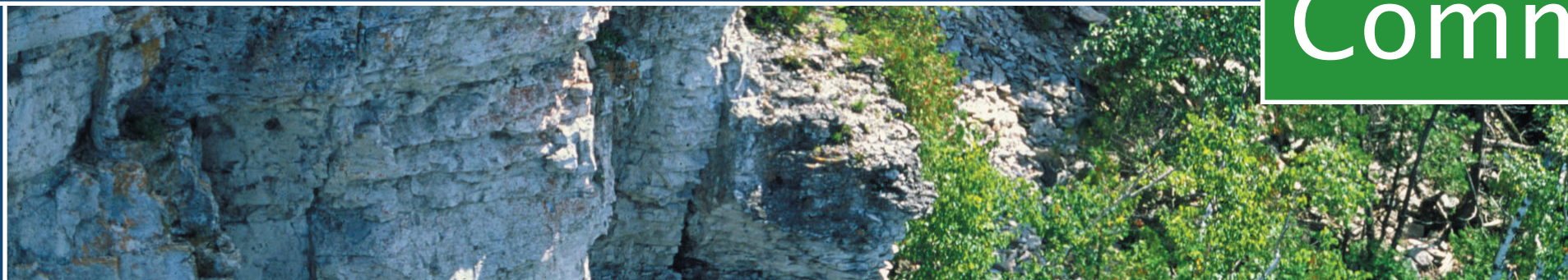




NORTHERN BRUCE PENINSULA ECOSYSTEM

Community Atlas



WILDLANDS LEAGUE
A chapter of the Canadian Parks and Wilderness Society

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INTRODUCTION



WHAT IS THIS ATLAS FOR?

This atlas presents information about the Northern Bruce Peninsula and the “Greater Park Ecosystem” of Bruce Peninsula National Park (BPNP). A Greater Park Ecosystem is the landscape around a park that influences the wildlife and ecological systems inside the park (see page 3 for a description of the Greater Park Ecosystem area). The objective of this atlas is to paint a picture of the natural values of the greater park ecosystem as well as existing and future land uses in the area. We hope that this picture, in turn, will assist everyone interested in protecting the ecological and economic health of the Northern Bruce in making good decisions and good choices about the future of this remarkable area.

THE COMMUNITY ATLAS PROJECT

From 2002 to 2005, the Canadian Parks and Wilderness Society (CPAWS) embarked on an exciting project working with local groups, individuals and agencies involved in land management around four of Canada’s national parks: Bruce Peninsula National Park and St. Lawrence Islands National Park in Ontario, Riding Mountain National Park in Manitoba, and Gulf Islands National Park Reserve in British Columbia. Our objective was to gather information about the regions surrounding the national parks; to compile this information into community conservation atlases, and to present these atlases in a way that will contribute to local policy development and land use that supports the ecological integrity of the national parks at the core of these landscapes. This Bruce Peninsula atlas has been compiled by CPAWS Wildlands League with the assistance of many other groups and individuals.

We now know that the long-term ecological health of our national parks depends not only on how lands within park borders are managed, but also on what happens in the surrounding region, referred to as the Greater Park Ecosystem. In other words, activities both inside and outside national parks impact on how well parks can protect plants, animals and ecological processes.

While we have used the technical tools of Geographic Information Systems (GIS) to analyze and present data in map forms, this project has been much more than a GIS project. It has been about working collaboratively to determine what information is needed to manage the landscape around a national park in a way that is supportive of healthy park ecosystems and healthy communities. It has been

about involving people who live in the greater ecosystems of national parks and ensuring that the atlases meet the needs of the individuals, agencies and organizations who will use it in their work and their voluntary activities.

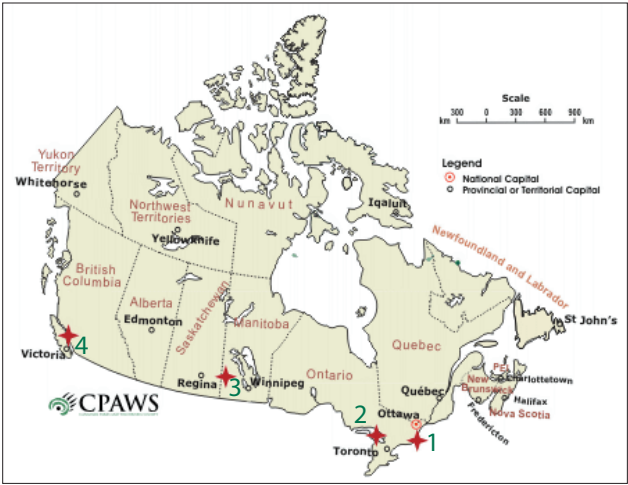
With this in mind, we involved local groups, agencies and individuals from the very beginning. Before we produced any maps, we talked to people; soliciting ideas about what information would be useful to include in a community conservation atlas, how it could be presented and how it might be used. We consulted on what data was available to build the atlas. The information that was generously provided by many people at many stages of the project is an absolutely essential part of the final atlas that is presented here.

We envision that this atlas could be used to inform government planning and policy development directly, and as a tool that will help citizens and groups participate in public planning processes in and around national parks. For example, national park management planning, local and regional planning all solicit participation from the public.

ABOUT CPAWS

The Canadian Parks and Wilderness Society (CPAWS) is a non-profit charitable conservation organization that has been working to conserve nature since 1963. CPAWS has 12 regional chapters. CPAWS Wildlands League is an Ontario chapter of CPAWS. It is a charitable conservation organization whose mission is to protect the land of Ontario through the establishment of protected areas and the promotion of natural resource use that is sustainable for nature, communities and the economy. Please visit our website — www.wildlandsleague.org — for more about our projects.

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The four national parks included in the Community Atlas Project: St. Lawrence Islands National Park (1) and Bruce Peninsula National Park (2) in Ontario, Riding Mountain National Park (3) in Manitoba, and Gulf Islands National Park Reserve (4) in British Columbia.

CHAPTER 1. THE NORTHERN BRUCE — A UNIQUE NATURAL ENVIRONMENT



The northern Bruce Peninsula is a critically important stronghold for the native flora and fauna of southern Ontario. In contrast to the extensive urban, agricultural and industrial development that characterizes neighbouring regions, this semi-wild landscape has maintained much of its natural diversity and character. In fact, its forests are sufficiently large and intact to support animals such as black bear, northern flying squirrel, barred owl and yellow-spotted salamander. As well, its cliffs, fens, talus slopes and alvars harbour many rare or unusual plant species, contributing to a rich and irreplaceable mix of wildlife habitats.

Completely unique, the northern Bruce Peninsula has been 400 million years in the making. Its defining geological feature is the Niagara Escarpment, a great limestone arc that rises and falls for 2,300 kilometres from New York State to the tip of the Bruce, north under Georgian Bay to Manitoulin Island, and south again along Lake Michigan into Wisconsin. As the one-time rim of an ancient inland sea, the escarpment has its origins in reef complexes of corals and sponges. These were eventually buried under deep deposits of sand, silt and clay that were later compressed into massive layers of sedimentary rock, and then carved by several successive glaciations.

The erosive forces of meltwater, waves and weather have continued to shape the Bruce Peninsula, eating away at the softer limestone layers of the escarpment, sculpting caves and leaving behind overhanging cliffs of harder dolomite limestone (dolostone). Chemical weathering — when water combines with minerals to form a solution that can eat away softer rocks such as limestone — has resulted in a type of terrain known as “karst,” which is characterized by sink holes, caves, underground channels and pitting of the surface rock.



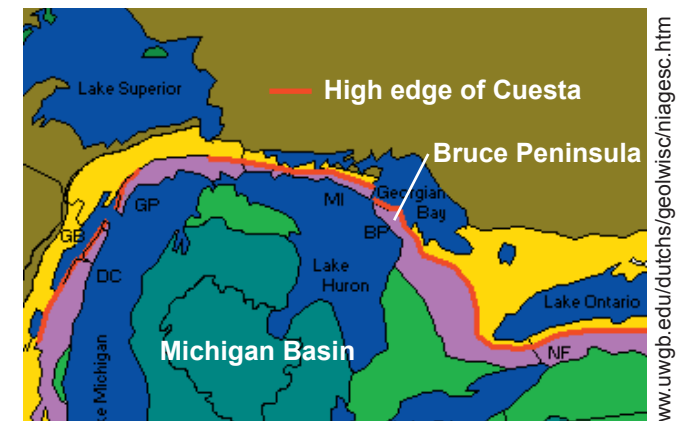
The Northern Bruce Peninsula is a unique environment that boasts high levels of natural diversity.

The rock cliffs of the escarpment provide habitat for one of the most ancient forest communities east of the Rocky Mountains, and one of the most unchanged forests in the world. The small, gnarled eastern white cedar that line the cliff face grow 10 to 100 times more slowly than those in the level-ground forests behind the cliffs. Some trees that are just 30 centimetres in diameter have proven to be hundreds of years old. Bruce Peninsula National Park contains some of the best examples of these ancient living forests, with trees ranging in age from seedlings to over 1,000 years old.

The cliffs of the escarpment provide vital habitat for a wide variety of species, including bats, snakes, hawks, owls, vultures and invertebrates. The difficult-to-access cliffs offer security in a dangerous world, especially for those rearing young. These cliffs are also home to many rare plant species, which help form a larger biotic community that is much the same today as it has been for the past 10,000 years.

The limestone cliffs of the escarpment slope westward from Georgian Bay toward Lake Huron, resulting in a dramatically varied landscape across the peninsula that includes everything from forests, lakes and streams to wetlands and rocky alvars.

Alvars consist of flat open areas of limestone bedrock with little or no soil. Exposed and windswept in winter, parched and dry in summer, and flooded in spring and when rainy, alvars favour mosses, lichens and prairie-type plant communities that can withstand extreme environmental conditions. They also support long-lived trees — the average age of trees in alvars along the Lake Huron coastline is over 300 years old. The Northern Bruce’s alvars are of particular interest, as they harbour several globally rare species and a high diversity of plant life overall: There are about 50% more plant species within the alvars than within neighbouring forests, for example.



Source: www.uwgb.edu/dutchs/geolwisc/niagesc.htm

Cuesta - Ancient landform shapes the Bruce

The curved ancient sea rim that today is known in Ontario as the horseshoe-shaped Niagara Escarpment actually starts further south, near Rochester, New York. At the tip of the Bruce Peninsula, the escarpment dips below the waters dividing Lake Huron and Georgian Bay and then resurfaces on Manitoulin Island. From here, it runs across northern Michigan and down the west side of Lake Michigan into the midwestern United States. The northern Bruce Peninsula is a transition zone on this great arc, which in geological terms is known as a Cuesta. On the upper Bruce, more northern forest types and species begin to supplant the southern deciduous forests and species that characterize the more southern parts of the Escarpment.

“Around the perimeter of the Michigan Basin the edge of the sedimentary rock layers is tilted upwards. Where this edge is exposed it has become a ridge formation, also known as a cuesta. Cuestas are ridges formed by gently tilted rock layers. Every cuesta has a steep slope where the rock layers are exposed on their edges, called an escarpment [red line on map]. They also have a more gentle slope on the other side of the ridge called a ‘dip slope.’”
- www.hamiltonnature.org/habitats/escarpment/escarpment_geology.htm



The Northern Bruce features many alvars (top photo), open or semi-open rock pavement areas that are home to many unusual and rare species that can tolerate hot dry conditions. But the area is also known for its coastal plants, some of which are more commonly found in Maritime environments. Bottom photo: dwarf lake iris.

The unique natural conditions of the Northern Bruce and its position in a transition zone between the southern deciduous and northern boreal forest zones have led to the presence of representatives of many different natural regions here, including arctic, boreal, Carolinian, prairie and maritime plants as well as plants more typical of the Great Lakes–St. Lawrence forest zone that the peninsula is actually located within.

The generally thin soils and cool climate lead to a mostly northern character in the peninsula’s forests, which are dominated by cedar, jack pine, tamarack and balsam fir. However, many southern broad-leafed trees, such as red oak, beech and sugar maple, are found here as well. Very much a transitional landscape, the area supports many species at the extreme limits of their range — north and south.

Whether you look at flowers, insects, fish, reptiles, amphibians, birds or mammals, the diversity of life on the northern Bruce Peninsula is remarkable. It is one of the finest locations in North America for viewing wild orchids (43 species), insect-eating plants (10 species) and ferns (more than 20 species). Specialties include calypso lady’s slipper, dwarf lake iris, lakeside daisy, Alaskan rein and northern holly fern. Over 60 species of fish are found in inland waters, including smallmouth bass, walleye and brook trout. Invertebrates include more than 54 species of butterflies and several spider and insect species at the northern or southern limits of their range in Ontario.

The moderate lakeside climate (winters on the peninsula tend to be relatively mild with snow loads dropping significantly toward the northern tip), abundant wetlands, ephemeral pools, rocky terraces and sandy beaches provide prime breeding and egg-laying habitat for 29 species of reptiles and amphibians, including the Massasauga rattlesnake (ranked as a threatened species) as well as the spotted turtle (vulnerable), yellow-spotted salamander and pickerel frog.



