Great Lakes Protected Areas in Ontario: A Celebration with A Challenge*

Tom J. Beechey
Nature Matters, The Conservatory

Abstract

North America's Great Lakes showcase extraordinary natural diversity with a remarkable array of environments and ecological conditions, many of which are unique to this region. The vast coastal region is a virtual kaleidoscope that merges billions of years of earth history with an impressive record of evolutionary development. The coastal area houses an impressive heritage estate featuring many significant foundation parks and other protected areas that represent well the terrestrial environments and ecological diversity of the region. The less robust representation of marine environments and conditions requires more research and concerted conservation attention. This paper combines a synopsis of the region's natural heritage with a pictorial essay of some of its more outstanding parks and other protected areas to celebrate this Great Lakes legacy and to encourage efforts to preserve it.

Introduction

Like a stunning giant oasis, the Great Lakes sit at the heart of North America, within daily motor access of more than 100 million people. The Great Lakes basin is the single largest reservoir of freshwater in the world, with Lakes Superior, Michigan, Huron, Erie, Ontario and their connecting water bodies housing 20 per cent of the world's freshwater. If fully unravelled, the Great Lakes coastline would more than extend across Canada. This vast coastal region provides a unique window into the Precambrian Shield of central Ontario, the St. Lawrence Lowlands underlying southern Ontario, and the ecosystems, flora and fauna of the associated ecological regions. Altogether, the Great Lakes feature an extraordinary array of natural heritage attributes (Table 1).

* This paper was not presented at PRFO 2002. This introductory photo essay was added to illuminate the PRFO 2002 Proceedings.

Table 1. Selected extraordinary heritage attributes of the Great Lakes.

- the single largest reservoir of freshwater in the world
- the longest continuous freshwater coastline on Earth
- Lake Superior, the largest freshwater lake on the globe
- the world's largest freshwater island, Manitoulin Island
- Caribou Island, the world's most remote freshwater island
- St.Clair marshes, one of North America's largest freshwater deltas
- spectacular geological and geomorphological environments
- an exceptional concentration of freshwater islands and habitats
- a continental crossroads of ecological regions, flora and fauna
- many biogeographical ties with endemics and disjunct species
- highly diverse aboriginal cultural heritage and human history
- exceptional amenity, recreational and socio-economic values
- an outstanding network of parks and other protected areas

A Remarkable Heritage

The Superior basin encompasses rocks from most of the major subdivisions of the Precambrian Shield. Granitic and volcanic rocks of the Superior Province, which form the basement core of the Shield, occur along the shore of Lake Superior. Basaltic and volcanic rocks related to mid-continental rifting (a splitting apart of the continent) provide dramatic topography around Thunder Bay and Nipigon, where giant mesas and cuestas known as the 'Port Arthur Hills', dominate the topography. Along the east shore of Lake Superior, relatively unmodified, very fresh looking volcanic rocks are strongly banded and have created a serrated shoreline character.

The coastal area of Lake Superior is marked by cold deepwater habitats punctuated by shallows only in protected bays and inlets. Along the shore, dramatic cliffs and rugged bedrock shores are interspersed with shorelines of cobble, gravel and sand deposits, adding to the diversity of habitats for plants and animals. Along the north shore, the harsh attenuating effect of the lake is evident in the Boreal flavour of the coastal and inland forests between Thunder Bay and Wawa. In sharp contrast, the eastern side of Superior features transitional deciduous forests of sugar maple *(Acer saccharum)* and yellow birch *(Betula lutea)* dominating the till-mantled uplands, with Boreal forest largely confined to the valleys and topographic lows.

Owing to its location, diverse geology and harsh climate, the Superior basin exhibits many special features. Around the lake, on suitable substrates, 'colder-than-normal' sites sustain true arctic 'relict' communities with many disjunct plants that

have persisted since deglaciation. Stranded glacial beaches sustain extensive, lichen gardens, believed to have survived since the decline of earlier post-glacial lakes. Woodland caribou (*Rangifer tarandus caribou*)—native to the region—persist in some areas with re-introductions in others. Other large herbivores and carnivores signify the true wilderness character of the region. The many islands around the lake enhance the habitat diversity of the coast, offering refugia for plants and animals including colonial nesting birds.

The North Channel of Lake Huron is dominated by sedimentary rocks of the Southern Province. These represent the deposition of sand, gravel and mud into a deep basin adjacent to the Shield. The most dramatic topographic expression of these rocks are the stunning quartzite hills and ridges of the La Cloche mountains. There is evidence in the rocks of the Southern Province that glacial periods were common during this time. In contrast, the Georgian Bay coast shows highly deformed gneissic and migmatitic rocks of the Grenville Province. This represents the core of a mountain chain that was built here a billion years ago during the collision of two continental masses. This area is very smooth and flat due to the relatively equal resistance to erosion of all of the rocks in the Grenville, and the great time of its erosion.

