



PROTECTING THE LAKE OF SHINING WATERS

The need to establish a National Marine Conservation Area in Lake Ontario

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Acronyms and Abbreviations

A2A	Algonquin to Adirondacks
AIS	Aquatic Invasive Species
ANSI	Area of Natural and Scientific Interest
CHP	Community Hatchery Program
DFO	Fisheries and Oceans Canada
FMZ20	Fisheries Management Zone 20
GLWQA	Great Lakes Water Quality Agreement
HEV	High Ecological Value
IUCN	International Union for Conservation of Nature
LAMP	Lakewide Action Management Plan
MECP	Ministry of Environment, Conservation and Parks
MPA	Marine Protected Area
NDMNRF	Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry
NMCA	National Marine Conservation Area
NOAA	National Oceanic and Atmospheric Administration
NWA	National Wildlife Area
OFAH	Ontario Federation of Anglers and Hunters
PEC	Prince Edward County
SAR	Species at Risk
SARA	Species at Risk Act

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Executive Summary

Protecting the Great Lakes for future generations is an important part of Canada's path to protecting 25% of land and freshwater by 2025. The North American Great Lakes are a stronghold for biodiversity in Southern Canada where nature is most vulnerable and at-risk. The federal government has committed to protecting a quarter of the country's land and waters in the next three years, and 30% by 2030. This is a crucial part of a wider commitment by Canada to halt and reverse nature loss by 2030 and put nature on a path to full recovery by 2050. The Great Lakes must be part of this national effort, as protections are currently lacking for the Canadian waters of the Great Lakes, with only two National Marine Conservation Areas (NMCAs) established as of 2022.

Parks Canada has a goal to protect each of Canada's distinct marine ecoregions with an NMCA, and Lake Ontario should be among the next in line. Millions of people in Canada and the U.S. rely on the lake for drinking water, recreation, and other uses. The Eastern basin is particularly rich in biodiversity and contains critical habitat that provides a host of ecosystem services for plants, wildlife, and people alike. First Nation communities that first settled along the northern shore of Lake Ontario have deep ties to the lands and waters that have supported them since time immemorial and continue to do so today. Consequently, the Great Lakes Region is hugely significant to Canada's cultural and natural heritage.

With species in free fall across Canada and around the world, this is a critical time for the protection of nature. Actions taken over the next few years will influence the future of biodiversity in Canada. It's time to better protect the Great Lakes, starting in Lake Ontario.

The launch of a feasibility assessment by Parks Canada, in close collaboration with the Government of Ontario, is the next necessary step to establish an NMCA in Lake Ontario's Eastern basin. Protecting this culturally rich area and the rare habitat and species within is key to enhancing ecosystem resilience and helping to meet the federal government's conservation targets while ensuring the long-term stewardship of the Great Lakes for generations to come.



Main Duck Island, John Brebner

Introduction

The Great Lakes are one of Canada’s most treasured and valuable natural resources, forming one of the world’s largest freshwater ecosystems, holding 21% of the world’s freshwater supply and 84% of North America’s. ¹ The biodiversity found throughout these ecosystems is unparalleled, containing diverse aquatic, forest, marsh, wetland, and dune habitat that is home to 4,000 species of plants and animals, some of which are found nowhere else in the world.

Indigenous peoples have called the Great Lakes Region home since time immemorial, and developed a deep relationship with the lands and waters they continue to rely on for hunting, fishing, and trapping. The lakes are a historic landmark with great cultural significance that continues to support communities across North America. In the Wyandot language, Ontario means “lake of shining waters”, and First Nation peoples were the first to inhabit this region.

Today, millions of people across Canada and the U.S. depend on the lakes for many uses including transportation, power, recreation, and drinking water. These ecosystems are an enormous asset to the regional and national economy, and support livelihoods across the region. ⁵ Protecting the Great Lakes is necessary to ensure these resilient ecosystems can continue to sustain a diversity of life and provide benefits to future generations.

50 Years of Bi-national Cooperation for The Great Lakes

Because of the critical role the Great Lakes play in North America, there is a long history of cooperation in their management. The Great Lakes Water Quality Agreement (GLWQA) was first signed in 1972 to coordinate the actions of Canada and the United States (U.S.) on Great Lakes protections. Initially focused on reducing algae and nutrient inputs that caused degradation to the lakes, the agreement has since evolved to reflect the priorities and actions needed to restore and maintain the chemical, physical, and biological integrity of the Waters of the Great Lakes.⁶

For fifty years, the GLWQA has guided the bi-national management of the Great Lakes and served as a model for water quality protection across the world's large lakes. Amendments to the agreement in 2012 outlined nine objectives to strengthen the GLWQA, including to "Support healthy and productive wetlands and other habitats to sustain resilient populations of native species" and "Be free from other substances, materials or conditions that may negatively impact the chemical, physical or biological integrity of the waters of the Great Lakes."⁷

Despite the progress that has been made over the past 50 years under the GLWQA, many anthropogenic factors like pollution, habitat loss, and climate change continue to threaten the health of the Great Lakes. Freshwater ecosystems are home to a higher proportion of threatened and endangered species than marine or terrestrial systems, yet they are the least considered or incorporated within protected areas planning.⁸

Protected areas are lacking throughout the Great Lakes, but most notably in the lower Great Lakes. Lake Ontario is home to a vast array of native species and species at risk, yet no protected areas meeting the International Union for Conservation of Nature (IUCN) criteria have been established for its waters or lakebed.⁹ There are also few examples of contiguous protections between lands and lakes, with the coastal boundary of terrestrial protected areas often stopping at the water's edge. Protections not classified under IUCN criteria are important for raising awareness, but establishing formalized protected areas will guarantee the effective long-term conservation of the Great Lakes.

Parks Canada has committed to protecting each of Canada's 29 distinct marine ecoregions through the establishment of National Marine Conservation Areas (NMCAs). In this framework, each of the Great Lakes, as well as Georgian Bay, represent a marine ecoregion in need of protection. NMCAs work to achieve ecological sustainability for the protection and long-term conservation of nature, while providing benefits to the people and communities that live in and visit the region.

Establishment and Management of NMCAs in the Great Lakes

NMCAs play a key role in protecting habitats, species, and ecosystems while delivering social, economic, and cultural benefits to the region.¹⁰ They promote awareness and understanding among the peoples of Canada and the world, creating enjoyable experiences for visitors, and providing benefits for Indigenous peoples and coastal communities.¹¹ NMCAs protect against harmful in-lake activities like oil and gas exploration, mining, trawling the lake bed, and dumping, helping contribute to the long-term health of freshwater and marine systems. Other ecologically sustainable uses of the lake are balanced with conservation goals, and activities like commercial and recreational fishing and hunting are managed to align with NMCA objectives.