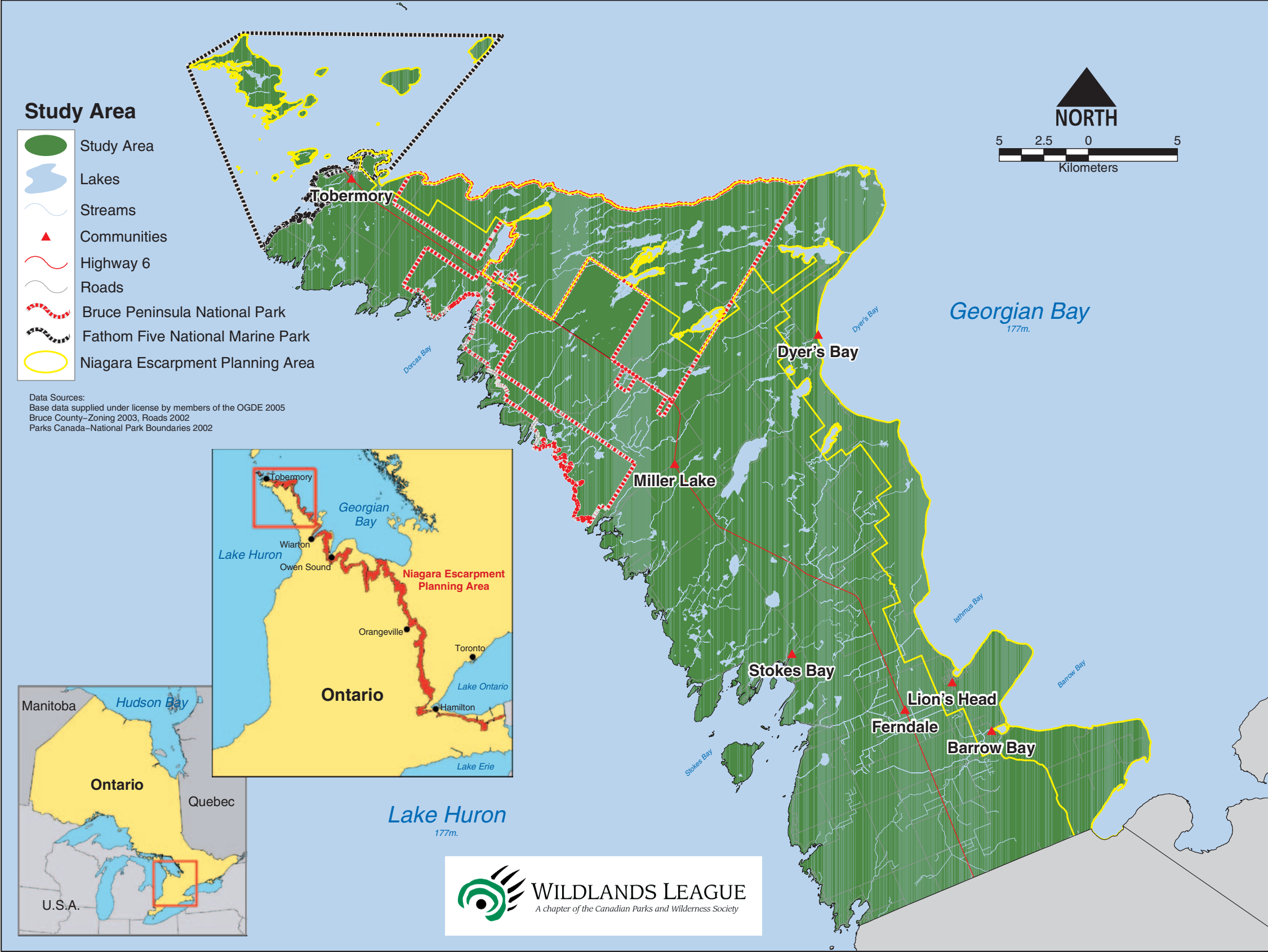
Pitcher plant

The area is especially attractive to birds because of its extensive forests, abundant wetlands, shorelines and lakes and its transitional position between southern and northern regions. Located on a major northern migration route, the Bruce acts as migratory funnel. Three hundred species of migrant and breeding birds have been recorded here, including a noteworthy diversity of raptors (nine hawk and four owl species). The large, intact forests of the northern Bruce Peninsula also support many interior forest species. Boreal species such as the olive-sided flycatcher and the ruby-crowned kinglet breed alongside southern species such as common moorhen and red-headed woodpecker, which are at the northern limit of their range here. Some western species are also present, including the sandhill crane and the western meadow-lark.

The northern Bruce Peninsula functions as a key transitional landscape for mammals as well. Thirty-nine species are found here, including seven of Ontario’s eight resident bats. Some mammals, like the river otter and red-backed vole, are more typically northern species that reach the southern limit of their ranges in Ontario on the Bruce. Because about 75% of the region is comprised of large, relatively intact forests, it is able to sustain interior forest mammals such as northern flying squirrel, fisher and long-eared bat as well as black bear, a prime indicator species for measuring the ecological health of the northern Bruce (see map on page 28).

Truly, from every angle, the northern Bruce Peninsula stands out as a unique and invaluable haven for biological diversity in southern Ontario. From its limestone cliffs to its swampy fens and rocky alvars, the area teems with life and represents a critical toehold for many species that are rare or uncommon or simply unable to tolerate the high levels of human disturbance that are typical in most other parts of Southern Ontario.

Map 1.1 — The Greater Park Ecosystem



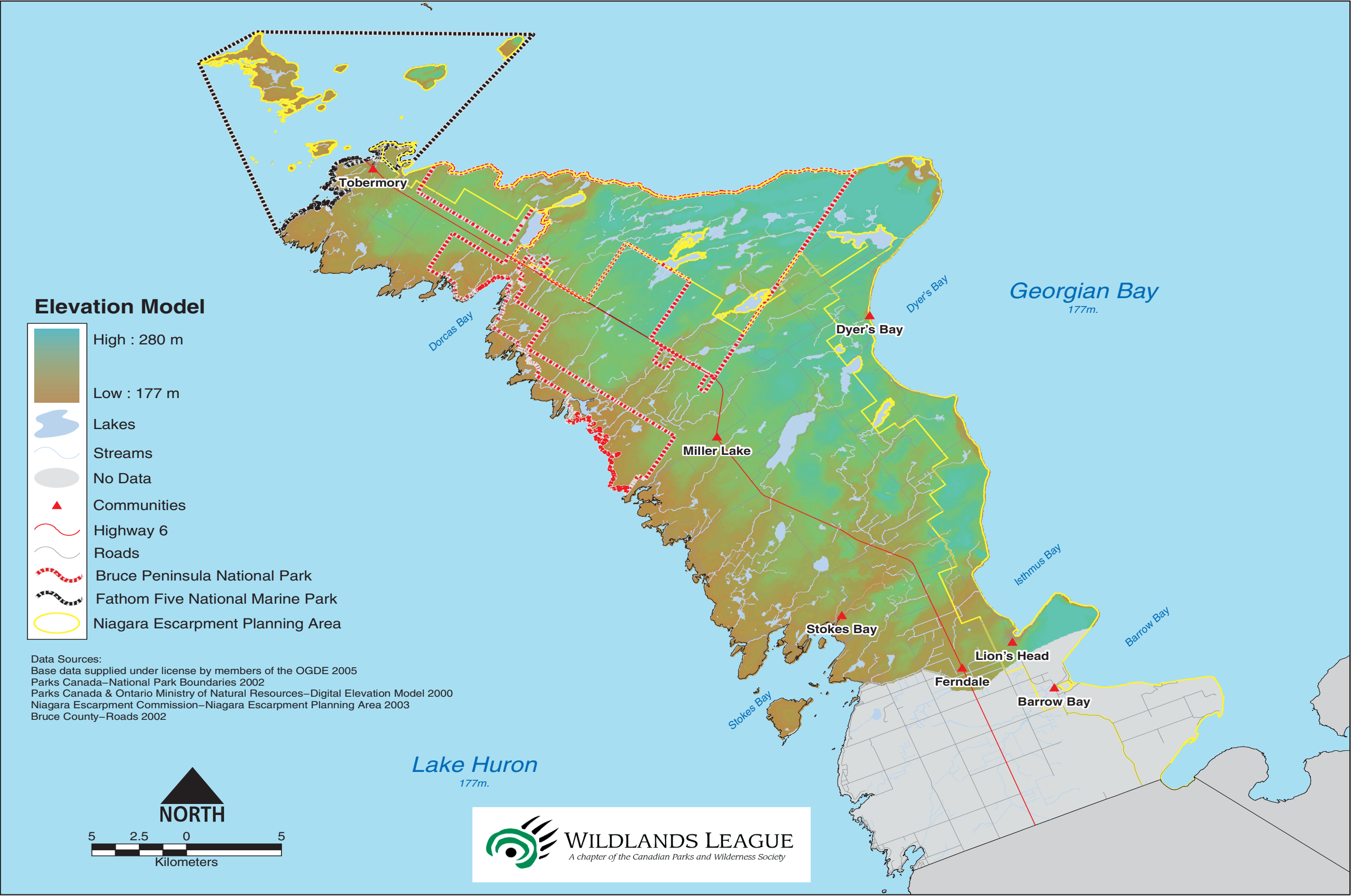
This atlas looks at land uses, habitat and ecosystem protection for what is known as the Greater Park Ecosystem of Bruce Peninsula National Park. In the Ecosystem Conservation Plan for Bruce Peninsula National Park, the area is described this way:

The view from space shows that the Upper Bruce Ecosystem (UBE) is surrounded on three sides by water. Just to the south of the park where the Bruce Peninsula narrows at Stokes Bay, the landscape changes (at what is called the Ferndale Flats) from primarily forest to primarily agricultural land. This is the practical southern limit of the UBE. The Miller Lake and Swan Lake area represents the transition zone between the rugged forests of the North Bruce and the agricultural landscapes of southwestern Ontario. Here the land is flatter, soils are deeper, and most of the forest cover has been cleared for agriculture and cattle grazing.

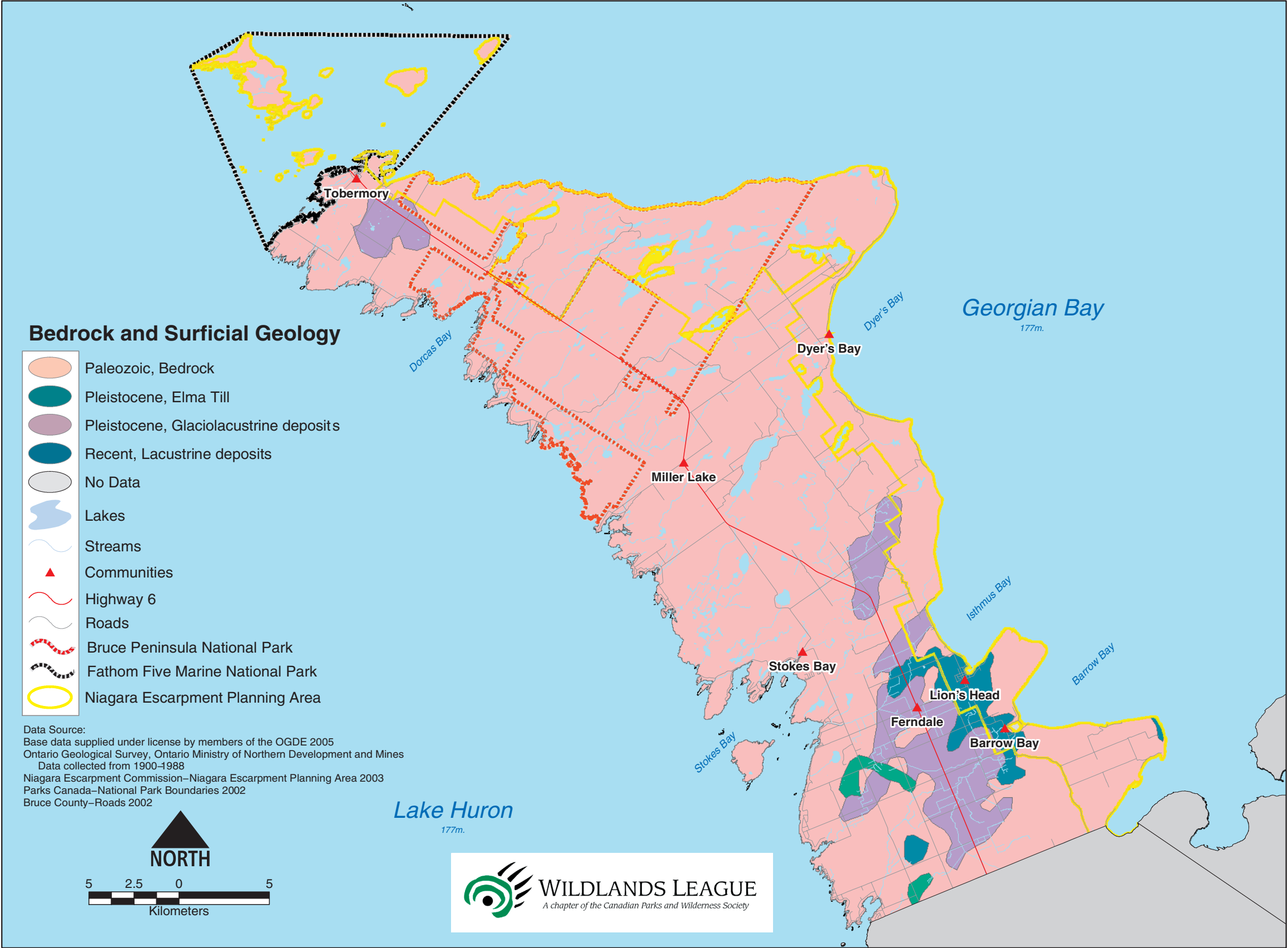
This is the area of focus for this atlas. However, the data used to create the maps in this atlas does not always perfectly match this boundary, which is approximate in any case.

Map 1.2 — Elevation of the Northern Bruce Peninsula

The Bruce Peninsula is essentially a tilted sabre dividing Georgian Bay and Lake Huron. On the high Georgian Bay side, the land plunges dramatically into the Bay with scalloped out limestone cliffs and flowerpots, eroded outliers of the escarpment that stand alone battered by waves just offshore. This is the high edge of what was once the rim of the immense Michigan Basin, a semi-tropical inland sea that covered much of what is now the central United States. From this high edge, the land falls away and slips gently under the waters of Lake Huron. The land edge here is much softer, with beaches, dunes and fens rather than rocky cliffs.



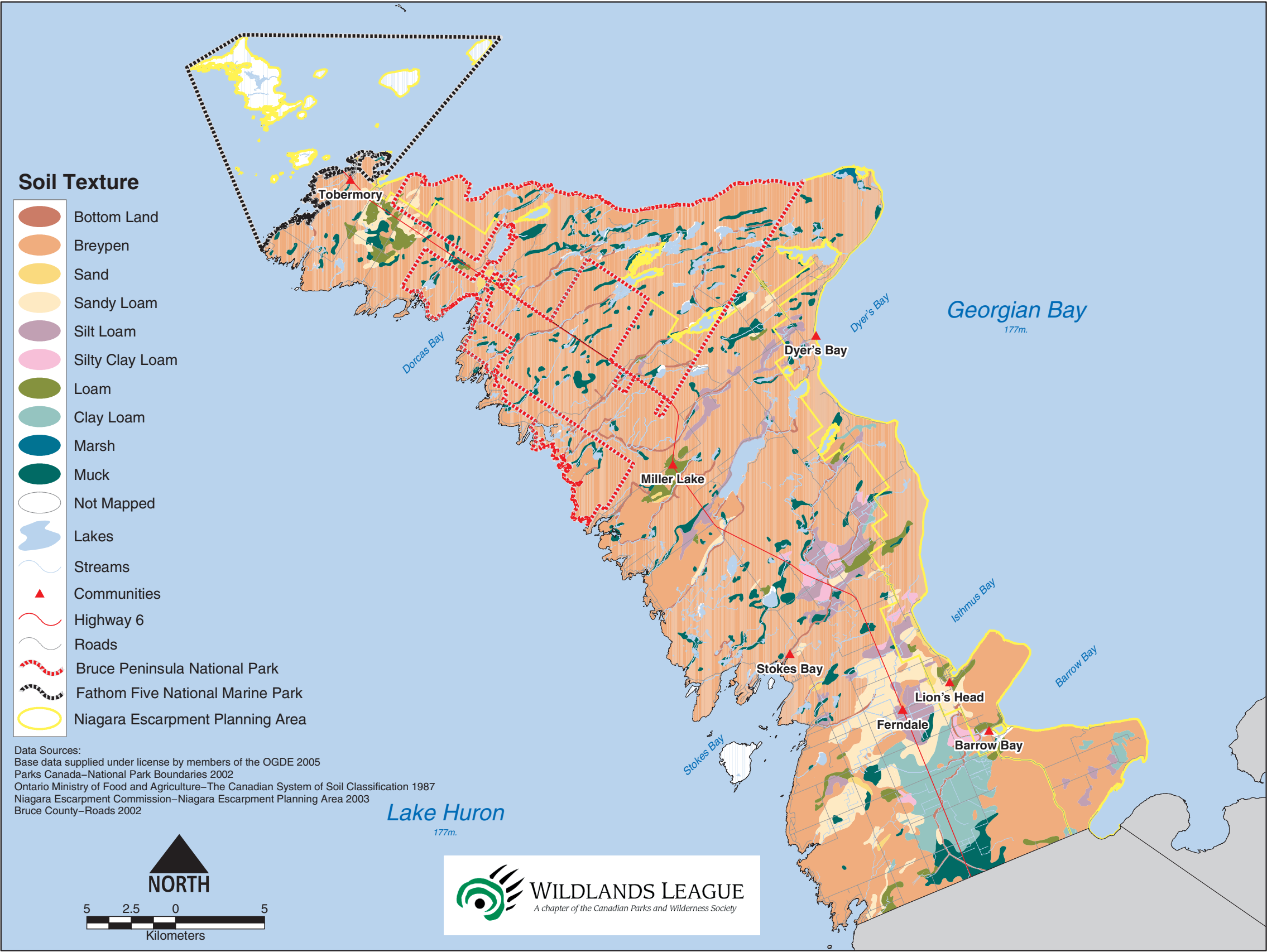
Map 1.3 — Geology of the Northern Bruce Peninsula