The North Channel and Georgian Bay is arguably the most diverse ecological region in the Great Lakes basin. The transition between the Boreal and Great Lakes regions associated with variations in physiography and ecological conditions, gives rise to diverse forests punctuated with wetlands, alvars and coastal habitats. Many of Ontario's finest alvars occur in the region, along with a predominance of Atlantic coastal plain plants and Great Lakes endemics. The numerous islands create a complex terrestrial and aquatic matrix, featuring numerous shallow aquatic habitats in the countless bays and inlets, and remote settings that provide refuge for colonial nesting birds.

South of the Canadian Shield, the geology consists of Palaeozoic rocks which are expressed most dramatically in the Bruce Peninsula, the mainland terminus of the Niagara Escarpment which extends in Ontario from Niagara Falls through Manitoulin Island. The carbonate-rich rocks of this complex, which links Michigan with New York state, represent the shallow-water deposition of reef-building animals into a warm marine environment some 450 million years ago. Its expression throughout the Bruce Peninsula and associated islands offers many opportunities to appreciate the Niagara Escarpment and its influence in determining distinctive patterns of vegetation communities and habitats.

Beyond the Bruce Peninsula, the flat lying sedimentary beds are exposed only sporadically along the coast of the lower Great Lakes, most notably in the Erie Archipelago where they house significant fossil exposures, and Prince Edward County where they contrast with the Frontenac Axis, a tongue of Precambrian bedrock which extends into New York state. Around the lower lakes—Lakes Huron, Erie and Ontario—the coast line cross-cuts extensive glacial and meltwater

features and pervasive shoreline and lacustrine deposits associated with earlier post-glacial lakes.

The Lower Lakes bridge two major forest regions—the Carolinian region extending north of Lake Erie for approximately 100 kilometres inland between Sarnia and Toronto, and the Great Lakes-St.Lawrence Forest Region extending beyond the Carolinian region onto the Canadian Shield. The ameliorating climatic influence of the lower lakes—especially Lake Erie—is a key factor in the extent of the Carolinian region, which once featured extensive rich deciduous forests interspersed with open woodlands, savannahs and prairies. Since pre-settlement times, these ecosystems have been drastically reduced to pockets of remnants so that the coastal area—like the interior—is now almost totally dominated by agricultural, rural and urban lands. This has placed added pressure on the survival of many southern species found nowhere else in Canada, giving this region the dubious distinction of housing more species at risk than any other in the nation.

The Great Lakes have been an important place of habitation since deglaciation. Numerous archaeological sites and pre-contact artifacts attest to extensive aboriginal occupation. The region's significant natural resources fueled European settlement, beginning with the fur trade, the early logging industry and agricultural development. Today, the Great Lakes remains a vital ecological and cultural asset, providing industry, recreation and amenity to many millions of people who reside in or vacation in the region. The unique ecological, social and economic perspectives associated with the Great Lakes have given rise to contrasting views and practices of stewardship and heritage preservation ranging from exploitation at one extreme to the highest order of amenity preservation at the other. This dichotomy is expressed most vividly in the juxtaposition of polluted and degraded environments alongside the elaborate network of coastal parks and other protected areas.

Protected Areas

Parks and protected areas around the Great Lakes comprise a world class heritage estate, with a lineage and maturity as impressive as the natural diversity of the region. The allure of 'big water' is reflected in many of the early foundation parks which were created along the coast: Ontario's first park—Queen Victoria Niagara Falls in 1887; Rondeau Provincial Park in 1894; Point Pelee National Park in 1918; Long Point Provincial Park in 1921; Presqu'ile Provincial Park in 1922; Lake Superior Provincial Park and Sibley (now Sleeping Giant) Provincial Parks in 1944; and Pukaskwa Wilderness Area in 1960 (later incorporated into Pukaskwa National Park) (Killan, 1993) (Figures 1 and 2). Most recently, the designation of the Great Lakes Heritage Coast, a signature site encompassing all of Ontario's Lake Superior coast and the north/east coast of Georgian Bay, caps more than a century of progress in preserving this Great Lakes heritage (O'Donoghue, this volume).

Today, examples of virtually every protective designation in Ontario are found within the extensive network of Great Lakes sites: First Nations lands, MAB reserves; CHRS designated rivers, national parks; provincial parks; national and provincial wildlife areas, conservation reserves; various natural heritage designations including areas of natural and scientific interest, wetlands, and sites for species at risk; park commission lands; conservation areas; municipal designations; and significant private holdings.