There are currently five NMCAs across Canada, two of which are within the Great Lakes. Fathom Five National Marine Park in Georgian Bay, and Lake Superior NMCA were designated to preserve the unique ecology that contributes to the region's high biodiversity and culturally significant marine heritage. The small 112 square kilometres area that is Fathom Five contains 22 shipwrecks alone that offer unique diving experiences. Over 70 fish species and 50 shipwrecks are found within Lake Superior NMCA, which covers a third of the Canadian portion of the lake and extends to the Canada-U.S. border. It is the world's largest freshwater protected area with a surface area of over 10,000 square kilometres,¹² and contributes greatly towards Canada's and Ontario's targets for protected areas.

Lake Erie

Parks Canada aims to designate an NMCA in all five Great Lakes, and Lake Erie is part of these plans. A dedicated community group has been at the forefront of the movement to drive the establishment of the Pelee Proposed NMCA with strong local support to protect the lakes' important ecosystems. Point Pelee in Lake Erie is the southernmost point of Canada's mainland, jutting into the waters of the lake. Located in the most species-rich zone in the country,¹³ the species found here and within Point Pelee National Park are similar to those from warmer, southern climates. A range of habitat types supports the largest number of species at risk and the second greatest native plant diversity of all of Canada's national parks.¹⁴ This region acts as an important staging area for over 370 bird and insect species and is home to an Important Bird Area and a Monarch Butterfly reserve. The Great Lakes are a system intertwined, and as Lake Erie flows into Lake Ontario, increasing connectivity between these waters is vital for the collective health of the lakes. Protecting Lake Erie with an NMCA would also contribute towards Canada's wider commitment to protect 25% of land and freshwater by 2025.

Lake Ontario's Eastern basin, the focus of this report, is an excellent representative area that would benefit from the establishment of an NMCA. The land and waters surrounding Prince Edward County (PEC) and eastwards have a rich diversity of plant and animal species, and are home to many species at risk. The region contains some of the most important wildlife habitat in the province of Ontario, particularly for birds and fish.¹⁵ Additionally, hundreds of shipwrecks dot the Eastern basin, providing unique diving and recreational experiences, enhancing the opportunity for people to learn about, enjoy, and respect this critical area.

Several planned and existing terrestrial protected areas are located throughout the Eastern basin of the lake. Establishing an NMCA in surrounding waters will ensure connectivity between terrestrial and aquatic ecosystems for more effective biodiversity conservation.¹⁶ Commencing a feasibility study is the next step towards protecting this highly important resource, as part of the pathway towards government efforts to conserve 25% of Canada's land and waters by 2025.

For its part, the U.S. has a wider network of protected areas across the Great Lakes Region and works closely with Canada on lakewide initiatives. Providing protection on the Canadian side of Lake Ontario would strengthen opportunities for bi-national cooperation and conservation of the Great Lakes.

Great Lakes Protected Areas in the United States

The U.S. has worked to protect environments of cultural and ecological significance throughout the Great Lakes, establishing numerous Marine Protected Areas (MPAs) that focus on conserving and protecting these ecosystems while promoting tourism and recreation. In fact, 11.6% of U.S. Great Lakes waters are within MPAs.¹⁷ As of 2020, nearly 1,000 marine protected and conserved areas have been established across the U.S.,¹⁸ one third of which were designated to protect the area's distinct cultural heritage, consisting largely of shipwreck sites dating back as far as 1780.

In 2019, the U.S. National Oceanic and Atmospheric Administration (NOAA), proposed a new marine sanctuary in the Eastern basin of Lake Ontario in response to a community-based nomination.¹⁹ This sanctuary, once established, will protect up to 67 historic shipwrecks and biologically significant species like Lake Sturgeon and Deepwater Cisco while providing the opportunity for human exploration and enjoyment of the surrounding natural areas.²⁰

The new marine sanctuary would contain a large recreational fishery for Lake Trout, Small-mouth Bass and Walleye within its boundaries, which could encompass a portion of the Thousand Islands and the waters along the Canada-U.S. border. The establishment of a Canadian NMCA in this region would present another opportunity to build on bi-national cooperation and collaboration to protect the Great Lakes. Extending NMCA protections across the Eastern basin of the lake and up to the U.S. border would allow for further bi-national collaboration between governing agencies to ensure the conservation of Lake Ontario's ecosystems, as well as its historic and cultural artifacts.



A Rare Lake Ecosystem that Deserves Protection

The Great Lakes form the world's largest freshwater ecosystem and provide habitat for thousands of native species including 279 globally rare plants, animals, and natural communities.²¹ Nearly 11 million people live within the Lake Ontario Watershed across Canada and the U.S., including nearly a quarter of Canada's population. While the region is densely populated, the Great Lakes are rich in biodiversity. But only 27% of the Great Lakes coastline and 9.4% of Great Lakes waters are currently protected for conservation purposes.²²

As Indigenous peoples have long understood, the Great Lakes are one interconnected system. Lake Superior flows to Lake Huron and Michigan, to Lake Erie which then flows into Lake Ontario through the Niagara River before draining into the St. Lawrence River to the Atlantic Ocean. Improving the health of the lakes through region-wide collaborative conservation and restoration initiatives is key in protecting and enhancing this massive freshwater ecosystem.

Lake Ontario is one of the least protected Great Lakes. The Eastern basin of Lake Ontario, which has been prioritized for protection by Parks Canada, has critical conservation values, including for species at risk, migratory habitat and ecological connectivity for adjoining terrestrial areas and the wider dynamic freshwater system of the North American Great Lakes.

The Local Terrestrial Ecosystem

Eastern Lake Ontario and its watershed are vital in sustaining a wide diversity of aquatic and terrestrial species. Prince Edward County (PEC) and the surrounding region comprise a variety of habitats including meadows, savannah, woodlands, wetlands, marshes, and shrub thicket. The area supports many ecologically significant features, including globally rare and imperiled alvars (areas of flat limestone/dolostone bedrock with thin or no soils that sustain rare ecosystems) and the world's largest freshwater sandbar and dune system, located in Sandbanks Provincial Park.²³ The unique conditions in this region make for a perfect environment for rare species to thrive, some of which occur in few other habitats in the world.²⁴

The provincially significant coastal wetlands in Eastern Lake Ontario are home to many birds, turtles, frogs, and fish, and provide critical habitat to several species at risk (SAR) like the Eastern Ribbonsnake and Least Bittern. Several of these wetlands have been identified as Areas of Natural and Scientific Interest (ANSI), and support the surrounding ecosystem by acting as a buffer against flooding, improving water quality, absorbing excess nutrients from nearshore areas, and maintaining biodiversity.²⁵ As of 2002, one third of PECs wetland area has been lost or converted to other uses, which threatens already imperiled species.²⁶

The Local Aquatic Ecosystem

The shallow waters of Lake Ontario's nearshore zone are the most biologically diverse and productive in the lake, providing critical feeding and reproductive habitat for a multitude of species. Consequently, this area hosts the highest diversity of fish species.²⁷ More areas of High Ecological Value (HEV) have been identified in Lake Ontario than in any other North American Great Lake. In the Eastern basin of the lake, several HEV areas have been highlighted to support priority-setting for nearshore protection and restoration including the entirety of the PEC South Shore, Presqu'ile Provincial Park, the Bay of Quinte, and several islands east of PEC.²⁸

Marshes in the Bay of Quinte form spawning grounds for important nearshore species like Walleye, as well as excellent staging and production areas for migratory birds and waterfowl.²⁹ The mouth of the river upstream from the Bay of Quinte is also historically important to the American Eel and provides habitat and potential spawning sites for the remaining population of Lake Sturgeon in this area.³⁰ Both fish have been classified as SAR and are protected province-wide. The waters of Eastern Lake Ontario are home to over 30 fish species ranging from bottom-dwelling prey fish to top predators.