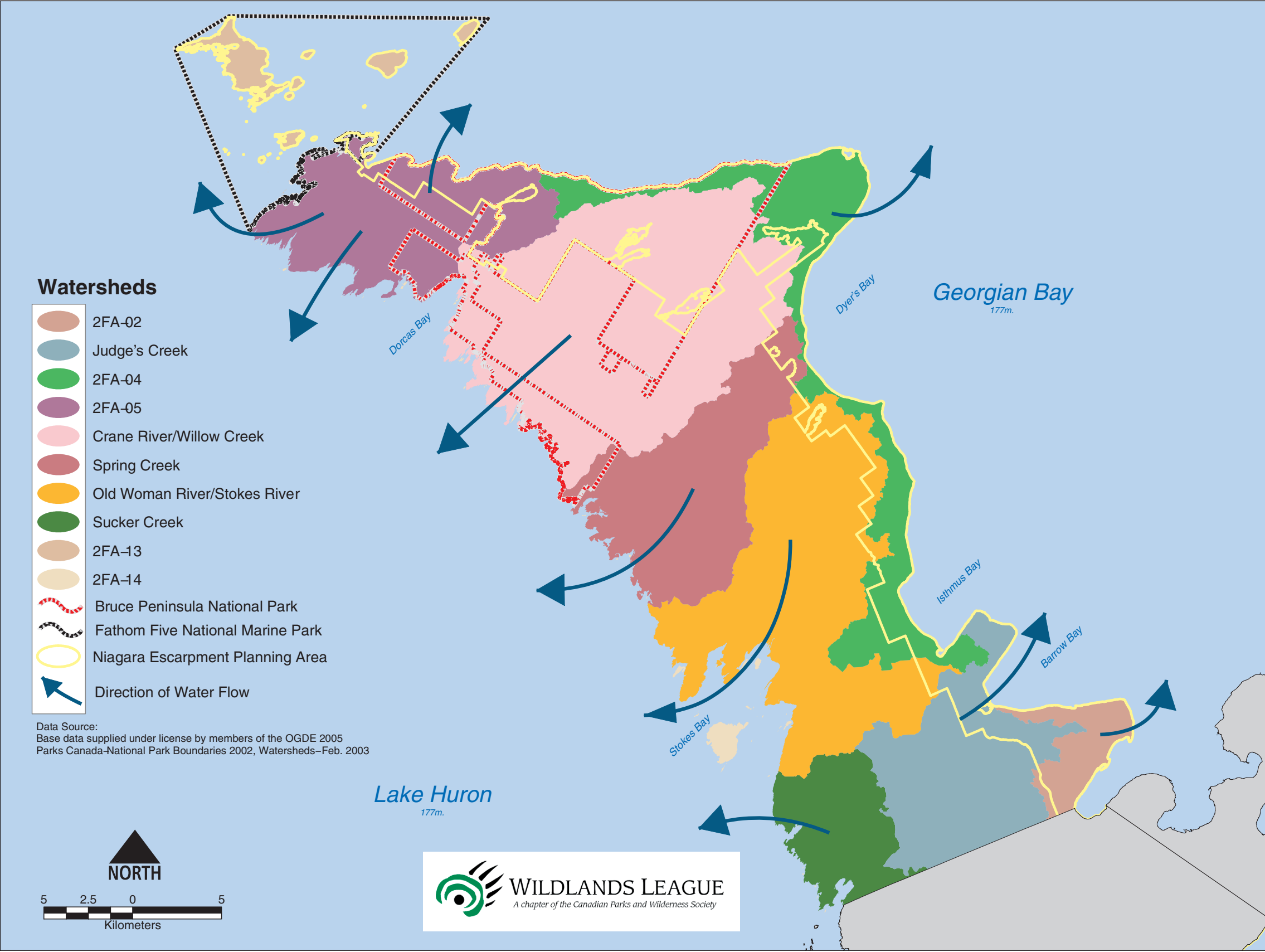
The geology map of the northern Bruce in some ways understates the geological complexity of this landscape. The northern Bruce is particularly known for its karst landscape of sinkholes, underground channels, caves and pitting. These karst landforms are a result of the mechanical (weather) and chemical (corrosive minerals that mix with water) weathering of the softer sedimentary rocks that underly the harder Dolostone caprock on the Bruce. This phenomenon leads to extensive underground drainage, and when new sinkholes or channels open up, it can actually lead to the drying out of wetlands or soils on the land surface. One of the most interesting geological formations of the northern Bruce are its extensive alvars. These areas of hot dry rock pavement with little or no soil cover at first seem extremely inhospitable, but actually support a surprising diversity of plant life.

Map 1.4 — Soils of the Northern Bruce Peninsula

The northern Bruce is mostly characterized by thin rocky soils that broke many a settler’s plough. Today, agriculture is largely restricted to the pockets of clay and till around and to the north of Ferndale — the Ferndale Flats — as well as in smaller areas near Miller Lake and just south of Tobermory.



Map 1.5 — Watersheds of the Northern Bruce Peninsula

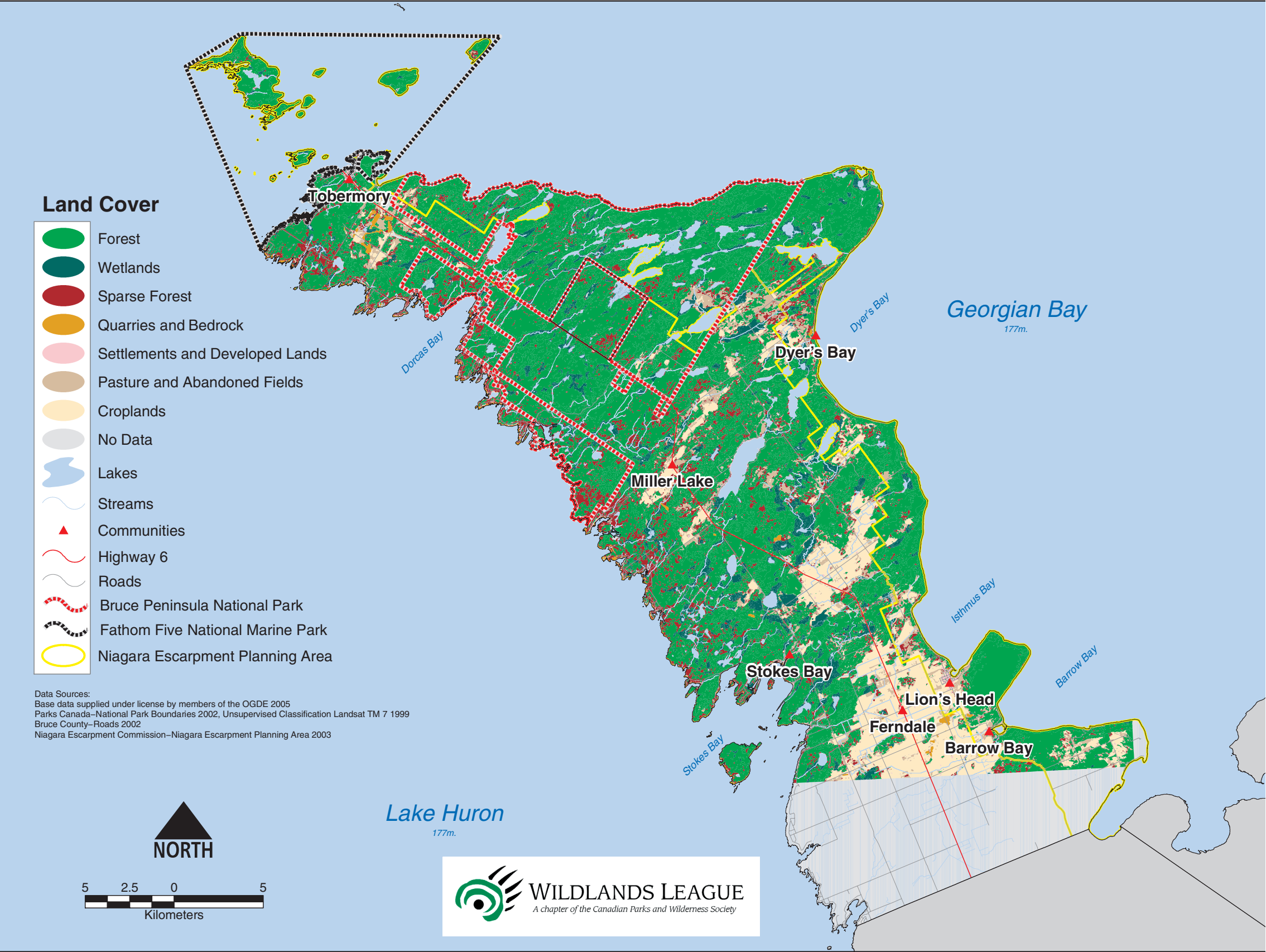


The east-west tilt of the Peninsula results in a general flow of waters toward Lake Huron. Some of this drainage occurs beneath the surface in underground channels and rivers that have cut their way through the soft porous rock. On the surface, the northern Bruce is dotted with wetlands and lakes and has a history of rich inland fisheries.

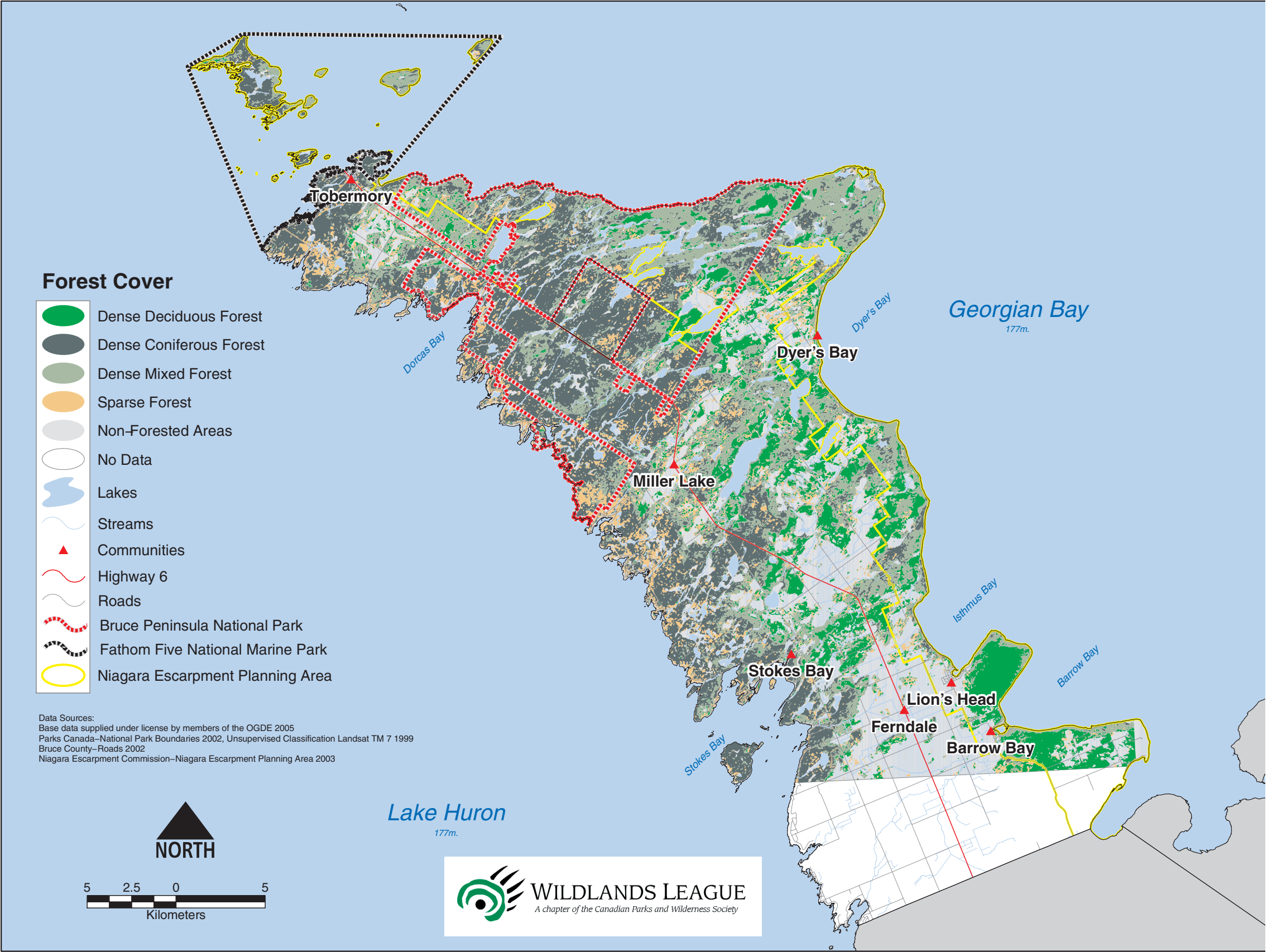
“Within [Bruce Peninsula National Park], surface waters move northeast to southwest. A complex of inland lakes, including Emmett, Crane, George, Umbrella, and Upper and Lower Andrew, are found in the north central portion of the Park; some occupy basins carved by glacial action from the bedrock. In addition to the surface flow, there is some underground drainage through caves and fissures in the bedrock. The park area also has several different types of beaches: sand, cobble, and boulder.” (Parks Canada, 1996).