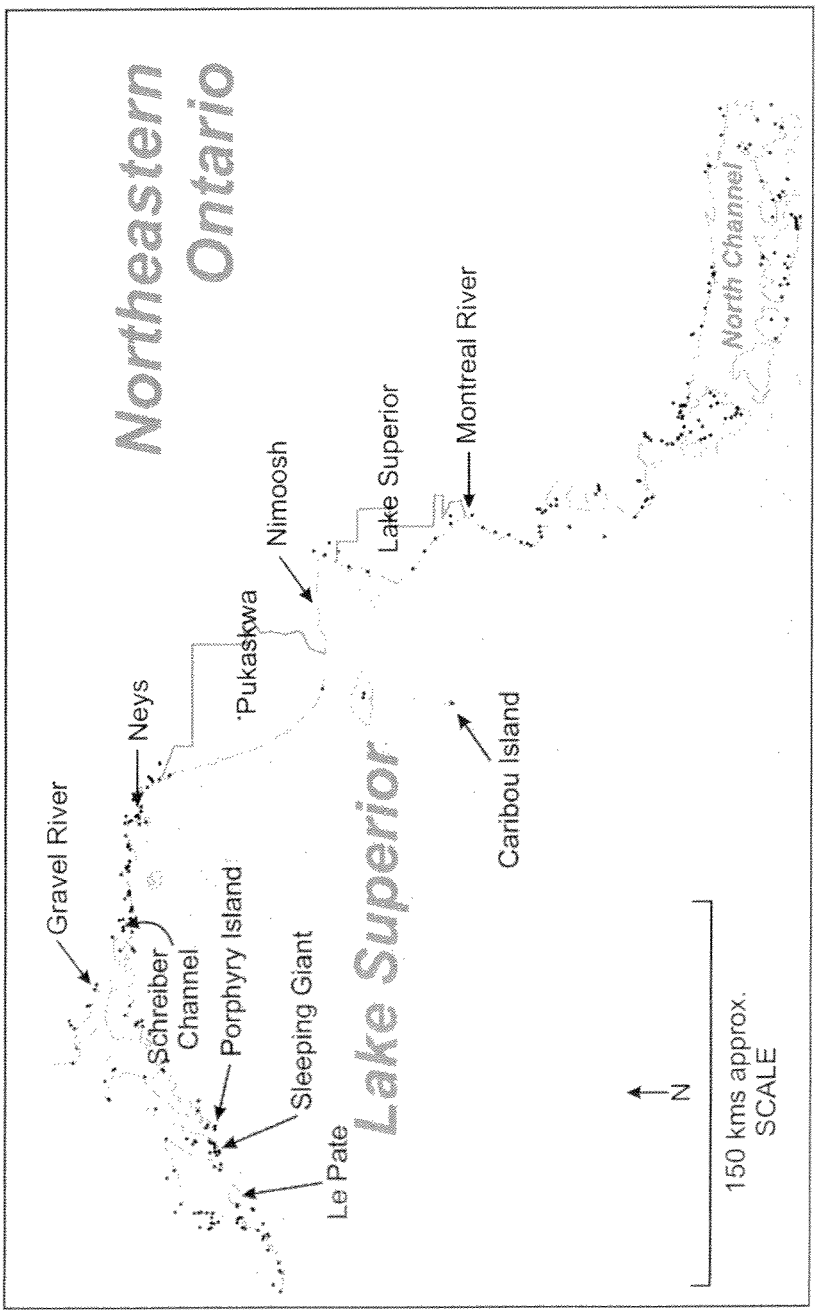
A Conservation Challenge

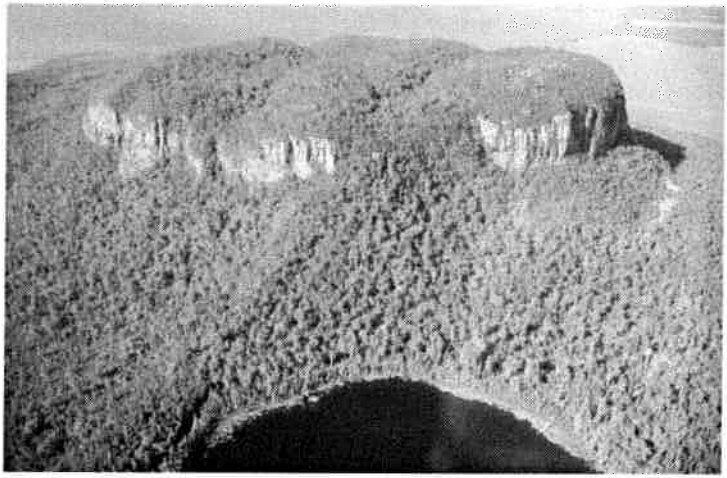
Notwithstanding the progress in establishing and managing coastal protected areas, much more remains to be done, especially on the aquatic side of the line. To date, only one formally protected 'marine conservation area'—Fathom Five National Marine Park—has been established on the Great Lakes. Many other existing coastal parks and protected areas include waterlots—some quite significant—within their regulated boundary. In many cases, more articulate policies and practices are required to protect and manage these aquatic zones. In addition, more aquatic areas still need to be designated in order to represent adequately the diversity of marine environments and ecosystems in the Great Lakes.

To meet the challenges of aquatic heritage conservation will require dedicated planning and research. More work is required in defining what constitutes an adequate system of aquatic protected areas in the Great Lakes from various perspectives including 'representation', 'special features' and 'ecological integrity'. In addition, further work is required to address the many special stewardship needs associated with protection, management and environmental monitoring. Foremost among these challenges is the need to better sort out jurisdictional responsibilities among the many stakeholders involved in the aquatic domain.