The sheltered bays and coastal areas of PEC are also the perfect habitats for native aquatic plants like Duckweed and Yellow pond lily, which provide great hunting grounds for fish to feed on invertebrates.³¹ Some species use submerged plants to nest while smaller fish use them to hide from predators. Emergent plants, those that stick their stems above the surface but are rooted in water, protect the shoreline from erosion and are a food source for mammals and waterfowl that rely on both aquatic and terrestrial ecosystems.³²



Restoring and Rehabilitating Native Fish Species

Protected areas that prevent habitat alteration have been found to contain a higher number of fish species,³³ however, necessary protections of aquatic habitat are lacking throughout the Great Lakes. The lack of protection and slow pace of restoration of fish habitat is one of the greatest threats to the recovery of freshwater and nearshore aquatic species.³⁴ Freshwater fish are particularly threatened by habitat loss and degradation from contaminants, land-use impacts, and aquatic invasive species (AIS).³⁵ The State of the Great Lakes 2019 Report points particularly to long-term prey fish community trends as “poor” and “deteriorating”.³⁶ This community is dominated by AIS like Alewife and Round Goby which influence the balance between predator/prey relationships, and continue to threaten native populations through competition and predation.³⁷



Among native prey fish populations, Deepwater Cisco (Bloater) which are found nearshore and offshore, have declined dramatically and were considered extirpated for decades in the lake until restoration efforts led to low abundances through stocking. Restoring Bloater populations could yield long-term benefits like increasing diversity of the prey fish community and supporting the region's commercial fisheries. 38 Focusing restoration efforts in nearshore areas also yields lakewide benefits like contaminant reduction in Great Lakes fishes.

The Bi-national Biodiversity Conservation Strategy for Lake Ontario identified the restoration of native fish communities and native species as a high priority recommendation which has also been one of the five focus areas of the Lake Ontario Lakewide Action Management Plan (LAMP) in recent years.³⁹ The federal and provincial governments have worked alongside U.S. agencies to implement bi-national collaborative initiatives in Lake Ontario to rehabilitate native fish species and SAR including Atlantic Salmon, Lake Trout, Deepwater Cisco, Walleye, American Eel, and Lake Sturgeon.⁴⁰

Overexploitation and habitat alteration led to dramatic declines of the Lake Sturgeon's population which is now threatened in the Great-Lakes-Upper St. Lawrence region. Enhancing and restoring habitat where necessary while maintaining ecosystem integrity and function is an important component in the Sturgeon's recovery strategy.⁴¹

Though once abundant throughout Lake Ontario's tributaries and the St. Lawrence, American Eel populations experienced serious decline in most watersheds and are now listed as endangered under the Endangered Species Act, 2007. The recovery strategy aims to re-establish this species throughout its historic range.⁴²

Sea Lamprey predation of adult Lake Trout previously inhibited the success of sustaining Lake Trout populations, however, successful Lamprey control efforts have created conditions for the recovery of Trout and Salmon through stocking.⁴³

These restoration initiatives have been instrumental in restoring and maintaining key components of the native fish community in Lake Ontario. NMCAs aim to conserve biodiversity and ecosystems by enhancing ecosystem resilience through restoration activities.⁴⁴ Therefore, these activities could continue and be further enhanced by NMCA establishment. Although there is still work to be done, the joint efforts of state, provincial and federal agencies, and various conservation authorities have contributed towards improving the lakewide status of these significant species. Continuing rehabilitation efforts in Eastern Lake Ontario, supported by an NMCA, would contribute to improving Ontario's biodiversity and ensuring that habitat and species are protected long-term.

Support for Species at Risk

Biodiversity is on the decline globally, with over 1 million species headed for extinction. In Canada over 800 species are listed as at risk.⁴⁵ Habitat loss and degradation, invasive species, overexploitation, and climate change have negatively impacted several of Eastern Lake Ontario's native species, and threaten their existence in the region. Protecting and recovering SAR and their habitat is a key component of conserving Ontario's biodiversity and is one aspect of the Ontario Great Lakes Strategy, which supports community work to protect Great Lakes habitat and native species.⁴⁶

Since 2015, the total number of SAR in Ontario has increased by 19 species (or 8%) to 243.⁴⁷ The County alone is home to over 50 SAR, including 17 bird species, 9 reptile species, 17 plant species, and 9 fish species.⁴⁸

Deepwater Sculpin were once abundant in cold, deep waters of Lake Ontario but have experienced population declines driven by habitat loss and degradation and the impacts of AIS like Alewife, which have heavily interfered with reproduction by targeting the fish's larvae.⁴⁹ The Sculpin plays an important role in predator-prey interactions, transferring nutrients from benthic invertebrates to top-predators like Lake Trout.



Blanding's turtle, Ian Dickinson

Habitat loss is also a significant threat to the federally endangered Blanding's Turtle which is found throughout PEC. Blanding's Turtles live in large wetlands and shallow areas of lakes with lots of aquatic vegetation.⁵⁰ This reptile travels great distances in search of nesting sites and is at high risk of road mortality as its habitat becomes further developed and fragmented.⁵¹

Several nearshore areas and coastal lakes and embayments in this region form critical habitat for aquatic SAR like the Pugnose Shiner, including Wellers Bay, West Lake, East Lake, and Smith Bay. Designated fish spawning habitat is protected in these nearshore areas for certain parts of the year to support early life stages. These spawning areas can be disrupted by the presence of AIS, especially large colonies of zebra or quagga mussels, which are a widespread problem in the area.⁵²

The waters and shorelines of Lake Ontario are also crucial habitats for endangered birds. Over the past 50 years, Piping Plovers have nearly vanished throughout the Great Lakes, threatened by shoreline development particularly along popular beaches that make the bird vulnerable to predation and nest destruction. Recovery and protection efforts are helping to repopulate former breeding sites along the lake's coastlines, and have led to increased numbers in recent years.⁵³ Since 2007, small numbers of the migratory shorebird have returned to nest along Lake Ontario, including at Presqu'île Provincial Park in 2016 and 2021.⁵⁴

