticides Act regulates the use and sale of pesticides in the agricultural industry, including cage aquaculture operations, and bans the use and sale of pesticides for cosmetic purposes toward protecting human and environmental health (157).

GBBR Gaps: Certain industries including golf courses and horticultural nurseries remain exempt from the Cosmetic Pesticides Ban under the Pesticide Act, while these land uses are often located within flood plains, with minimum setbacks to water bodies (157).


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By Kendall Flower

ISBN 978-0-9950159-0-6

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