In celebration of achievements to date, and with encouragement to build upon this work, what follows is a pictorial essay of some of the most stunning, coastal protected areas around the Great Lakes (Figures 1 and 2).

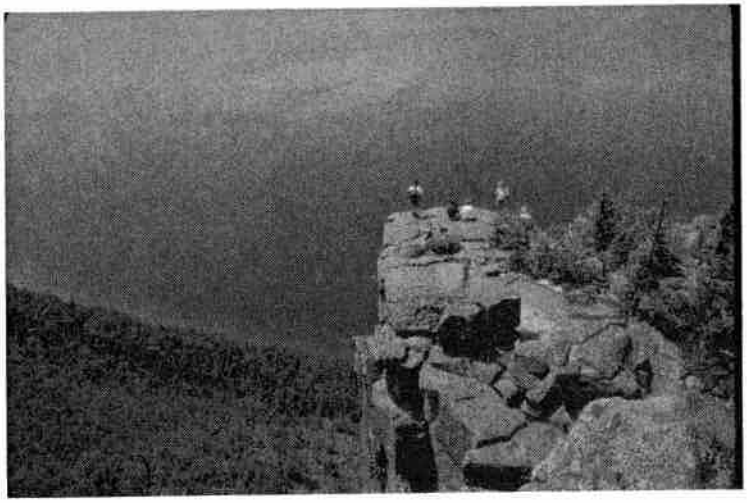
Figure 1. Featured Parks and Protected Areas with other Protected Sites in Ontario's coastal region of Lake Superior. Points depict centroids of sites on or within 5 kms of the coast. (Source: Natural Heritage Information Centre).





Le Pate, a tall isolated mesa on Pie Island, typifies the dramatic physiography of the 'Port Arthur Hills' around Thunder Bay. Le Pate Provincial Nature Reserve. (PSK)

The multiple mesa and cuesta landform complex at the tip of the Sibley Peninsula is personified as the 'Sleeping Giant' in local mythology. Sleeping Giant Provincial Park. (PSK)

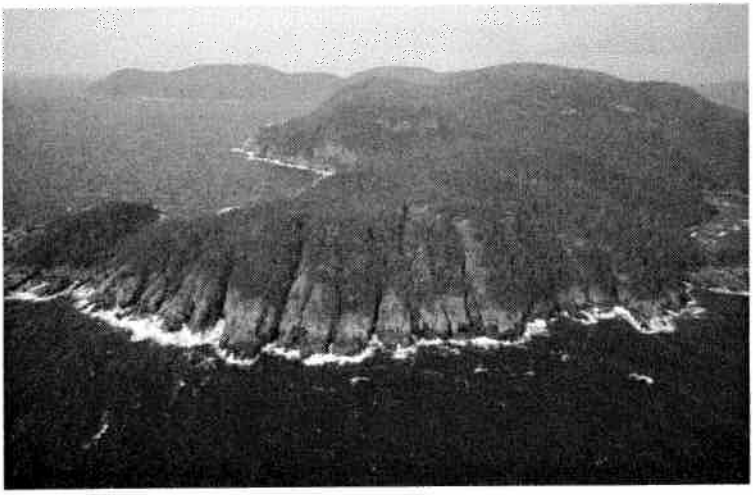


Lookouts on the Sibley Peninsula, 500 metres above Lake Superior, afford panoramic vistas of Lake Superior and the 'Port Arthur Hills'. Sleeping Giant Provincial Park. (M. Jones, OMNR Archive Photo)

Barren bedrock shores of ancient volcanic lava flows are typical of the island chain extending southwest from the Black Bay Peninsula. Porphyry Island Provincial Nature Reserve. (G. Merchant, OMNR Archive Photo)

The active bird's foot delta at the mouth of the Gravel River supports a dynamic complex of biotic communities. Gravel River Provincial Nature Reserve. (PSK)

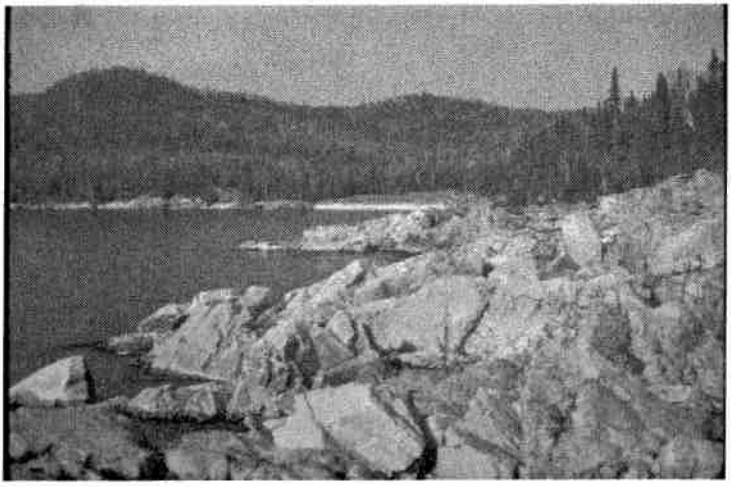
A small outcrop of Precambrian chert houses a community of world-renowned stromatolitic macrofossils (concentric imprints). Schreiber Channel Provincial Nature Reserve. (PSK)