SAR play a key role in Lake Ontario's ecosystems, and ensuring the protection of important habitats is crucial in their recovery and protection. An NMCA would be a crucial conservation tool, as the designation would mean increased protection for species' habitats and measures to prevent the introduction of AIS and prevent broader shoreline and water disturbance.⁵⁵

Protecting Migratory Bird Habitat



Juvenile piping plover,
Jeff and Cassandra Moore of J&K Photography

Canada's diverse landscape supports more than 450 native birds, a large portion of which travel to and from their southern wintering grounds.⁵⁶ A number of areas throughout Eastern Lake Ontario are significant for birds, including the southern shore of the County, Timber Island Provincial Nature Reserve and the Sandbanks Provincial Park area which also provides diverse habitats for breeding and migrating birds.⁵⁷ An NMCA in Lake Ontario would support bird conservation by protecting the shoreline and waters that provide essential bird habitat, and feeding, migration stopover and wintering sites.⁵⁸

Waterbirds represent a strong link between terrestrial and aquatic systems as they source most of their diet from wetland and nearshore habitats as well as open water habitats.⁵⁹ Maintaining quality nearshore habitat is essential not only for fish but also for waterbirds and aquatic animals that depend on both the land and waters. Conservation of these key elements is important in the area's role as a link in the chain of essential migratory habitat in Lake Ontario. An NMCA in these waters would improve aquatic and terrestrial connectivity by offering contiguous protections between aquatic and terrestrial protected area boundaries.

A Hotspot for Important Bird Areas

Lake Ontario, and its islands and coastal area, is a globally important stopover for migratory birds, which face the daunting task of crossing vast expanses of open water to reach their nesting grounds, feed, and raise their young. Canadian waters of the Eastern basin of Lake Ontario have long been recognized for their importance to migratory bird species, containing five Important Bird Areas (IBAs) including Amherst Island, Pigeon Island, Wolfe Island, Presqu'île Provincial Park, and Prince Edward County South Shore (IBA).⁶⁰ *

The IBA encompassing PEC's South Shore is the largest in Eastern Lake Ontario, followed closely by Wolfe Island. It extends eastward from Point Petre to Prince Edward Point covering 91 kilometres of combined land and nearshore waters, and 30 kilometres of shoreline, which is one of Lake Ontario's few remaining undeveloped shorelines.⁶¹ At Prince Edward Point, nearly 300 bird species have been recorded, including tremendous numbers of White-winged Scoter and Long-tailed Duck during migration and parts of the winter. These species numbers are often captured during migration with individual numbers reaching from 10,000 as high as 70,000 in the case of the Dark-eyed Junco.

** IBAs were created by BirdLife International in the 1980s to support groups of birds by safeguarding and monitoring habitat. The IBA designation is granted based on the high population of birds a site hosts including species at risk, endemic species, and migratory birds. They are a significant tool in bird conservation and biodiversity globally, and have helped advance conservation planning in Canada and bird monitoring. This system goes hand in hand with the internationally recognized Key Biodiversity Areas (KBAs) program which was established in 2016 by the International Union for Conservation of Nature, and aims to safeguard critical sites for nature by highlighting key habitats. IBAs are currently being integrated with KBAs and to date, 75% of global KBAs that have been identified are IBAs, further emphasizing the biological significance of these areas.*



Eastern whip-poor-will, Paul Jones

Up to 2,000 raptors a day migrate through the South shore of Prince Edward County in the fall. A thousand Red-tailed Hawks and dozens of provincially endangered Golden Eagles have been observed flying over Prince Edward Point. Recent studies document the importance of shorelines and wetlands to migratory birds, describing a “shoreline effect,” or areas along and in from the shore where landbirds concentrate during their migration. Great Lakes shoreline peninsulas and wooded wetlands in particular are recognized as being “disproportionately used by migrating landbirds”.⁶²

Similarly, Presqu’île Provincial Park on the North shore of the lake is renowned for its bird life, with 318 bird species having been recorded within the park, including the nationally endangered nesting King Rails, and globally significant Ring-billed Gull and Caspian Tern populations.⁶³ Wolfe Island in Eastern Lake Ontario supports several waterfowl species which congregate here during spring migration. As many as 15,000 Greater Scaup have been recorded here in one day.⁶⁴

Prince Edward Point was designated a National Wildlife Area (NWA) to protect the staggering numbers and high diversity of birds that congregate at this site. Due to the area’s significant role in supporting Monarch butterfly migration in addition to bird species, Prince Edward Point was designated an International Monarch Butterfly Reserve. Moreover, this site also houses the Prince Edward Point Bird Observatory which was established as a Canadian Migration Monitoring Network station in 1995 to continue monitoring the high volume of migratory birds passing through annually.

Building Ecological Connectivity

Protected areas are significantly more effective in biodiversity conservation when they form a part of a greater ecological network.⁶⁵ These networks connect species populations, maintain ecosystem function, and allow for the unimpeded movement of species and the flow of natural processes that sustain life on Earth.⁶⁶ One of the biggest threats to Southern ecosystems in Canada is loss of connectivity of natural systems, particularly between terrestrial and aquatic ecosystems. The two are often managed as distinct units despite being highly interconnected, which negatively affects ecological connectivity.⁶⁷ Despite the higher proportion of threatened and endangered species in freshwater systems than marine or terrestrial systems, they are the least considered or incorporated within protected areas planning.⁶⁸ Increasing large-scale habitat conservation by connecting terrestrial and aquatic protected areas is a strategic approach to achieve the targets to conserve and protect 25% of Canada's land and waters by 2025, and 30% by 2030.