Map 1.6 — Land cover of the Northern Bruce Peninsula

The northern Bruce remains extensively forested with up to 75% of the area still under forest cover. However, almost all of this forest is second or third growth due to the extensive logging and many fires that swept the Peninsula in the 1880s through to the early 1900s. The forests of the northern Bruce are also interspersed with numerous wetlands (including some large swamps), lakes and alvars (sparsely treed or open rock pavements). As noted earlier, most of the cleared agricultural land is in the southern end of the region where soils are more suited to agriculture. The region as a whole boasts highly diverse vegetation, with 872 species of vascular plants identified within Bruce Peninsula National Park alone. However, it is estimated that as much as one-third of these species may be alien invasives.



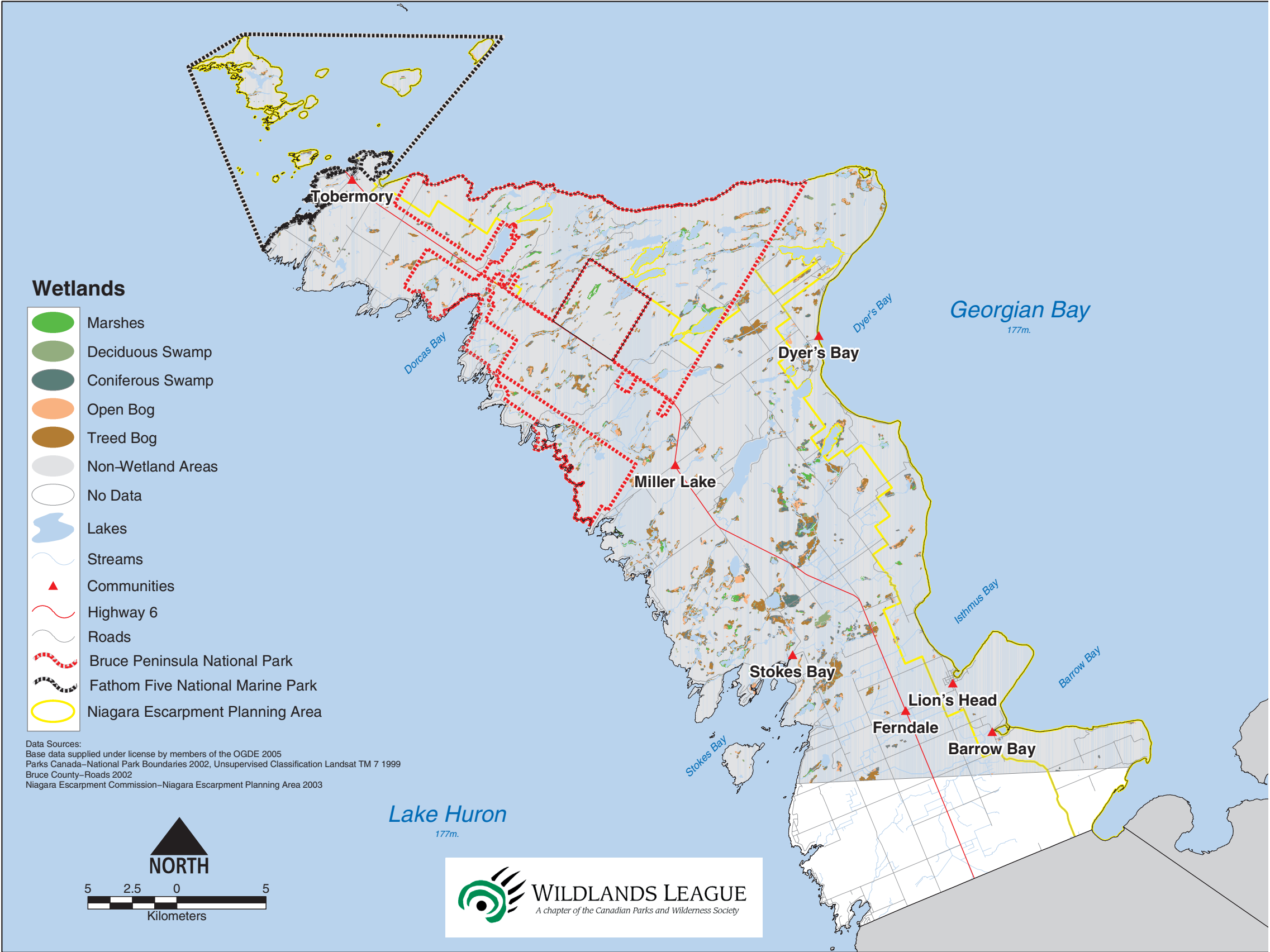
Map 1.7 — Forest cover of the Northern Bruce Peninsula



The forests of the northern Bruce Peninsula have a mostly northern character. The pre-settlement climax hemlock forests that dominated in the region before post-settlement logging, fire and agricultural clearances has been largely replaced by a second-growth forest dominated by early successional species such as eastern white cedar, trembling aspen and white birch. Stands of white, red and jack pine are still relatively common and are often mixed with white cedar. On sites with deeper soils, the natural maple-beech-oak deciduous forest has mostly been cleared for agriculture and today only pockets of this mature forest type remain on the upper Bruce.

Map 1.8 — Wetlands of the Northern Bruce Peninsula

The Northern Bruce is particularly known for the orchid-dotted fens along the Georgian Bay coastline. However, there is a rich diversity of wetland types on the northern peninsula, although wetland formation can be limited by the underlying porous rock layers, which can cause new drainage channels to suddenly open.



CHAPTER 2. HUMAN HISTORY — PEOPLE AND THE PENINSULA



The Bruce Peninsula is part of the traditional territory of the Saugeen Ojibway Nations, the collective name of the Chippewas of Nawash Unceded First Nation (Cape Croker) and Chippewas of Saugeen Unceded First Nation (Chippewa Hill). Up until the mid-1800s, the territory controlled by these First Nations included the entire peninsula as well as much of what is today Grey and Bruce County and adjacent areas.

Archeological evidence suggests that the Odawa occupied the peninsula about 2,500 years ago; however, the oral tradition from Nawash and Saugeen suggests that that their ancestors were here as early as 7,500 years ago or earlier. The Saugeen Ojibway are a part of the Three Fires Confederacy of Ojibway, Odawa and Pottawatomi, which, in turn, is part of the Anishnabek nations that historically occupied and controlled the Great Lakes region.

There is evidence that the peninsula has long been a spiritual destination for Aboriginal people from across the Great Lakes region. In particular, it is believed that many travelled to what is today Hope Bay, but to the Ojibway is Nochemoweniing, or Place of Healing.

In 1836, Sir Francis Bond Head pushed for a treaty with the Saugeen Ojibway for lands south of the peninsula in exchange for proper housing, assistance to become “civilized” and protection of the peninsula “forever.” Eighteen years later in 1854, the Saugeen Ojibway were coerced into signing another treaty, this time for the peninsula. In 1994, the Saugeen Ojibway launched a land claim for part of their traditional territory, claiming breach of trust by the Crown in failing to meet its obligations to protect Aboriginal lands. The claim seeks the return of lands still held by the Crown and financial compensation for other lands. The claim has yet to be resolved.

By the late 1800s, European settlement had begun in earnest on the peninsula, which early settlers referred to as the “Indian” or “Saugeen Peninsula.” At the time of the 1854 treaty, the Peninsula was still deeply forested with rich fisher-

ies in Georgian Bay and Lake Huron as well as in inland lakes and rivers. It took only roughly a decade, however, for the big pines to be logged out. With the construction of the first sawmill in Tobermory in 1881, the pace of logging continued to increase and by the turn of the century most of the valuable timber was gone. What followed were a series of intense fires, fuelled by the slash and waste that had been left behind by the rapid logging and agricultural land clearances of the previous decades. By the mid-1920s, almost all of the forests of the peninsula had been cut over or burnt down.

More trouble was to come for the area when the lamprey eel entered Lake Huron and Georgian Bay in 1932 through the just-finished Welland Canal, severely damaging a fishery already weakened by over-fishing of more valuable species like lake trout.

As a result, the human population of the peninsula began a steady decline in the 1900s, a trend that wasn’t reversed until the 1970s. Thin, dry soils made agriculture difficult in many parts of the peninsula and other resources had been severely depleted, leading many to leave the peninsula to settle elsewhere.

However, the beauty of the peninsula attracted visitors from the growing cities of Southern Ontario and the Great Lakes States and the first cottages began appearing in its coves and along its shorelines in the 1920s. After the Second World War, the pace of cottage development increased and today seasonal residents outnumber permanent residents on the peninsula.

Recreation and tourism are now the major economic activities for the Northern Peninsula region, fuelled by the spectacular scenery of the Escarpment cliffs, the clear waters of Georgian Bay and Lake Huron, fascinating flora and fauna, mysterious caves and well preserved shipwrecks. Many also travel through to reach the Chi-Cheemaun ferry service. The first Tobermory-Manitoulin ferry, the Kaga-wong, could carry only eight vehicles. Today, the Chi-Cheemaun carries on average 260,000 passengers a year.



Visitors have long been drawn to the natural beauty, interesting species and habitats and spectacular scenery of the Northern Bruce.



Nature-based tourism is an important industry on the Northern Bruce with thousands of visitors exploring the national park and other areas each year.

Children; Don Wilkes/Parks Canada; hiker: Willy Waterton/Parks Canada



The treacherous waters around the Peninsula have led to many shipwrecks and a fascinating maritime history. Fathom Five National Marine Park located off the tip of the Northern Bruce Peninsula, helps to protect this legacy. Above: Cove Island lighthouse.

One of the key attractions for Peninsula visitors is Bruce Peninsula National Park. Established through an agreement between the federal and provincial governments in 1987 and encompassing the former Cyprus Lake Provincial Park and other provincial lands, the park attracts an average of 74,000 overnight campers and roughly 35,000 day users each year. Camper nights at the park grew steadily through the 1990s, increasing 38% between 1992 and 2000. It is estimated that as many as 900 people a day visit the park's No. 1 attraction – the Grotto – in peak season.

The establishment of the park sparked much debate and discussion among residents of the northern Bruce during the late 1980s. One result was that areas planned for inclusion in the former Lindsay Township were dropped from consideration. The final park boundaries encompass an area of approximately 156 square kilometres, but currently there are significant private land holdings within these boundaries (covering about one-fifth of the park's area). (All lands identified for inclusion in the park are to be acquired only on a willing-seller, willing-buyer basis, which means the park will not expropriate land and private landowners are not required to sell to Parks Canada.)



Overuse of popular areas is a major concern for park staff.

As a park established within a settled landscape, Bruce Peninsula National Park in many ways represents a series of ecological compromises, with straight line boundaries that do not reflect ecosystem or species population boundaries, a major highway running through the centre of the park, and pre-existing uses like snowmobile trails, that are not usually allowed within national parks.

As of 2003, 22% of land within the park boundary was privately owned, 37% was owned by Parks Canada and 32% was provincial land managed by Parks Canada under agreement with the Ontario Ministry of Natural Resources. Seven percent is inland waters (lakes and streams). (See map on page 15.)

Parks Canada

The result is that, almost 20 years after its establishment, Bruce Peninsula National Park is still a work in progress, but one that has been increasingly embraced by both local residents and visitors. A park survey of Bruce County residents found, for example, that 73% of respondents felt that the most important role of the park was protecting the natural environment. Sixty percent of the local residents surveyed had visited the park in the previous year. Meanwhile, it is estimated that close to 10 million people now live within a four-hour drive of the park and, of current visitors, close to half have visited more than once. The beauty of Bruce, it seems, is a powerful drawing card.