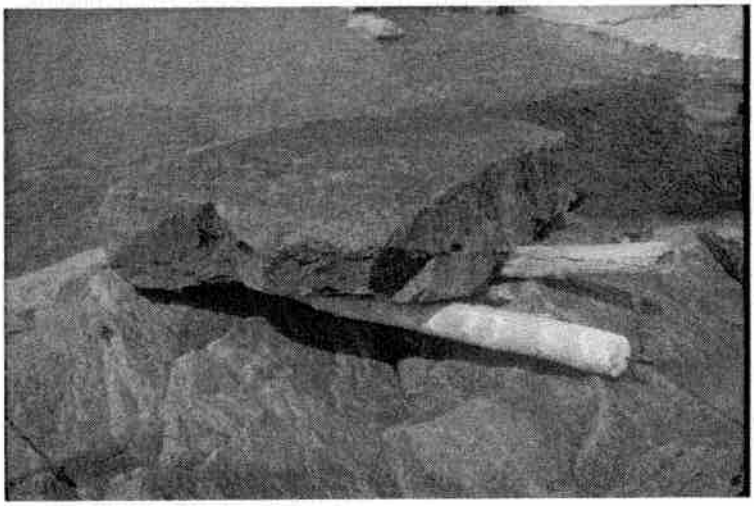
Detention Island is recognized for its spectacular topography and its concentration of post-Minong cobble beaches which ring the island's volcanic bedrock spine. Neys Provincial Park. (PSK)

Tundra-like ecosystems with arctic plants persist in colder-than-normal exposures on the north shore of Lake Superior. Neys Provincial Park. (Anon. OMNR Archive Photo)

The sand spit and rock cliff at the mouth of the Dog River, which emerges from rolling, forested Precambrian Hills. Nimoosh Provincial Park. (PSK)



Rugged, ice-plucked bedrock shores with forested Precambrian hills are typical of the eastern Lake Superior coastline. Lake Superior Provincial Park. (TJB)



A massive boulder slab perched on driftwood timbers marks a high wave surge on Lake Superior. Lake Superior Provincial Park. (TJB)

Rugged, forested Precambrian headlands, such as the Agawa River escarpment, mark many river mouths exiting into Lake Superior. Lake Superior Provincial Park. (TJB)

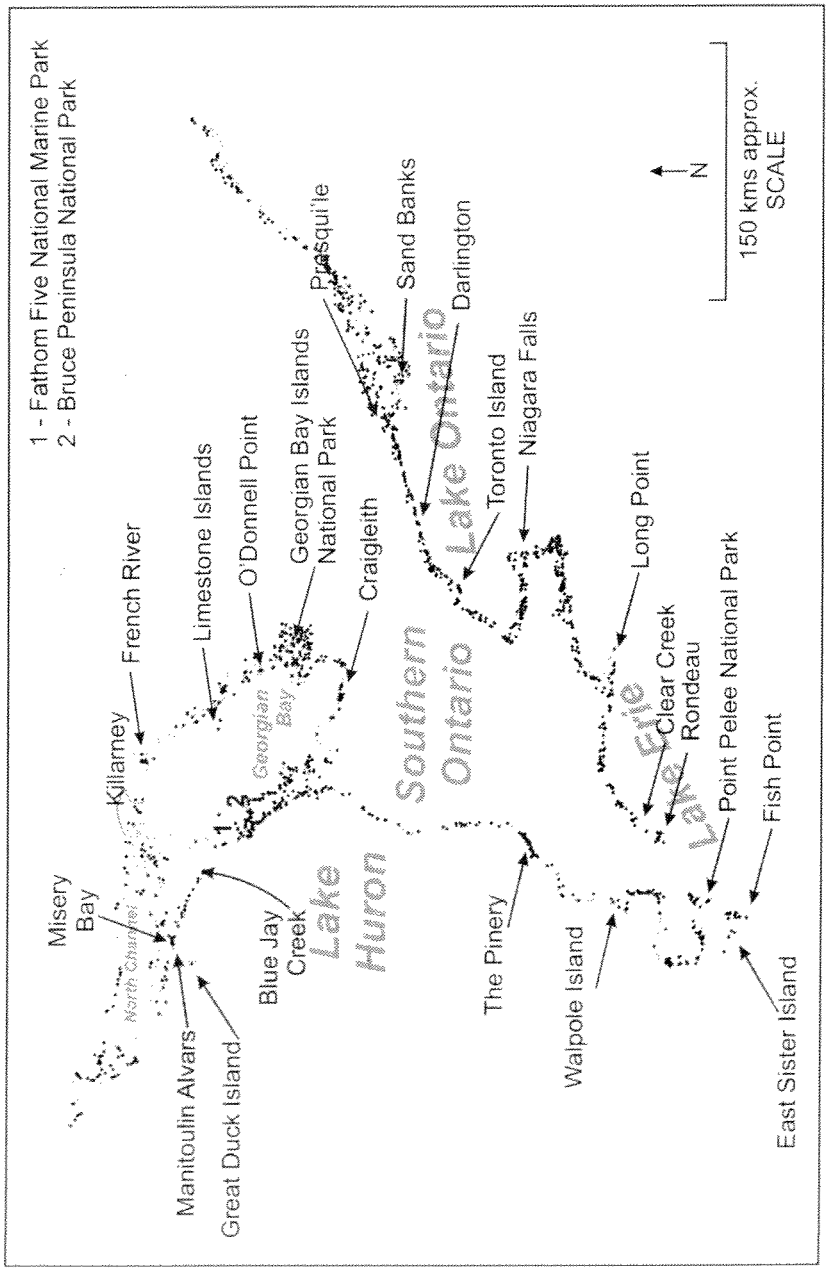
'Misshepezhieu' the swimming horned lynx in Ojibway lore, is one of numerous pictographs in many protected areas and other locales around Lake Superior. Lake Superior Provincial Park. (M. Sundland, OMNR Archive Photo)