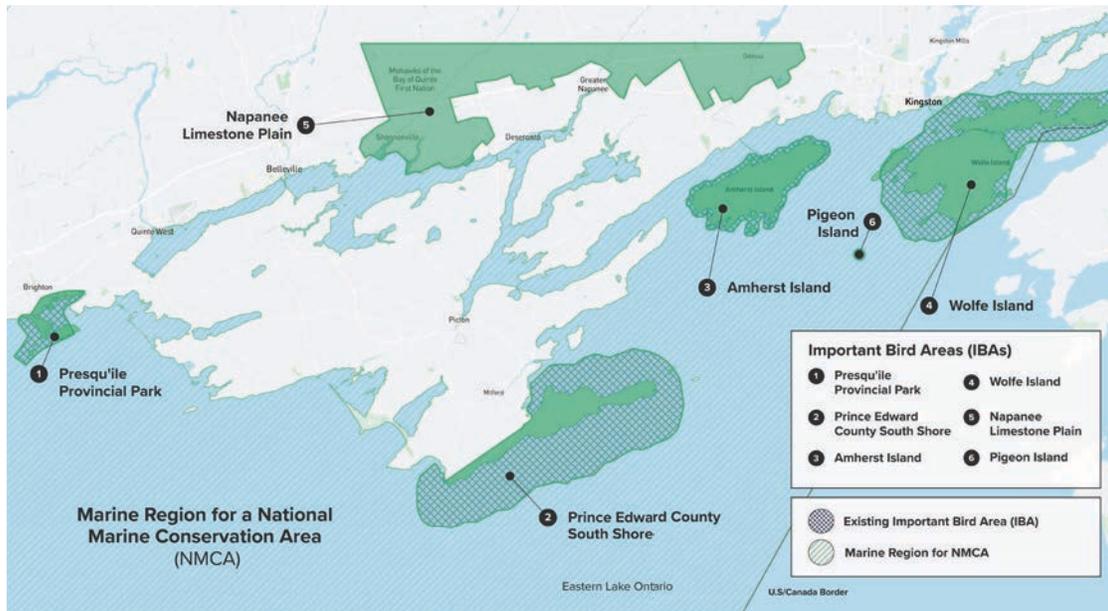


Caspian tern, Ian Dickinson

The 2018 Lake Ontario LAMP outlines loss of aquatic connectivity and quality of nearshore and offshore waters as critical threats to Ontario's species diversity. Shoreline development and alteration negatively affects habitat quality and native species, while the construction of dams and barriers alters the hydrology and physical characteristics of this habitat, making it difficult for some species to reach their spawning areas. The degradation of quality habitat for near-shore and aquatic species that depend on these ecosystems negatively influences native populations.

PEC is under moderate stress from loss of tributary connectivity which is impeded by barriers along its length.⁶⁹ In urban areas particularly, shoreline alteration negatively impacts natural processes while disrupting connectivity of coastal habitats and contributing to wetland habitat loss. Development has hardened 25% of the County's shoreline, which can reduce coastline resilience among other impacts.⁷⁰ Addressing these drivers of loss of habitat connectivity and coastal habitat degradation by designing terrestrial protected areas to integrate the needs of freshwater species can enhance freshwater conservation without compromising on terrestrial protections.

The Ontario Ministry of the Environment, Conservation and Parks (MECP) has proposed the creation of a new conservation reserve along PECs south shore to protect the area’s rich biodiversity. The two sites, Point Petre Provincial Wildlife Area and Ostrander Point Crown Land Block, are home to several SAR and contain globally significant habitat. Designation of the reserve would “provide opportunities for the community to enjoy the area’s natural beauty, including hiking, hunting and birdwatching, while strengthening the long-term protection of biodiversity.”⁷¹ If established, the conservation reserve would be the latest addition to the local network of conserved land in the County, particularly in the South Shore.



This region of Eastern Lake Ontario holds three nationally protected NWAs, six provincial and national parks, and ecologically significant habitat, including six IBAs, six areas of High Ecological Value, nearly 30 ANSIs,⁷² and is part of the Algonquin to Adirondacks (A2A) bioregion that also encompasses forests and wetlands that are home to a vast array of plants and wildlife.

In this way, an NMCA in Lake Ontario provides an opportunity to increase connectivity between existing and planned terrestrial protections, making them more resilient to climate change and more able to sustain viable populations of threatened species.⁷³



Black swallowtail, Paul Jones

Engaging History and Culture in Eastern Lake Ontario

Indigenous History and Culture

Indigenous peoples have called the lands and waters of what is now known as Lake Ontario home since time immemorial. Oral and written histories suggest the traditional homelands of the Wendat and Anishinaabeg span the north side of Lake Ontario, while the traditional homelands of the Haudenosaunee span the south side of the Lake, in the finger lake region of upstate New York.*

Indigenous Peoples were drawn to this body of water and surrounding lands because of the abundant fish, wildlife, and plant life it supported. For example, Anishinaabeg peoples traveled and harvested from tributaries that drained into Lake Ontario. Their ancient campsites can be found all along the shorelines of these tributaries. Fishing villages were established near major river mouths, where societies could come together and celebrate in social and spiritual gatherings. Anishinaabeg stories speak to the times before, during, and after the great movements of ice walls.

The Haudenosaunee people were horticulturalists and tended to set up their villages upland from the waterways. There is evidence tying the Haudenosaunee Confederacy to agriculture in Prince Edward County 1,200 years ago.⁷⁴ Fertile soils enabled the growing of corn, beans, and squash, known as “The Three Sisters”, named because of the support they provide each other when grown together.⁷⁵ The cornstalks serve as a trellis for the beans, which in turn support the cornstalk during high winds and provide nitrogen to the soil. The leaves of the squash provide shade to all three plants, keeping moisture in the soil and preventing weeds from growing, which contributes to productive harvests.

** Macaulay Heritage Park in PEC worked closely alongside the Mohawks of the Bay of Quinte and Alderville First Nation to develop a timeline of the area’s significant Indigenous history, and the movement and changes in populations as displayed in their Indigenous History Exhibit.*

Throughout this history, as today, the growth of local communities in the region spurred the trade and transport of goods via the connected waterways of the St. Lawrence River. Archaeologists unearthed a spearhead made of Ramah Quartzite at East Lake, an inland lake on the western side of PEC. This material dates back 2,000 years, and has been traced to the northern tip of Labrador, indicating the spearhead made a lengthy journey from the Maritimes to the Great Lakes.⁷⁶

The movements and migrations of First Nations in and out of this area have been shaped over time by Wampum Agreements between nations, confederacies, amalgamations, colonization, treaty making, conflict, disease and displacement. This complex history results in myriad interests and deep continued connections for Indigenous nations to the lands and waters of Lake Ontario.

The treaties associated with this area are very significant and unique. The Anishinaabeg were integral to the signing of treaties with the British Crown that shaped settlement in the area for Indigenous and non-Indigenous groups alike. The Crawford Purchase of 1783 was one of the first agreements negotiated between the Anishinaabeg and the Crown. The Johnson-Butler Purchase, or “Gunshot Treaty”, was signed a few years later in 1787, at the Carrying Place at the west end of the Bay of Quinte. This purchase involved land on the northern shore of Lake Ontario, east of Toronto and encompassing the Bay of Quinte eastwards.⁷⁷ This ‘treaty’ was nicknamed for covering the land as far back from the lake as one could hear a gunshot. These lands were later formally incorporated into the Williams Treaties of 1923 - the last historic land cession treaties in Canada.

Over the years, the Williams Treaties have been interpreted differently between government and First Nations, resulting in legal disputes up until 2018, when the Williams Treaties First Nations and the Governments of Ontario and Canada came to a final agreement about land surrenders and harvesting rights.⁷⁸ This agreement has had profound consequences and is integral to understanding First Nations’ harvesting rights on territories across south-central Ontario. Williams Treaties First Nations are composed of the Chippewas of Beausoleil, Georgina Island, and Rama, and the Mississaugas of Alderville, Curve Lake, Hiawatha, and Scugog Island.