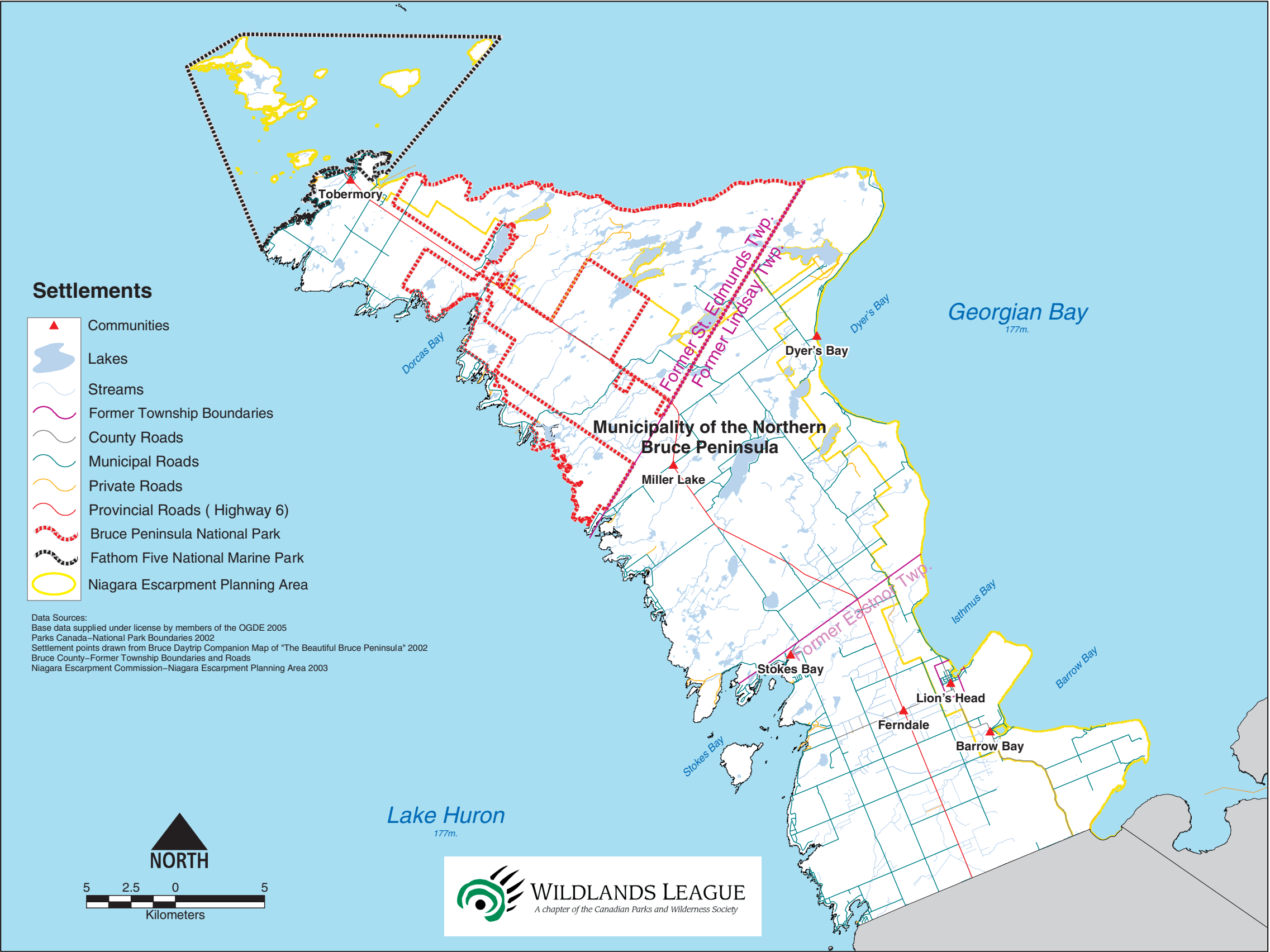
Figure 2.1 — First Nations Territories



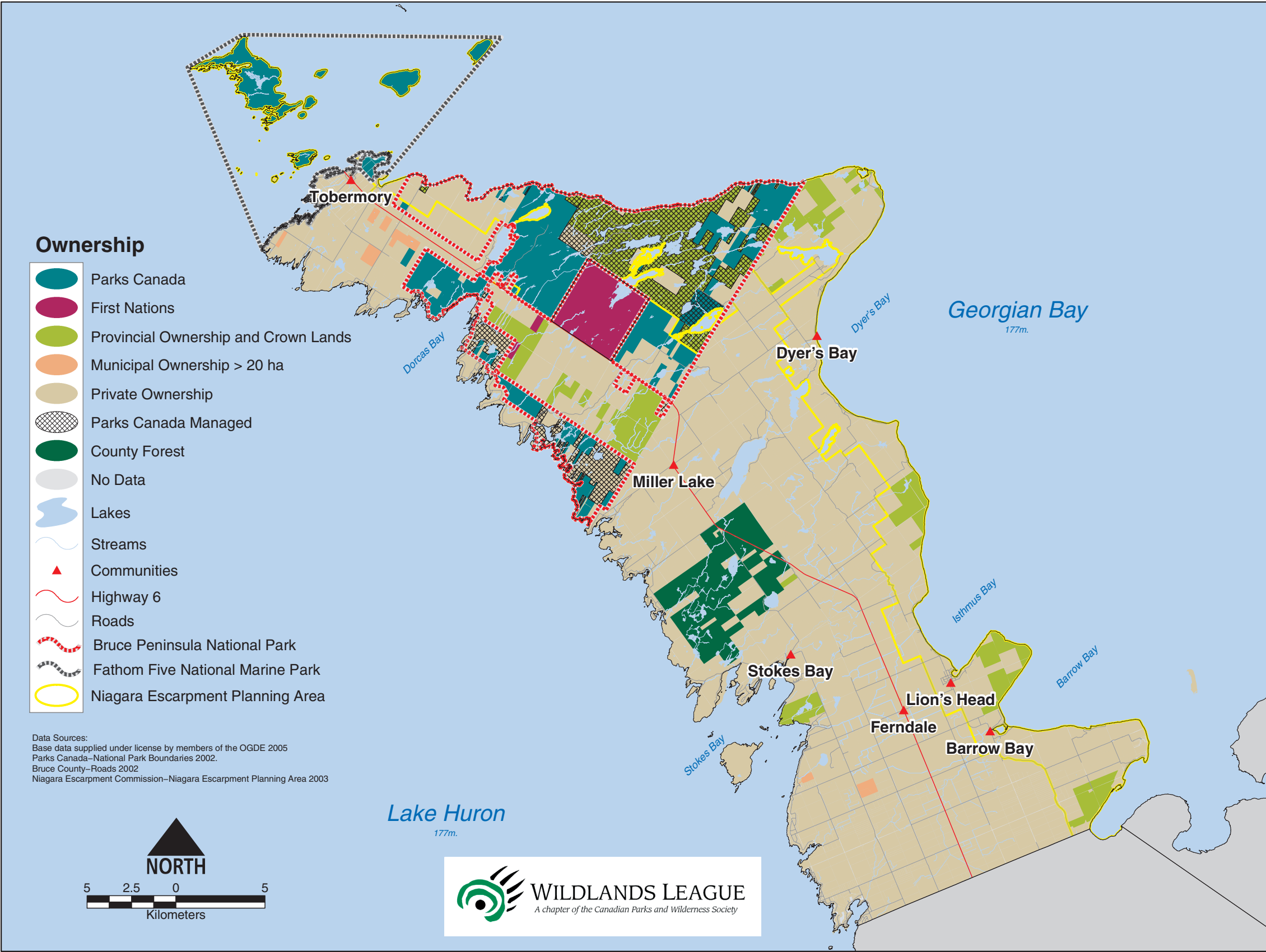
Figure 2.1 is based on the traditional knowledge of the elders of the Saugeen Ojibway Nations and current research. It shows the territory and treaty areas of the Saugeen Ojibway peoples, who have inhabited the Bruce Peninsula and areas to the south of it for thousands of years. Saukiing Neyashiing translated means “homeland of the Saugeen Nations, this beautiful land partially surrounded by water.” As well as current reserve lands, the Saugeen Ojibway Nations (composed of the Chippewas of Nawash Unceded First Nation and the Saugeen Ojibway Unceded First Nation) share a hunting ground known as Nitaage-kamiing, which is bounded on three sides by the national park. The First Nations collectively launched a land claim in 1994 for part of their traditional territories, claiming breach of trust by the Canadian government in meeting its obligation to protect Aboriginal lands. The claim seeks return of lands that remain unsold and financial compensation for the loss of use of the peninsula.

Map 2.1 — Settlements of the Northern Bruce Peninsula

There are no major urban centres on the Bruce Peninsula, but rather a mixture of towns and hamlets. The Bruce County official plan sets out a goal of generally preserving the rural character of the county, while steering population growth to identified population centres. On the northern Bruce, these centres are Tobermory and Lion's Head. Overall, the population of Bruce County is slowly increasing, but income levels remain below the provincial average and the average age of residents is higher than the provincial median.



Map 2.2 — Land ownership of the Northern Bruce Peninsula



There is a complex mix of land ownership on the northern Bruce Peninsula, including within Bruce Peninsula National Park itself. Large public landholdings include lands owned by Parks Canada, provincial park lands, provincial crown lands, and county forests. Lands within the boundary of Bruce Peninsula National Park include lands owned by Parks Canada, provincial lands managed by Parks Canada, and private lands that are outside of Parks Canada's control. The intent is for Parks Canada to eventually acquire all lands within the boundary of Bruce Peninsula National Park, but this will be done only on a willing seller-willing buyer basis in the case of private lands.

As of 2003, 22.1% (34.5 km²) of the land within the BPNP boundary was under private ownership, 37% (57.7 km²) was owned by Parks Canada and 32% (50 km²) was managed by Parks Canada under agreement with the Ontario Ministry of Natural Resources. Seven percent was inland waters (lakes, rivers, etc.).

CHAPTER 3. PROTECTING THE PENINSULA



The 156-square kilometre Bruce Peninsula National Park is the largest protected area on the Niagara Escarpment and forms an important northern anchor for the system of special land-use zones and protected areas that run along this natural corridor from Niagara to Tobermory. Officially, the park was established to protect a representative example of the ecosystems and habitats of the Great Lakes-St. Lawrence Lowlands natural region, one of 39 such regions identified by Parks Canada from coast to coast. However, it has also been more informally described as “a living example of what the southern Ontario wilderness once looked like.”

On the northern Bruce, the National Park is joined by a number of provincial protected areas, including provincial parks and nature reserves, and a handful of private nature reserves (some of which are managed by the national park) that together provide relatively strict protection for about 19% of the northern Bruce landscape. In these special places, no industrial activity (logging, mining) or development (cottages, homes, businesses) is allowed.

In addition to these strictly protected areas, there is what might be called a second tier of areas that have been designated for special consideration and management. These include Areas of Natural and Scientific Interest (ANSIs) and significant wetlands, woodlands and wildlife habitats. However, these areas do not have the kind of formal legislated protection enjoyed by the national and provincial parks under the Canada National Parks Act and the provincial Parks Act and are not off-limits to development. (For provincially significant wetlands, no new development is allowed under provincial policy.)

There are provisions in the Bruce County official plan for identifying significant natural areas and assessing the potential impact of development on such places. In some cases, the plan requires the development of Environmental Impact Statements before any development is allowed within such areas. The 1997 Bruce County Official Plan sets out a number of objectives for protecting the fragile northern Bruce environment and says the county will “identify, conserve, and where possible enhance the natural environment to ensure that natural systems

are sustained, which will also serve to maintain human health.” The plan specifically calls on the county to:

- identify, protect and enhance all Provincially significant wetlands and Areas of Natural and Scientific Interest (ANSIs);
- identify and preserve areas of environmental or ecological significance;
- encourage the preservation of locally significant Environmentally Significant Areas (ESAs); and,
- protect the habitat of endangered and threatened species.

In addition, the Niagara Escarpment Plan (NEP) designates a number of zones that regulate the type of development that can occur along the Escarpment. This NEP zoning covers a wide band along the east side of the Peninsula and ranges from the

“Escarpment Natural” zone, which allows for only very limited development, to zones such as “Recreation,” “Urban Area” and “Mineral Extraction” that allow for a much wider range of developments and activities. (See page 22 for a description of all the NEP zones.) The strongest level of protection (the Escarpment Natural zone) applies to the cliff edge and shoreline areas along the escarpment, although there is significant cottage and residential development along the Georgian Bay shoreline that pre-dates the NEP.



The Northern Bruce Peninsula is known for its rare and unusual species, including many orchids. Above: showy lady's slipper.



The Niagara Escarpment forms a natural corridor along the eastern edge of the Peninsula.

Protecting Ecological Integrity — Putting Nature First

“Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority when considering all aspects of the management of parks.”

“Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations.”

Canada National Parks Act, 2000

The Bruce Trail — Promoting protection and appreciation of the Niagara Escarpment from Niagara to Tobermory

The Bruce Trail Association (BTA) has added considerably to the protected areas system in the Northern Bruce Peninsula. By purchasing property and then giving it to the provincial or national parks system, it has secured more than 24 kilometres of trails in the Municipality of Northern Bruce Peninsula while protecting 445 hectares of land.

The Mission Statement of the Bruce Trail Association is to “Provide a public footpath to promote protection of the Niagara Escarpment and appreciation of its natural beauty.” True to its mission, over the past several years the BTA has undertaken a land conservation program for properties along the Niagara Escarpment. Through donations from BTA members, corporate donors and the provincial government, the BTA purchases land on the Escarpment so it can be preserved in perpetuity.

For example, the Dean property, located just north of Lion’s Head at White Bluff, is a spectacular example of Escarpment shoreline topography. The BTA is currently discussing transferring this and other properties to Ontario Parks for their long-term conservation.

The importance of protecting the Escarpment connection to the overall health of Bruce Peninsula National Park cannot be overstated. As the Ecosystem Conservation Plan for Bruce Peninsula National Park (BPNP) states “It is this thin ribbon of relatively intact forest that provides the terrestrial corridor linking the park to the rest of southern Ontario. Without this land bridge, BPNP would truly be an island. Indeed, the well-being of the park is inherently tied to the well-being of the Niagara Escarpment. It is this thin ribbon of near wilderness known as the Niagara Escarpment Biosphere Reserve that holds the key to the long-term future of Bruce/Fathom Five.”

Another notable category of natural area on the Northern Peninsula is the large county forest near Clarke’s Corners (which also overlaps with ANSIs and other environmentally sensitive areas). County forests are zoned as “open space” under the county’s official plan, meaning development should be limited in these areas, but they have no official protected status. Management of county forests is generally guided by a multiple-use philosophy, with different forms of recreation (including motorized recreation) combining with other uses such as logging.

For the top tier protected areas, which provide the strongest protection for species and ecosystems within their boundaries, the missing link remains a system of corridors or carefully managed landscape linkages to bring these areas together in an actual protected-areas network.

Scientists have come to understand that protected areas on their own cannot provide long-term protection for species and ecosystems. There are a few reasons for this. Firstly, most protected areas are usually too small to meet the full habitat needs of wide ranging species like bears or wolves. Secondly, when protected areas become surrounded by developed landscapes, the populations of species within them become cut off from a healthy interchange with other populations in other areas. This is called the “island effect,” with wild species stranded on isolated protected “islands” that can’t meet their long-term survival needs. Such “islands” are also more vulnerable to things like invasive species and disturbances, such as storms or fires that can leave their wildlife populations with nowhere else to turn.

Fortunately, the Northern Bruce remains well forested and — especially compared to most other areas of Southern Ontario — its natural landscape remains relatively intact. The NEP land-use designations along the Georgian Bay side of the penin-



Unlike many other areas of Southern Ontario, the Northern Bruce Peninsula remains heavily forested.

sula also provide some assurance that the “ribbon of green” running along the Escarpment has some long-term protection. Outside of the NEP plan area, however, protection for environmentally significant areas is much spottier, and much more dependent on things like municipal zoning and the goodwill of farsighted private landowners.

Bruce Peninsula National Park itself is also a less than fully intact natural landscape. Parks Canada’s 2003-04 *State of the Parks* report found that the park faces a number of threats to its ecological integrity, including missing top predators such as wolves, the pressures of surrounding development and population growth (particularly as it leads to increased seasonal use) and the

presence of roads within the park that fragment forests and ecosystems.

Some of these issues can be dealt with within the park, such as by removing no-longer-used roads or dwellings. But many other issues reach well beyond the park’s boundaries and require cooperation from the local community. Bruce Peninsula National Park is the jewel that sits at the tip of the Escarpment crown. But if the rest of the crown crumbles away, the wild species and ecosystems that make this place special are not likely to remain intact and in place for long.

Escarpment Biosphere Conservancy — working to create conservation corridors on the Northern Bruce

The mission of the Escarpment Biosphere Conservancy (EBC) is to create nature reserves in the area of the Niagara Escarpment. The land trust has determined that the Huron shore of the Bruce Peninsula is the most ecologically sensitive and most threatened part of Ontario north of Carolinian Canada. Landowners, donors and foundation funders, with provincial government support, have joined with EBC to build ecological corridors, especially along the shore from Stokes Bay to Tobermory with land that is worth \$1,275,000.

While the Conservancy has created 42 reserves from Caledon to Manitoulin, 18 of these properties are on the Bruce, including more than two kilometres of shoreline. EBC’s focus has been the 800 hectares it has protected to create an ecological corridor joining and extending the Bruce County Forest and the national park on the Huron shore. It has two more agreements in progress at Cape Hurd, including a further kilometre of shoreline. Discussions are also underway with three more landowners who are contemplating conservation agreements to prevent development on their land.

Notable reserve discoveries include Massasauga rattlesnakes, a great grey owl, ancient cedars, a queen snake (formerly thought to have been extirpated from the northern half of the Bruce) and three-dimensional glacial formations on alvars.