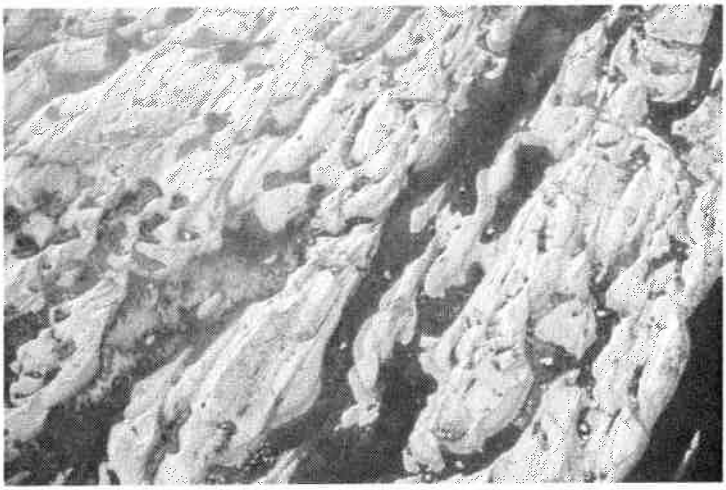
Raised cobble beaches with diverse lichen gardens mark the shorelines of post-glacial lakes in the Superior basin. Montreal River Provincial Nature Reserve. (G.Merchant, OMNR Archive Photo)

Caribou Island, an extensive, flat-lying sedimentary formation with boreal forest and wetlands, is the most isolated freshwater island in the world. Caribou Island Area of Natural and Scientific Interest. (PSK)

Magnificent 'Sphinx' ridges of ghostly Lorrain quartzite offer a magical aura to the La Cloche Hills on the North Channel of Georgian Bay. Killarney Provincial Park. (I.Macdonald, OMNR Archive Photo)

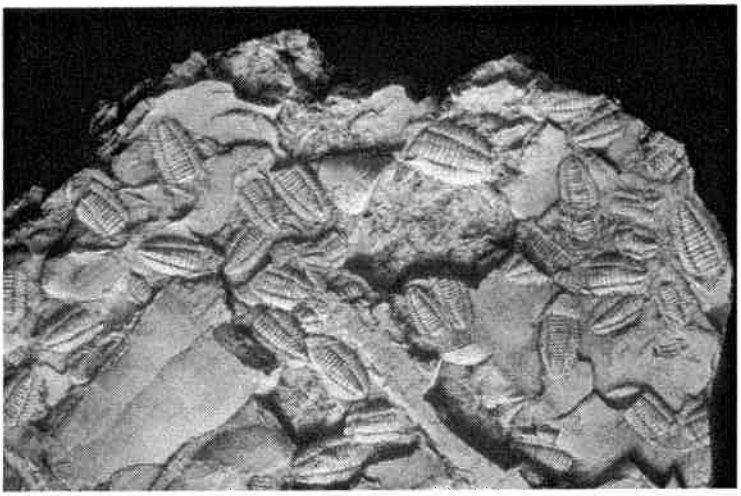
Figure 2. Featured Parks and Protected Areas with other Protected Sites in Ontario's coastal region of Georgian Bay, Lake Huron, Lake Erie and Lake Ontario. Points depict centroids of sites on or within 5 kms of the coast. (Source: Natural Heritage Information Centre).