Another important First Nation on Lake Ontario is the Tyendinaga Mohawks of the Bay of Quinte, who have ancestral ties to Mohawk River Valley (or present-day New York state). After the American Revolution, the British Crown promised to restore their homeland villages, but instead in 1783 gave up Mohawk and other Haudenosaunee homelands to American rebel forces who in turn destroyed the Nations’ villages and lands.⁷⁹ As ‘repayment’ for their military support and allegiance with the British Crown, the Six Nations of the Haudenosaunee were to select lands in parts of Upper Canada including the north shore of Lake Ontario. About 20 Mohawk families arrived on the shores of the Bay of Quinte in 1784 and were met by the Mississaugas inhabiting the area.⁸⁰ The anniversary of the Landing is a tradition still celebrated today by re-enacting landfall in thanksgiving for the safe arrival of these Mohawk ancestors.

The lands and waters around Eastern Lake Ontario continue to hold great significance to local First Nations to this day. This area forms a network of rich, biodiverse ecosystems that support an array of plants and wildlife, including deer, otter, coyotes, muskrat, turkey, grouse, and fox, as well as species at risk like American Eel. These species remain a strong component of Ontario’s cultural and natural heritage.⁸¹ Importantly, this ecosystem also continues to support fields of wild rice, or manoomin meaning “good berry” in Anishinaabemowin, a spiritual and culinary staple harvested by First Nations.⁸² The establishment of an NMCA in these waters will encourage stewardship of the linkages between aquatic and terrestrial habitat, as well as maintaining and improving water quality and the enhancement of habitat for the fish and wildlife that support many Indigenous cultures and communities.



Long-Tailed Duck, Paul Jones

An additional stated objective of the NMCA program is ensuring the conservation of cultural heritage, including Indigenous culture and traditions.⁸³ According to Parks Canada, NMCAs “are places where Indigenous rights are respected, and Indigenous peoples can continue their traditional and cultural practices – including accessing traditional foods – and fulfilling their roles as stewards”. Nature Canada is undertaking continuous outreach with local First Nations to understand their priorities related to the potential establishment of an NMCA in these waters. Nature Canada hopes to facilitate continued conversations about conserving the waters of Lake Ontario using the principles of ethical space, which as identified by the Indigenous Circle of Experts,⁸⁴ includes creating an environment for knowledge systems to interact with mutual respect, kindness and generosity, while recognizing that all knowledge systems are equal and no single system has more weight or legitimacy than another.*

Marine Heritage

The diverse marine ecosystem that dominates Eastern Lake Ontario is dotted with historic shipwrecks and even aircraft representing centuries of human use. Several lighthouses sit along the lake’s coasts and islands, some of which operated as far back as the 1800s and have since been given historical designation, including the Prince Edward Point Lighthouse.⁸⁵

Shipwreck maps of the area display many sunken ships, in particular small sailing ships known as schooners. Many were vessels that met their demise at the hands of adverse weather conditions and storms, while others ran aground or were involved in collisions with other vessels, war ships, or barriers. Over 270 confirmed ships and as many as 500 are sunk in the Eastern basin of the lake, particularly in an area known as The Marysburgh Vortex.⁸⁶ This region has a magnetic anomaly that can offset compass bearings by 20 degrees, making navigation hazardous. Studies into the area’s magnetic field disturbances have uncovered a ring-shaped shoal 25 feet underwater that is consistent with a meteorite impact. It is thought that 460 million years ago, the impact deposited minerals that affect Earth’s magnetic fields, displacing compass readings, but further studies are needed.⁸⁷

**The focus of ethical space is on creating a place for knowledge systems to interact with mutual respect, kindness, generosity and other basic values and principles. In this framework, all knowledge systems are equal; no single system has more weight or legitimacy than another. Ethical space provides a venue for collaboration and advice, sharing and cross-validation (where one side validates the other’s decisions). This approach was developed as a way to respect and reflect Indigenous knowledge in the context of the Pathway to Canada Target 1 initiative, but applies more broadly for achieving conservation and nature protection measures. More information available at <https://conservation-reconciliation.ca/ethical-space>.*

Historians say that sailing has been hazardous in the Eastern end of Lake Ontario for centuries. The area is often referred to as the “Graveyard of Lake Ontario” and is known for its sudden and deadly squalls, while shoals, reefs, and rocky islands grow increasingly prevalent as the lake narrows and shallows nearing the St. Lawrence River.⁸⁸ These factors contribute to the extraordinary number of sunken vessels at the bottom of the waters.

An NMCA in this region would ensure the conservation of these known cultural resources, as well as the many more that are speculated and yet to be discovered.⁸⁹ Shipwrecks preserve a snapshot of history and provide an excellent opportunity to study the influence of nature on human activity. The sunken ships are popular recreation sites among divers, allowing for the exploration of an underwater environment that has experienced little disruption. These archaeological sites also demonstrate how sunken ships influence the ecology of their underwater environment, including transferring organisms between water bodies, colonizing their final resting place on the lakebed. Over time, these wrecks become suitable habitats for aquatic species and help improve water quality.⁹⁰

The depths of Lake Ontario even hold some of the country’s aviation history. In 1954, a test supersonic jet known as the Avro Arrow was launched as a part of a military aircraft project.⁹¹ The fate of the craft remained a mystery until recently, when decades-long marine search expeditions located the model offshore of Point Petre at the County’s south shore. The finding of one of the 12 test models that were launched over 60 years ago was the culmination of a year-long expedition. Today, the Avro model is on display in Ottawa, Ontario as one of few surviving remnants of the Avro Arrow jet fighter program.

These archaeological sites are a significant part of Lake Ontario’s marine history and provide incredible educational and recreational opportunities. NMCAs aim to enhance the experience of visitors to the region, and conserve Ontario’s marine heritage by protecting historical features.⁹² Studying these artifacts allows visitors to connect with Lake Ontario’s past and gain a better understanding of its fascinating history to ensure its protection for the benefit, education and enjoyment of the people of Canada and the world.⁹³

Supporting Sustainable Commercial & Recreational Activity

Across the Great Lakes, the collective value of all fisheries (recreational, Indigenous, commercial) is more than \$7 billion USD annually, supporting more than 75,000 jobs.⁹⁴ In a recent report, the Great Lakes Fisheries Commission highlighted that the economic value of the Great lakes fisheries are “the tip of the iceberg when you consider the broader value of the ecosystem services provided by healthy Great Lakes habitats”.⁹⁵ An NMCA can help support the benefits people draw from recreational and commercial fishing.