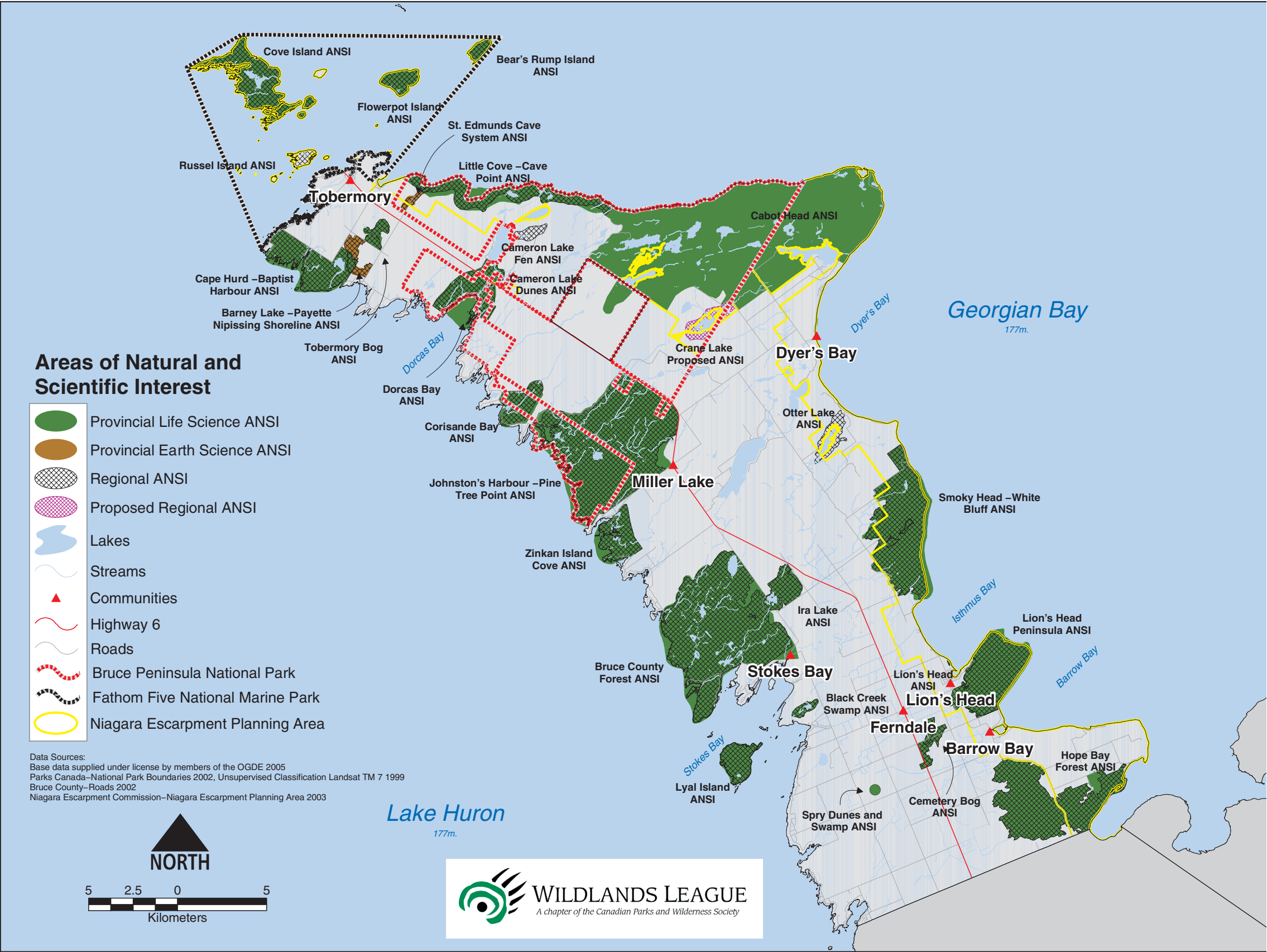
Map 3.1 — Protected areas of the Northern Bruce Peninsula



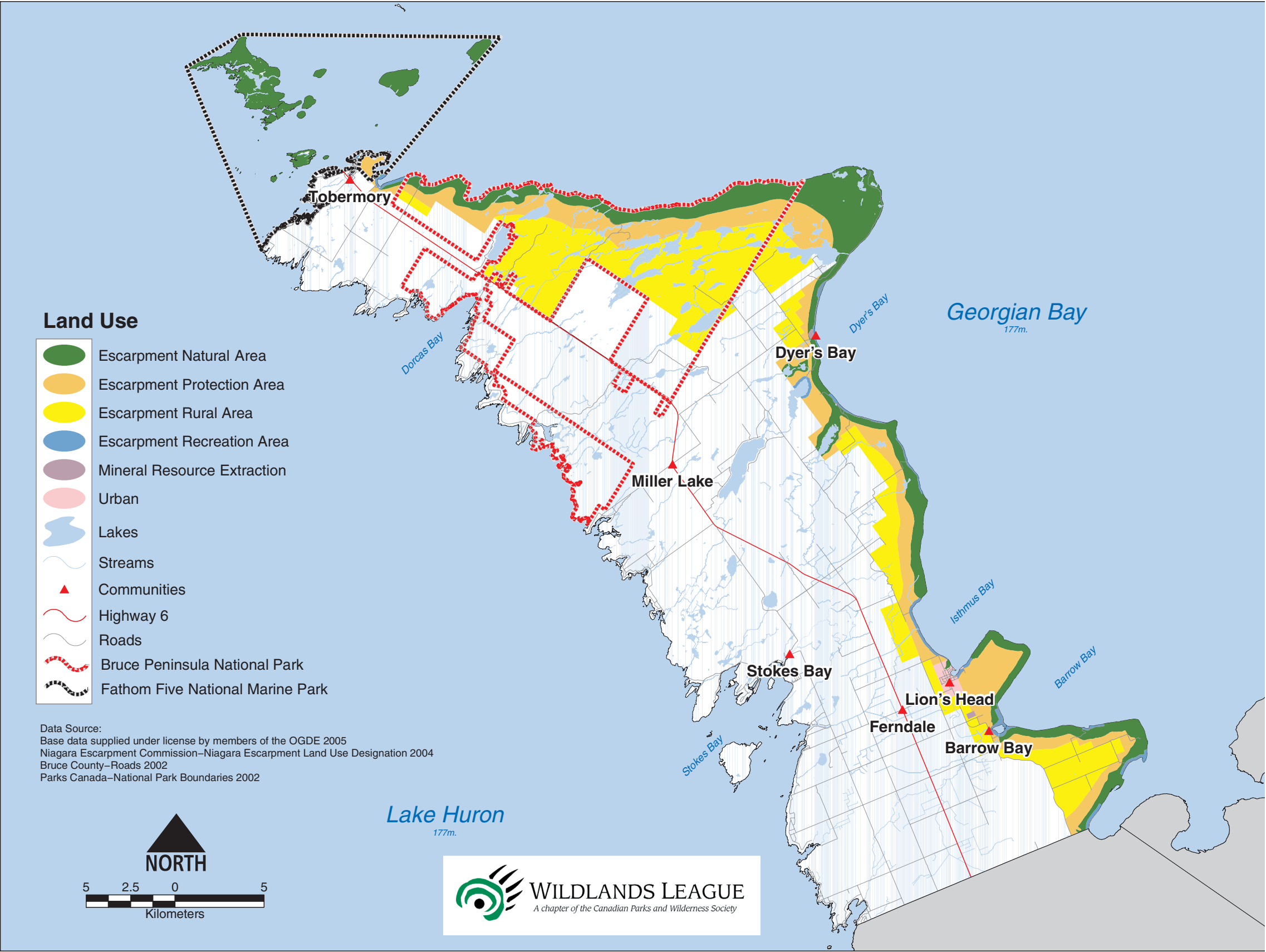
Bruce Peninsula National Park is the largest, but not the only, fully protected area on the northern Bruce Peninsula. There are five provincial parks and nature reserves within the greater park ecosystem of Bruce Peninsula National Park as well as a handful of private nature reserves and Fathom Five National Marine Park (which includes a number of islands and a small main-land area) . This diversity of protected areas reflects the high degree of biological diversity and the number of rare and unusual species and ecosystems found on the Bruce. But protected areas on their own cannot protect species and ecosystems. Species may have home ranges that are much larger than any one protected area or rare species may be found in areas that are not protected. This is why scientists are increasingly calling for the establishment of landscape linkages between different protected areas and for stewardship of private lands.

Map 3.2 — Areas of Natural and Scientific Interest of the Northern Bruce Peninsula

The Ontario Ministry of Natural Resources designates ANSIs that recognize either distinctive “life science” features, such as rare species or ecosystems, or “earth science” features, such as unusual or unique geological formations. ANSI designation is often supported by a detailed inventory of the species and special characteristics of the area, but the designation itself provides no protection from development or resource harvesting within the area. The Bruce County Official Plan recognizes that ANSIs should be managed as special natural environments and that development, if it occurs, should be planned to avoid undermining the ANSIs natural values. However, the plan also recognizes the County has limited means to control or permanently protect these special areas.



Map 3.3 — Niagara Escarpment Plan land-use zones of the Northern Bruce Peninsula



The Niagara Escarpment Planning and Development Act, passed in 1973, created seven land-use zones for the Niagara Escarpment planning area. Of the total plan area, about 93% has been designated as Escarpment Natural Area, Escarpment Protection Area or Escarpment Rural Area, the most protective categories under the plan (see page 22 for details on what uses are allowed in each category). The Niagara Escarpment Plan, which is the implementation mechanism for the act and is overseen by the Niagara Escarpment Commission, was most recently reviewed in 2001. The goal of the plan is to “ensure that there is a balance between environmental protection, development and enjoyment of this precious resource.”

Table 3.1 — Niagara Escarpment Plan land-use zone classifications

<p>Escarpment Natural Area is the most protective designation in the plan. It includes escarpment cliffs, slopes at the base of cliffs, forested lands on top of cliffs, river and stream valleys, wetlands, and the most significant Areas of Natural and Scientific Interest (ANSIs). The aim is to maintain these lands and features in their natural state in order to protect significant ecological, cultural and scenic values. Only very limited types of development are permitted upon lands in this designation.</p>
<p>Escarpment Protection Area includes escarpment slopes and related landforms that are visually or environmentally significant, but which have been significantly altered by existing land uses. It also includes regionally significant ANSIs and lands that serve as buffers to protect Escarpment Natural Areas. This designation permits some development and is intended to maintain the remaining natural features and open, rural landscape character of the escarpment and lands near it.</p>
<p>Escarpment Rural Area includes minor escarpment slopes and related landforms, as well as lands that are necessary to provide an open landscape and/or are of ecological significance to the escarpment environment. The intent is to buffer ecologically sensitive lands — Escarpment Natural and Escarpment Protection Areas — and to provide a transitional zone where additional types of agricultural, residential and commercial land uses are permitted. In some instances, lands designated as Escarpment Rural Areas may be redesignated as Mineral Resource Extraction Areas (see below) if certain conditions are met.</p>
<p>Minor Urban Centre identifies rural settlements, villages and hamlets within the Plan Area. It is intended to concentrate further rural growth in these localities in order to prevent sprawl and scattered rural development, and to protect more environmentally significant or sensitive areas. Residential subdivisions are permitted in this designation; however, changes to the boundaries of a Minor Urban Centre require a Plan amendment. A number of development and growth objectives in this designation ensure that natural and cultural heritage values are maintained in Minor Urban Centres.</p>
<p>Urban Area identifies the larger towns and cities within the Plan Area. The intent of this designation is to minimize the impact and further encroachment of urban growth upon the rural escarpment environment. A wide range of land uses and development are permitted in this designation, subject to certain objectives and restrictions intended to protect adjacent Escarpment Natural, Escarpment Protection, and Escarpment Rural Areas.</p>
<p>Escarpment Recreation Area includes areas of intensive existing or potential recreational development such as ski centres, lakeshore cottage areas and resorts. Various buildings, facilities, commercial establishments and residential developments are permitted in this designation, subject to development restrictions intended to minimize the impact of recreational uses on natural and cultural heritage values.</p>
<p>Mineral Resource Extraction Area identifies pits and quarries licensed under the Aggregate Resources Act and areas where mineral resource (aggregate) extraction may be permitted subject to certain restrictions. A small number of land uses related to aggregate operations are permitted in this designation, including accessory buildings and facilities. However, asphalt plants, concrete plants, brick plants and similar manufacturing uses are prohibited. The aim of the designation is to minimize the impact of aggregate extraction upon the escarpment, and to ensure that appropriate rehabilitation measures are undertaken and compatible “after-uses” are approved in such areas.</p>
<p>Source: Coalition on the Niagara Escarpment</p>

CHAPTER 4. THE BIGGER PICTURE — THE GREATER PARK ECOSYSTEM



The Northern Bruce Peninsula is unique in southern Ontario in the degree to which its natural environment remains intact here. Looking at the “Big Picture” map of southwestern Ontario developed by the Nature Conservancy of Canada, we can see what an important anchor the northern Bruce is for wild species and systems in this part of the province. The high degree of remaining forest cover combined with the unique geology and climate of the peninsula also mean that it is rich in rare species and unusual ecosystem, from orchid-filled fens to globally unique alvars.

This combination of factors has led to significant efforts to protect the natural character of the northern Peninsula, including the creation of Bruce Peninsula National Park. It has also led to the commitment in the Bruce County official plan to protect the valuable natural environment throughout the county, including on the northern peninsula. Among the plan’s objectives, for example, are to:

- “identify and protect the County’s unique natural resources and environment;” and
- “identify, conserve, and where possible enhance the natural environment to ensure that natural systems are sustained, which will also serve to maintain human health.”

These commitments are important, because, as the maps in this section demonstrate, protected areas alone are not sufficient to meet all the needs of many wild species.

From the rare species map (Map 4.2), for example, we can see that many threatened and endangered species are found outside of any officially protected area. Unfortunately, the general protection given these species under federal and provincial species-at-risk legislation is relatively weak and does little to protect the larger habitat areas that these species may require for their long-term survival.



The Bruce Peninsula forms a corridor for migrating birds and a stepping stone for crossing Lake Huron. Above: scarlet tanager.

Even for relatively common species such as black bears, the boundaries of protected areas may mean little. These wide-ranging creatures will move in and out of protected places such as Bruce Peninsula National Park, in search of food, denning sites or mates. And while the largely forested northern Bruce still provides good cover for these movements and food sources for foraging, there is also evidence of looming problems for a population that has become increasingly

isolated by the loss of habitat to the south. Genetic testing has found that the northern Bruce’s bears are quite distinct from other Ontario populations, indicating a high degree of separation from other bear populations. There is also a concern that unnatural mortality (rates of death) caused by humans, particularly among females and young bears, could lead to a rapid decline for what is currently a relatively healthy but small bear population within the national park.

For birds that use the peninsula as a migratory flyway or as nesting habitat, the long-term protection of habitats and food sources inside and outside of protected areas is equally important. Many songbird species, for example, require interior forest habitat — habitat that is well away from roads, trails and forest edges. Such

habitat provides better protection from nest predators, such as racoons, squirrels or cowbirds, and often has characteristics, such as large, old trees or structural diversity (such as a multi-level canopy), that support a greater diversity of bird life. Other species may depend on unique habitats, such as jack pine stands (Kirtland’s warbler), sand dunes (piping plover) or alvars (loggerhead shrike), which may or may not be contained within protected areas.