Aerial view of dramatic 'p-forms', unique meltwater sculpturing in the bedrock at the mouth of the French River. French River Provincial Park Additions. (PSK)

Georgian Bay coastal habitats are significant for populations of Great Lakes endemic and Atlantic Coastal Plain species. O'Donnell Point Provincial Nature Reserve. (PSK)



Palaeozoic exposures around the southern Great Lakes shorelines feature significant fossil exposures, such as these casts of trilobites (*Triarthus eatoni* Hall). Near Craigleith Provincial Park. (R. Ludvigsen, Royal Ontario Museum, OMNR Archive Photo)

Globally significant alvars adorn the extensive dolostone barrens around Belanger Bay on the south side of Manitoulin Island. Manitoulin Alvars. (TJB)

Alvar pavements and shrublands feature plants and animals well adapted to these highly stressed bedrock pavements. Misery Bay Provincial Nature Reserve. (TJB)

Blue Jay Creek enters Georgian Bay through a set of raised post-Nipissing offshore bars which support prominent ridge and swale communities. Blue Jay Creek Provincial Nature Reserve. (PSK)

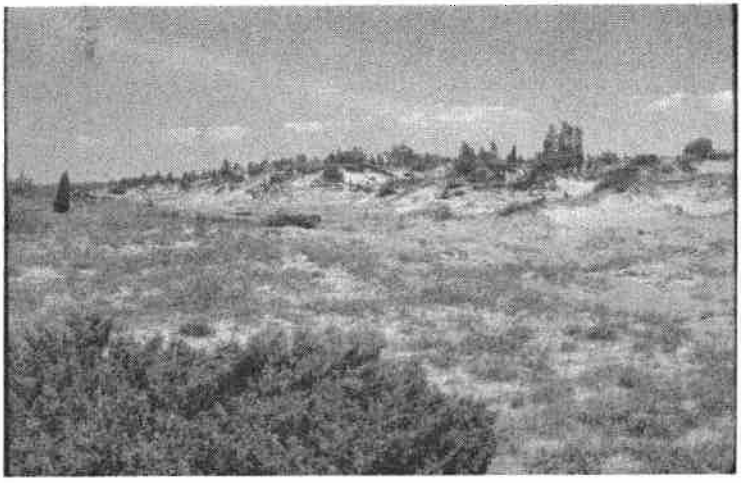
Boulder lags winnowed from thick till deposits populate shallow waters in many Great Lakes embayments. Great Duck Island. (TJB)

Northern tip of South Limestone Island showing the cobble/pebble spit and fossil-laden Paleozoic dolostone platform exploited by colonial birds. (PSK)

Escarpment and whale-back cuestas typify the eastern shore of the Bruce Peninsula and northern shore of Manitoulin Island. Bruce Peninsula National Park. (TJB)

Wave-washed glacial fluting of dolostone pavements mark the direction of ice flows and create habitat diversity on the west shore of the Bruce Peninsula. (D.Cuddy, OMNR Archive Photo)

Delicate calcareous gardens inhabit low, flat-lying bedrock shores, strewn with Precambrian erratics. West shore, Bruce Peninsula. (PSK)



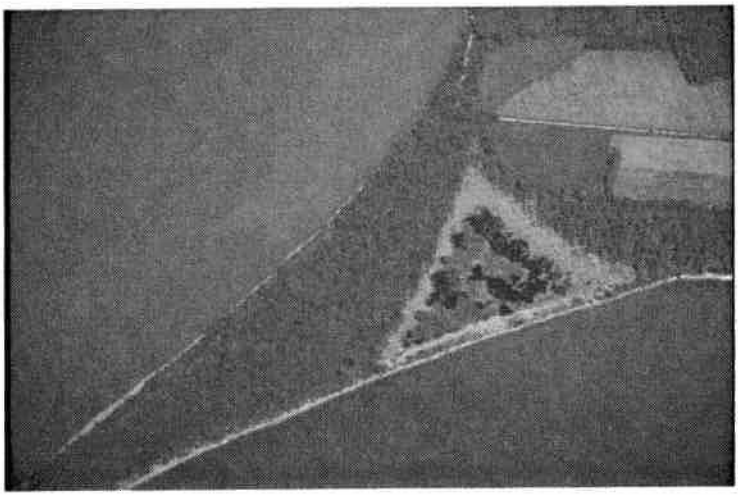
Dune systems trace the post-glacial development of shorelines and ecological succession around the Great Lakes. Pinery Provincial Park. (I.Macdonald, OMNR Archive Photo)

Boardwalks with bridges are utilized in many coastal dune systems to control pedestrian traffic and provide vantage points for viewing and interpretation. The Pinery Provincial Park. (TJB)