Recreational Fishing

In Eastern Lake Ontario, fish populations support significant recreational and Indigenous fisheries, and the positive economic impact of recreational anglers and Indigenous fishers is key to the regional economy. One of North America’s greatest trophy Walleye fisheries is based out of The Bay of Quinte.⁹⁶ Lake Trout and Smallmouth Bass are also important species for recreational anglers in the region. In the Spring, fishing for Brown Trout is common and there is trophy fishing for Muskellunge (Muskie) in the nearshore areas all summer long.⁹⁷ Meanwhile, offshore fishing is dominated by Trout and Salmon species.

In the central and Western basin (from the Pickering area and west) Chinook and Coho salmon are popular for anglers. Neither species are native to the region, though their populations support a significant recreational fishery. Atlantic Salmon was once abundant in Lake Ontario but were extirpated in the 1800s, and efforts to reestablish the population have been challenging.⁹⁸ Current efforts to bring Atlantic Salmon populations back are driven by The Lake Ontario Atlantic Salmon Restoration program, which was implemented in 2006. This partnership between the Ontario Federation of Anglers and Hunters (OFAH), Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNR), Fisheries and Oceans Canada (DFO), and several other agencies and organizations aims to re-establish a self-sustaining population of Atlantic Salmon in Lake Ontario and its tributaries.⁹⁹

Supporting healthy fish stocks and enhancing naturally produced populations is an important component of maintaining Lake Ontario’s thriving recreational fishery. OFAH and NDMNR have also launched the Community Hatchery Program (CHP) to grant funding to community hatcheries, facilitating the transfer of knowledge and technical expertise in support of Ontario’s fish culture and stocking efforts.¹⁰⁰ Hatchery-reared fish support Lake Ontario’s recreational fishing sector in addition to self-sustaining stocks, particularly where fishing opportunities may be limited.

Today, the province of Ontario continues to oversee recreational fisheries through an adaptive management approach in consultation with its many partners including Fisheries Management Zone 20 Council (FMZ20). FMZ20 Council represents a range of angling organizations that advise on Lake Ontario’s recreational fisheries management, and has been instrumental in shaping the fishery, helping to renew Fish Community Objectives, developing a stocking plan, identifying issues and concerns while acting as a liaison for public awareness about the lake’s recreational fishery.¹⁰¹ The Glenora Fisheries Station, on the shores of the Bay of Quinte, is a research facility that hosts the Lake Ontario Management Unit and conducts studies on the health of the recreational and commercial fishery.¹⁰²

Protecting Eastern Lake Ontario with an NMCA will support and promote opportunities for more people to connect with Lake Ontario via recreational fishing. By establishing an NMCA, we can safeguard this important freshwater system for the long term to ensure anglers will be able to fish in Lake Ontario for generations to come.

Commercial Fishing

The Lake Ontario drainage basin is considered the most productive of all Great Lakes for fish production, and is extremely valuable for its historical commercial fisheries catches.¹⁰³ Prior to European colonization, Lake Ontario had a rich warmwater fish community and a diverse coldwater fish community dominated by Lake Trout, Whitefish, and Burbot. Following colonization of the watershed, land-use change, construction of barriers, pollution, habitat degradation, and overfishing all led to the decline and extirpation of several of the region's native species.¹⁰⁴ The NDMNRF implemented individual species quotas in Eastern Lake Ontario in the mid 1980s – one of the first areas of the province to do so – and continues to manage fisheries today.¹⁰⁵

The fisheries operating out of Lake Ontario today are the smallest in all of the Great Lakes, concentrated mainly in nearshore areas and embayments of the Eastern basin and the PEC region, including an Indigenous fishery operating in the Bay of Quinte and surrounding tributaries. Many of these local commercial fisheries have operated for generations, forming a significant part of the region's legacy and culture.

Inland fisheries such as those in the Great Lakes provide many social, economic, and environmental benefits including contributing towards food security by providing local food sources throughout Southern Ontario, and a lower carbon footprint (through less fossil fuel usage) compared to sourcing fish from the Pacific ocean or international markets.¹⁰⁶ Despite its dwindling size, the commercial fishing industry in Lake Ontario contributes greatly towards the province's economy, harvesting species like Yellow Perch, Lake Whitefish, Sunfish, and Walleye, among others.¹⁰⁷

Commercial fishing in the Great Lakes is a long-standing industry that continues to support the local community, and Ontario's economy. Ontario's Provincial Fish Strategy is a useful tool in improving conservation and fisheries management through a sustainable management approach, including through the use of low-mortality fishing methods.

According to Parks Canada, NMCAs contribute to the well-being of coastal and Indigenous communities by protecting, conserving, and enhancing the ecosystem services that the oceans and Great Lakes provide. This includes opportunities for ecologically sustainable use of renewable marine resources, like fishing, which enables communities to pursue sustainable livelihoods and access sustainable food sources.¹⁰⁸ An NMCA in Lake Ontario would enhance the health of the lake and fish populations, supporting continued sustainable commercial fishing in the region.

Commercial Shipping

The St. Lawrence Seaway is the longest deep draft navigation system in the world, spanning 3,700 kilometres and linking the Great Lakes and the St. Lawrence River out to the Atlantic ocean.¹⁰⁹ This marine industry shared by Canada and the U.S. enables efficient trade within North America and across the globe, with a combined GDP of over \$6 trillion CAD.¹¹⁰ The Seaway also supports a comprehensive road and rail network that transports goods throughout the Great Lakes ranging from raw materials for iron and steel production to manufactured products destined for domestic use and export.

Ontario's close proximity to this major international shipping channel and other transportation corridors increases the risk of AIS entering the waterway.¹¹¹ Concern surrounding the introduction of AIS has prompted increasingly stringent ballast water management regulations for vessels in the Great Lakes, resulting in a declining rate of AIS introduction in recent years. A range of activities and uses are permitted in NMCAs, including shipping, with effective management to ensure ecological sustainability.¹¹² Administration of the waterway is shared bi-nationally by Canadian and U.S. agencies that work collaboratively on a daily basis to oversee Seaway operations and adhere to shipping regulations.



Lavender field , Peggy deWitt

Tourism

South Eastern Ontario is entirely linked by water and contains several well-known visitor destinations. In 2016, tourism in the region generated over \$800 million CAD.¹¹³ Eastern Lake Ontario is a particularly idyllic and laid back locale that attracts visitors year-round. Sight-seers flock to sandy shores, exploring the region's rolling dunes and nature hotspots like Little Bluff, Presqu'île, Lake on the Mountain, North Beach, and Sandbanks Provincial Park. The South Shore of PEC is one of Lake Ontario's important staging areas for migratory birds, making the location a birdwatcher's dream. A visit to The Prince Edward Point Bird Observatory is a great opportunity to hone bird identification and banding skills.¹¹⁴ The Bay of Quinte's world-renowned Walleye fishery attracts anglers looking for trophy catches.