For some species, the Northern Bruce environment represents a last chance — the final fragment of what was once a much larger natural range. A good example is the Massassauga rattler, which was once found across central North America as far south as Texas. Today, the northern Bruce combined with eastern Georgian



One interesting outcome of the Bruce’s unique karst geology is the use of caves and crevices as denning sites by the region’s black bears. Unlike bears in other regions, Bruce bears rarely excavate dens, relying on the region’s plentiful natural rock accommodation instead.

Scarlet tanager: ©Ethan Meleg; black bear: Lori Labatt

**Figure 4.1 — Current Range
Map of the Massasauga
Rattlesnake**



Source: Natural Heritage Information Centre, September 2001

Eastern Massasauga Rattlesnake

The eastern Massasauga rattlesnake is Ontario's only venomous snake. Historically it ranged over much of southwestern and west-central Ontario, as well as the Midwestern United States as far south as Texas. Since European settlement, however, it has been in decline throughout its entire range due to loss of habitat and human killing. Among the largest remaining populations are those found along eastern Georgian Bay and on the Bruce Peninsula. The Massasauga rattlesnake is locally abundant in the vicinity of Bruce Peninsula National Park. There, this solitary and secretive snake survives by making use of secluded wetlands, alvars and wet depressions in the terrain. In winter it hibernates in cracks, holes and animal burrows below the frost line.

Throughout its remaining range, including on the Northern Bruce Peninsula, the Massasauga rattlesnake continues to be threatened by roads and traffic, quarrying, logging, residential and commercial development, recreational activity and outright persecution. It was designated as threatened by the Committee on the Status of Endangered Wildlife in Canada in 1991.

Local subpopulations appear to be genetically distinct, with significant genetic distinctions occurring between populations that are as little as two kilometers apart. This suggests that if a local subpopulation were reduced or destroyed, repopulation through immigration from neighbouring areas would occur very slowly – if at all. This factor, combined with the snake's secretive nature, adds to the urgency to protect the habitat of known as well as suspected populations.



Bay represents one of the best remaining toeholds of this species in North America. However, it can be difficult to pinpoint the habitat of this shy and elusive snake, which means that we need to err on the side of caution in identifying and protecting – formally or informally – potential Massasauga habitat. Habitat outside of protected areas is too important to lose for a small and threatened remnant

population that has limited remaining habitat and that faces many obstacles to its long-term survival, from poorly informed human attitudes to roads or other barriers that isolate individual populations.

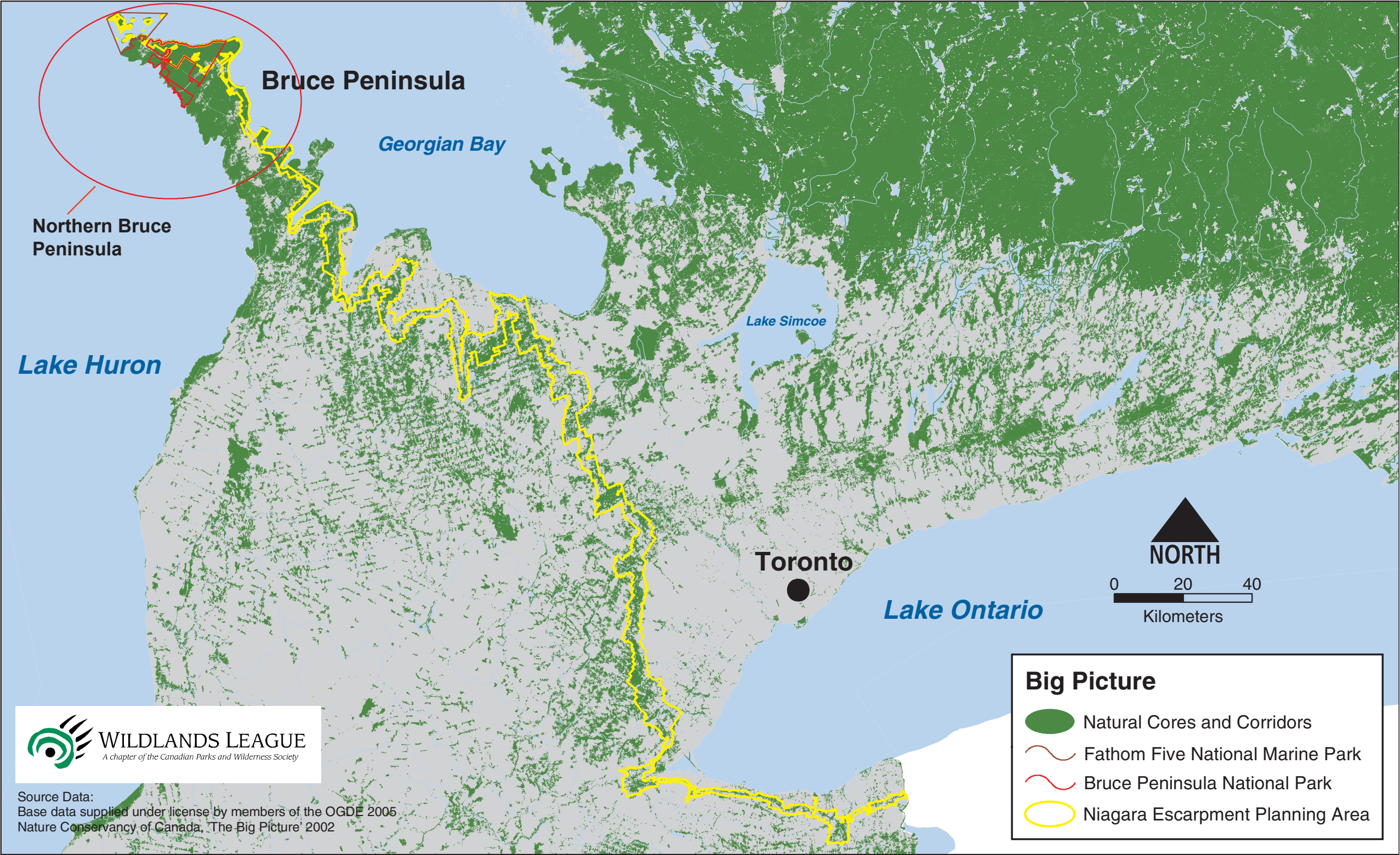
The significant efforts to protect and restore the wide diversity of natural habitats on the Northern Bruce Peninsula have helped this area avoid the loss of species and habitats that has occurred across much of Southern Ontario. But the flip side of this situation for wild species is isolation and an inability to expand or increase populations in many cases due to habitat limitations. This is why it is so important that we do not allow the protected areas of the northern Bruce to become isolated islands

of protection in a larger inhospitable landscape. Such an outcome would be a disaster for both rare and common species – and for the people who treasure and depend upon the unique natural environment of the Northern Peninsula.

By instead treating protected areas as “core” habitats that are linked through landscapes that retain much of their natural character, we can ensure a different outcome – a healthy and diverse natural environment for both people and wildlife.

John Mitchell/Earth Images

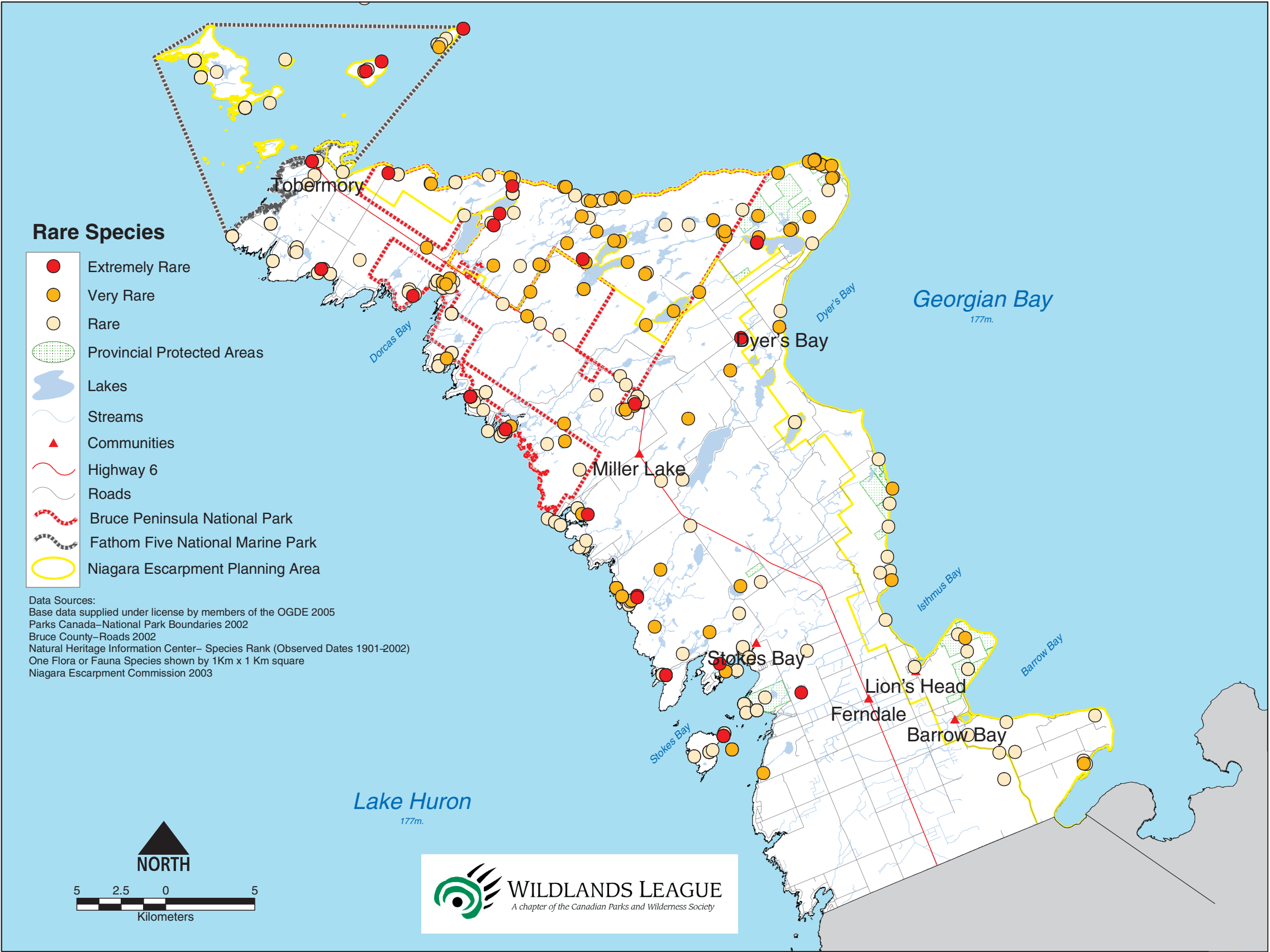
Map 4.1 — Big picture mapping of Southern Ontario



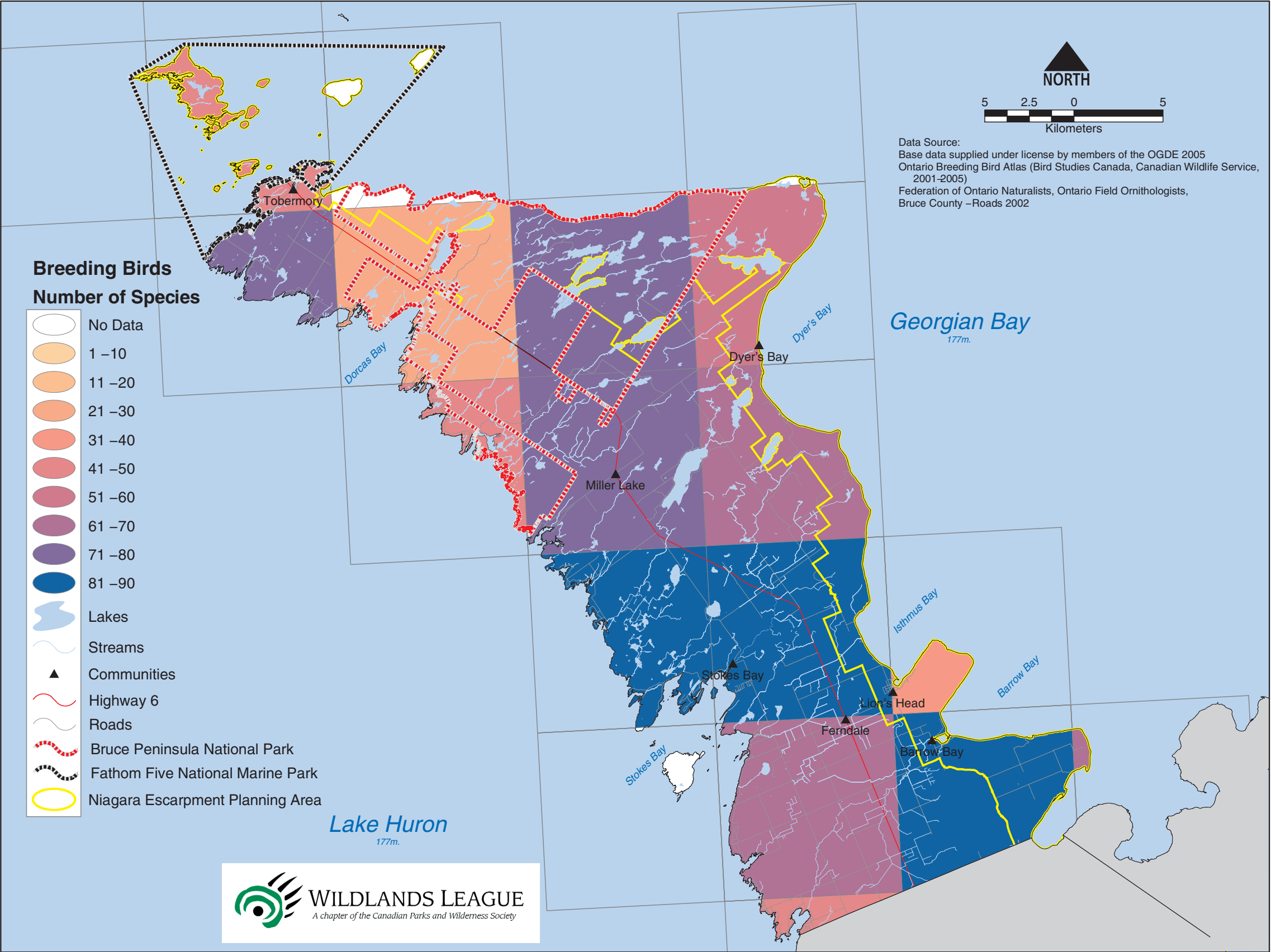
The Nature Conservancy of Canada has developed a “Big Picture” coarse-scale map of much of southern Ontario as a tool for identifying areas with high conservation value and for mapping potential habitat linkages between these core areas. It is easy to trace the green arc of the Niagara Escarpment through the highly developed Southern Ontario landscape on this map, and to immediately see the important position of the northern Bruce as a large core natural area in a region where most other remaining natural areas are small and scattered. Thinking about this from the perspective of a wild species, the importance of having such a large refuge connected to a semi-wild corridor running through some of the most wildlife-unfriendly habitat in the province probably cannot be overstated.