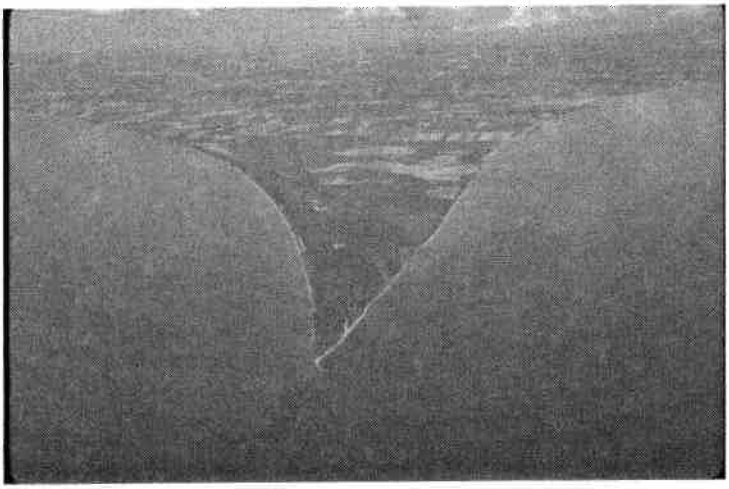
Rich lacustrine and alluvial deposits in southwestern Ontario harboured extensive luxuriant prairies and oak woodlands prior to white settlement. Walpole Island First Nation. (TJB)

East Sister Island, one of the flat-lying limestone islands of the Lake Erie Archipelago, houses many Carolinian species. East Sister Island Provincial Nature Reserve. (J. Kamstra, OMNR Archive Photo)

Lake Erie water snake (*Natrix sipedon insularum*), a pale race of the northern water snake centred on the Lake Erie Archipelago. East Sister Island Provincial Nature Reserve. (P. Pratt, OMNR Archive Photo)



Fish Point, a sinuous sandspit on the southern tip of Pelee Island, features Carolinian forest and wetlands harbouring many southern plants and animals. Fish Point Provincial Nature Reserve. (J. Kamstra, OMNR Archive Photo)

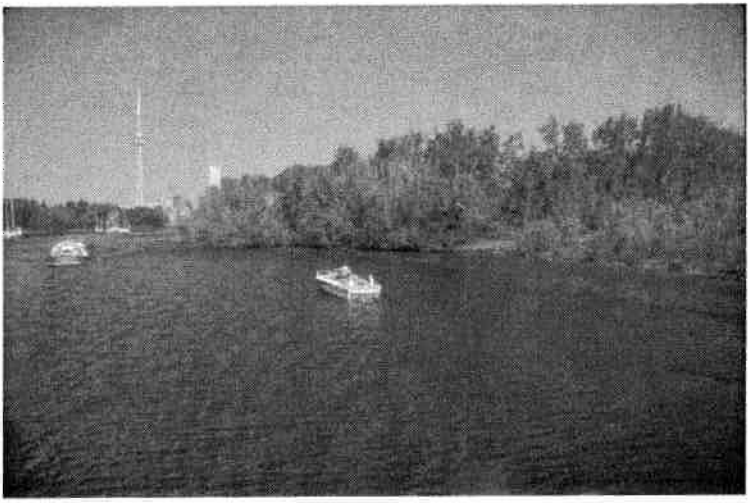


Point Pelee is one of three extensive sand spits on Lake Erie famous for highly significant Carolinian ecosystems and outstanding birding. Point Pelee National Park. (Anon. Parks Canada Archive Photo)

Clear Creek Forest, an extensive forest and riparian complex, recently acquired by The Nature Conservancy of Canada (NCC) to complement Rondeau Provincial Park. (NCC Archive Photo)

Abrasion tracks and sparse vegetation attest to hostile shoreline conditions in windswept exposures around the Great Lakes. Long Point Peninsula Wildlife Area. (TJB)

Parks and other protected areas in the coastal region provide important opportunities for scientific research and monitoring to better understand the natural world. (TJB)



Urban valleylands and pockets of woodlands and wetlands contrast sharply with the Toronto skyline. Toronto Island. (TJB)

Embayment beaches with wooded backshores characterize many shorelines in protected areas on the lower Great Lakes. Darlington Provincial Park. (PSK)

Finger sand bars with intervening wooded ridges and marshy swales provide an intricate ecosystem associated with the Presqu'ile tombolo. Presqu'ile Provincial Park. (Anon. OMNR Archive Photo)

Contemporary dunes, important for understanding shoreline evolution and ecology, are best developed on Lake Ontario in the Sandbanks-Outlet Beach complex. Sandbanks Provincial Park. (Anon. OMNR Archive Photo)

Acknowledgements

Pete Sorrill and Mike McMurtry, with the Natural Heritage Information Centre (NHIC), are acknowledged for compiling the basemaps of protected areas from the Natural Areas Database (NADb) of NHIC. Special thanks to Phil Kor, with Ontario Parks, for generously providing geological information and the images credited to him as (PSK). Archive slides of the Ontario Ministry of Natural Resources (OMNR), Parks Canada and The Nature Conservancy of Canada, featured in the article and on title pages throughout the volume, are gratefully acknowledged with photographers credits, while slides by the author are simply annotated as (TJB). Chris Lemieux is acknowledged for helping with the assembly and graphic layout of the maps, photos and the final manuscript. Review comments by Bob Davidson and Phil Kor, providing encouragement and advice on publishing the article, are much appreciated.

References

Killan, Gerald. 1993. *Protected Places: A History of Ontario's Provincial Parks System.* Dundurn Press Limited, Toronto.