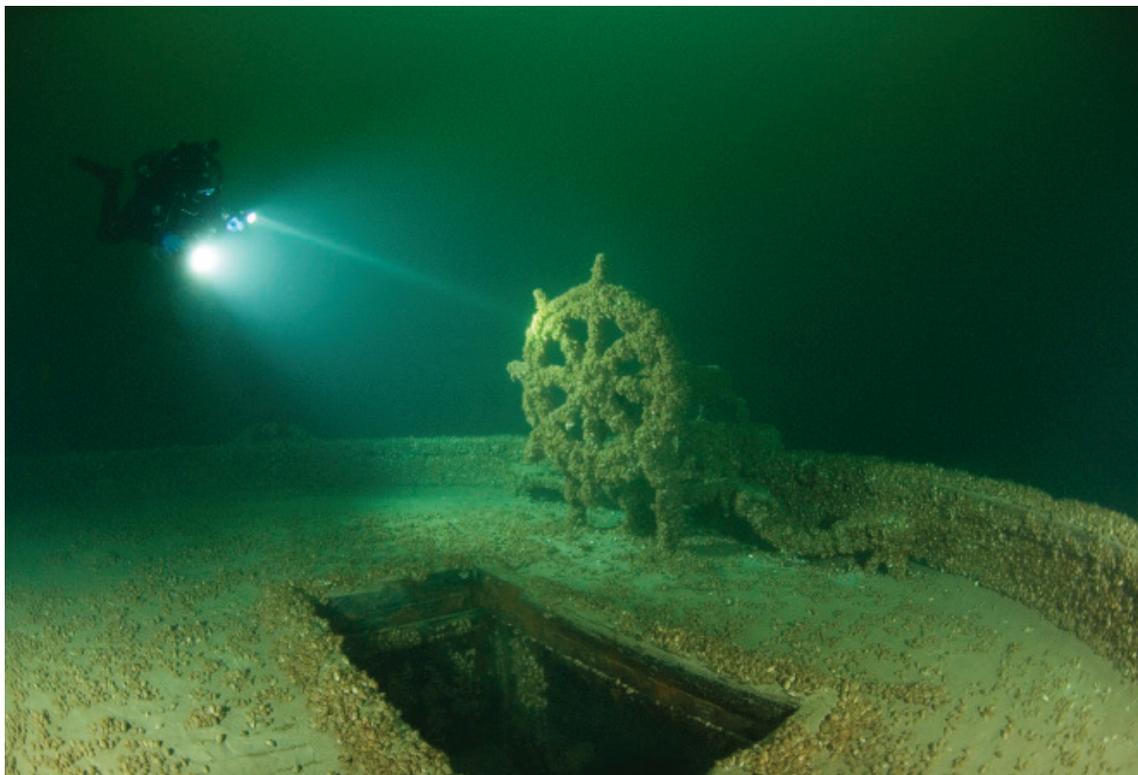
There are accommodations for every type of experience in the region, ranging from camping to luxury spa suites. Eastern Lake Ontario is home to several farms and orchards, and PEC is one of Canada's newest wine regions with several vineyards and wineries reaching out towards the water's edge. A vibrant lavender farm can be found nestled in the heart of wine country, making for exquisite pictures in peak summer months. The County's art scene is present on walls, in gardens, at vineyards and everywhere in between.¹¹⁵ Several art galleries and studios feature the work of local artists who have sought inspiration from these picturesque landscapes.

In PEC, many community partners including the County Museums work to preserve the area's history and local heritage, providing experiences from outdoor exhibits and museum tours to discovering the region's heritage houses and lighthouses.¹¹⁶ This region is also the ideal place to learn the history behind the many shipwrecks that surround the island's waters all over Eastern Lake Ontario. Chartered boat and sailing tours take visitors across the Eastern basin and the Thousand Islands region, showcasing historic lighthouses, island sights, shallow coves and waterfalls, even traveling to the edge of the Marysburgh Vortex – an area notorious for its history of mysterious sinkings and shipwrecks.¹¹⁷

Throughout the year, PEC and surrounding communities host food and music festivals, events, and markets featuring local vendors. The wealth of tourist attractions make this region a highly sought after destination on the Eastern shores of Lake Ontario, and one that would benefit from the conservation of its treasured resources through an NMCA.

Recreation

The Great Lakes are often referred to as inland seas due to their ocean-like characteristics, and Lake Ontario is no exception. Eastern Lake Ontario hosts surfers from across the province who visit the region for surf-worthy waves that blanket the coastline, peaking in fall and winter months. PEC has an active boating and sailing community during spring and summer months, while kayaking, paddleboarding, and a number of water sports are also popular in the area. The historic shipwrecks that dot the Eastern basin of Lake Ontario make for excellent scuba diving opportunities with the possibility of finding still-undiscovered wrecks.



Corey Phillips, Shipwreck in Eastern Lake Ontario

The region's many provincial parks and conservation areas allow for a range of activities including hiking, camping, and wildlife observation.¹¹⁸ Sport fishing is commonplace across the bays and nearshore areas of the County, supported by the region's diverse fish community. Hunting is also a popular and culturally rooted activity in PEC, where high numbers of migratory birds make for abundant waterfowl in the peninsula. Effectively managing activities like hunting and fishing within NMCA's ensures the sustainable use of renewable marine resources for the needs of present and future generations while protecting the lake's diverse ecosystems.



Conclusion and Recommendation

The health of Lake Ontario has improved greatly over the past 50 years, largely due to the Great Lakes Water Quality Agreement's role in outlining objectives to address degradation across the Great Lakes region. The establishment of freshwater protected areas in the Great Lakes can serve as a celebration of the progress to date on the recovery of the Great Lakes and help ensure that protection and restoration will continue for the long-term. Freshwater systems remain underrepresented in Canada's network of MPAs despite being home to a higher proportion of threatened and endangered species than other systems.¹¹⁹ Ecological sustainability can be achieved in an NMCA when marine biodiversity and ecosystem processes are protected.¹²⁰

The Eastern basin of Lake Ontario holds biologically diverse and productive habitat, supporting a multitude of native and at-risk species. Millions of people in Canada and the U.S. Indigenous and coastal communities have long depended on this freshwater biogem and continue to benefit from the lake today, in its life giving support to cultures, jobs and industries, recreation and tourism , food and wellbeing, and more. The marine archaeological sites across the Eastern basin tell the country's history from early settlements to shipwrecks, and form part of the region's cultural heritage. It is time that this site is protected for the long-term with an NMCA.

Recommendation:

The Government of Canada and the Government of Ontario, in close consultation with First Nation communities, should initiate a feasibility assessment in 2022 to advance the establishment of a National Marine Conservation Area in Lake Ontario.

An NMCA in the waters of Lake Ontario would conserve freshwater ecosystems while contributing towards the goal of protecting 25% of lands and waters by 2025. Launching a feasibility assessment for the establishment of an NMCA is the next step towards ensuring the protection and conservation of nature and the long-term conservation of the Great Lakes for generations to come.

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