Map 4.2 — Rare species occurrences

This map shows the approximate known locations of rare species based on data from the Natural Heritage Information Centre. The map demonstrates the importance of Bruce Peninsula National Park for the protection of rare species (although the number of occurrences within park boundaries may also be, in part, due to more thorough species inventories undertaken here). It also demonstrates the importance of areas outside of parks and indicates areas where concentrations of rare or uncommon species may occur, such as in the vicinity of Stokes Bay, Lion's Head and Cabot Head. Some of the species mapped may occupy just a small area (such as a rare orchid), while others, such as rare bird species, may be dependent on both a wider range of local habitat conditions along with hemispheric environmental conditions, such as the condition of wintering grounds or food sources along migration routes.



Map 4.3 — Breeding bird density



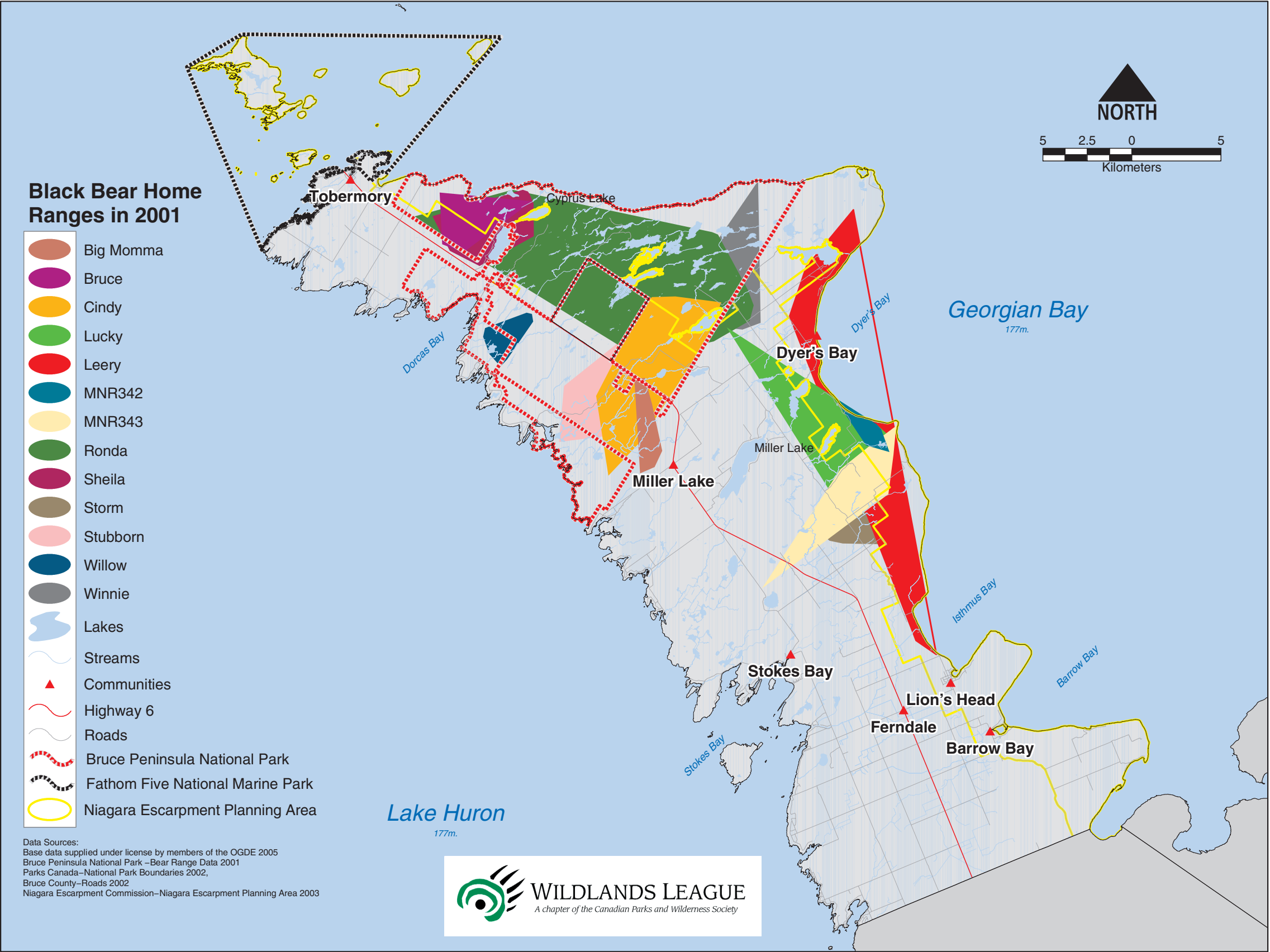
The Ontario Breeding Bird Atlas surveys 10 kilometre by 10 kilometre blocks across Ontario in order to ascertain the status of bird species across the province. Expert volunteers survey these blocks using a set methodology and record all their bird observations in a central database. This map shows the Breeding Bird Atlas “squares” that cover the northern Bruce Peninsula and the number of species of breeding birds observed within each square. The results, again, show the importance of areas outside of protected areas, particularly the band across the southern part of the region from Stokes Bay to Lion’s Head. Bruce Peninsula National Park itself has a rich diversity of breeding bird species and migrants, totaling almost 300 species. Particularly noteworthy are the large number of interior forest habitat-dependent bird species found in the park.

The combination of land and water in some squares covering the Peninsula and the arbitrary boundaries of the squares themselves can lead to over- or under-representation of species distributions in any one area. This map should be viewed only as a rough guide to the importance of the Northern Bruce for breeding birds. The map uses data collected from 2001-2005.

Map 4.4 — Black bear home ranges

Bruce Peninsula National Park has an ongoing program to assess the health and status of the Peninsula's black bear populations. Because of their large home ranges – 20-30 km² for females and two- to three-times larger for males – bear populations can be good indicators of overall ecosystem conditions. Radio collaring of bears has allowed park researchers to map bear movements in and around Bruce Peninsula National Park. They found that the bears used both wild and human-occupied landscapes, with males moving longer distances than females. Overall, research to date indicates that the density of bears in the park is on the low to mid end of the provincial average (0.2-0.4 bears per km²) with levels likely lower outside the park. Genetic sampling found that the peninsula's bear population is quite distinct from other provincial populations.

This map shows the movements of a number of bears that have been radio collared by park staff. These are just a subset of the Northern Bruce's total bear population, but provide a good picture of the bears' habitat use patterns.



CHAPTER 5. THE HUMAN FOOTPRINT — STEPPING LIGHTLY TO PROTECT THE GREATER PARK ECOSYSTEM



What does the future hold for the Northern Bruce Peninsula? That’s a difficult question to answer, particularly when it comes to complex natural systems and forces. What will be the impact of climate change, air pollution, population growth and a hundred other factors on the future of this natural region?

While it might be difficult to answer any of these questions with 100% accuracy, we can set objectives for what we would like to see the Bruce landscape look like in future and plan for how to achieve our landscape objectives. If, for example, we want to maintain or improve the health of natural systems and species — and therefore human health and quality of life as well — then we need to develop a plan for protecting the core natural areas and connecting landscapes that are the foundation of these wild systems.

The Provincial Planning Act offers a useful framework for such an undertaking. Through the Provincial Policy Statement (PPS), which is the mechanism for implementing the act, municipalities are required to identify and protect significant wildlife habitat, including significant wetlands and forests, by ensuring that development (if allowed) does not damage the natural values and functions of such areas.

The Ontario Ministry of Natural Resources (MNR) has provided municipalities with a guide (*Significant Wildlife Habitat - Technical Guide*) to identifying significant natural heritage features in keeping with the requirements of the PPS. The guide describes significant areas in this way: “Wildlife habitat is considered significant where it is: ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System . . .”

The guide puts a great deal of emphasis on the idea of working toward the identification of an interconnected system of significant areas as the first step in addressing the long-term protection of such areas through planning and zoning. It

notes that “the identification and protection of a system of large, well-connected natural areas with good representation of the ecosystems and natural communities in the planning area will often include many [finer scale] features. The large size of these areas can provide better protection than if habitats are individually identified and protected as isolated features on the landscape. Isolated habitats, even with protective buffers, are less effective in protecting the ecological functions of a feature than when that feature is part of a larger natural area.”

However, the procedures outlined in the guide are not mandatory and many municipalities find they lack the resources to fully implement the MNR’s suggested approaches. (Recognizing the complexity involved in identifying significant natural heritage features, the MNR guide urges municipalities to form Conservation Advisory Committees to bring together all interested local people and groups to collaborate on the work of identifying significant features.)

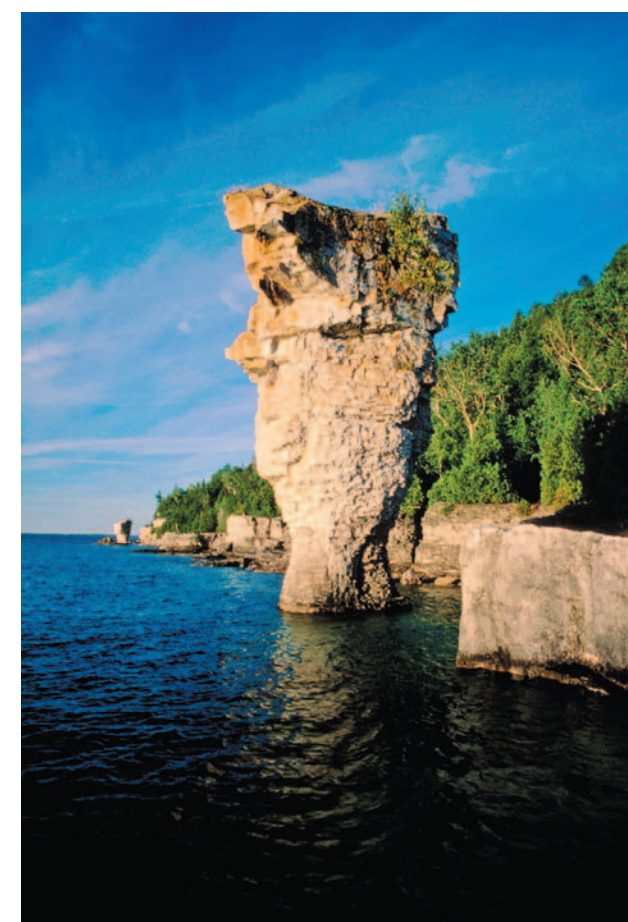
Bruce County, for example, has opted in its official plan to identify significant woodlands as any woodland located in a county township that has less than 30% forest cover overall. There is some good ecological evidence that 30% forest cover is a

significant threshold for species and ecosystem health. But such a threshold does not address the many other factors that could make a woodland significant, such as providing valuable interior habitat or serving as a connection between core protected areas.

The Eastern Ontario Natural Heritage Working Group (EONHWG) was formed to help municipalities address this problem. They undertook to develop new map-based approaches to identifying significant natural areas that could be used by municipalities and others to guide the identification of significant natural heritage features. The group, assisted by staff at the Eastern Ontario Model Forest, produced a report in July 2003 that outlined suggested criteria and mapping approaches for the identification of significant woodlands and wetlands (see www.cpaws-ov.org/naturalheritage for the full report).



We must take steps to ensure that species and ecosystems across the greater park ecosystem are treated with care in order to protect and enhance the health of both people and wild species. Above: Calypso orchid.



Lands and waters within and outside the park are important to wildlife.

Table 5.1 — Ontario Planning Policy

The following is an excerpt from the new Provincial Policy Statement (PPS), issued under the *Planning Act* of Ontario, which came into effect on March 1, 2005. The *Planning Act* requires that, in exercising any authority that affects planning matters, the actions of □

2.1 Natural Heritage

- 2.1.1 Natural features and areas shall be protected for the long term.
- 2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.
- 2.1.3 Development and site alteration shall not be permitted in:
 - a. significant habitat of endangered species and threatened species;
 - b. significant wetlands in Ecoregions 5E, 6E and 7E1; and
 - c. significant coastal wetlands.
- 2.1.4 Development and site alteration shall not be permitted in:
 - a. significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E1;
 - b. significant woodlands south and east of the Canadian Shield ;
 - c. significant valleylands south and east of the Canadian Shield;
 - d. significant wildlife habitat; and
 - e. significant areas of natural and scientific interest unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.
- 2.1.5 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.
- 2.1.6 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.
- 2.1.7 Nothing in policy 2.1 is intended to limit the ability of existing agricultural uses to continue.

Definition of significance from Provincial Policy Statement (abridged):

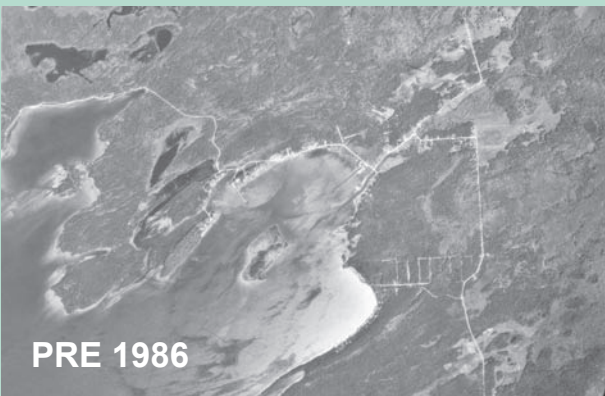
Significant: means

- a) in regard to wetlands, coastal wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time;
- b) in regard to the habitat of endangered species and threatened species, means the habitat, as approved by the Ontario Ministry of Natural Resources, that is necessary for the maintenance, survival, and/or the recovery of naturally occurring or reintroduced populations of endangered species or threatened species, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of its life cycle;
- c) in regard to woodlands, an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history;
- d) in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system;


We have used the working group’s significant forest criteria (see Table 5.2) to map potentially significant woodlands on the Northern Bruce Peninsula. The resulting map essentially represents a “first pass” attempt to identify significant forest areas and is meant more as a guide to further investigation than a final declaration of a level of significance for any particular forest area. Factors like the age of data and completeness of data layers, for example, could affect the results of this mapping, which really requires field verification. However, the map does provide a useful guide to where to look for significant woodland areas on the Northern Bruce.

For wetlands, we have relied on MNR’s investigations of Peninsula wetlands to determine provincial and local significance. However, the Eastern Ontario Working Group has also developed detailed criteria for map-based identification of significant wetlands, which could be used in future to assess whether there are any remaining gaps in MNR’s wetlands identification for the Northern Bruce.

As stated earlier, the identification of significant wildlife habitat, including significant woodlands, should be a precursor to pro-active planning for the long-term protection of an interconnected network of natural heritage sites. The final maps in this section look at the current and planned land use and zoning status of the Northern Bruce Peninsula and potential development pressure points in this context.



PRE 1986

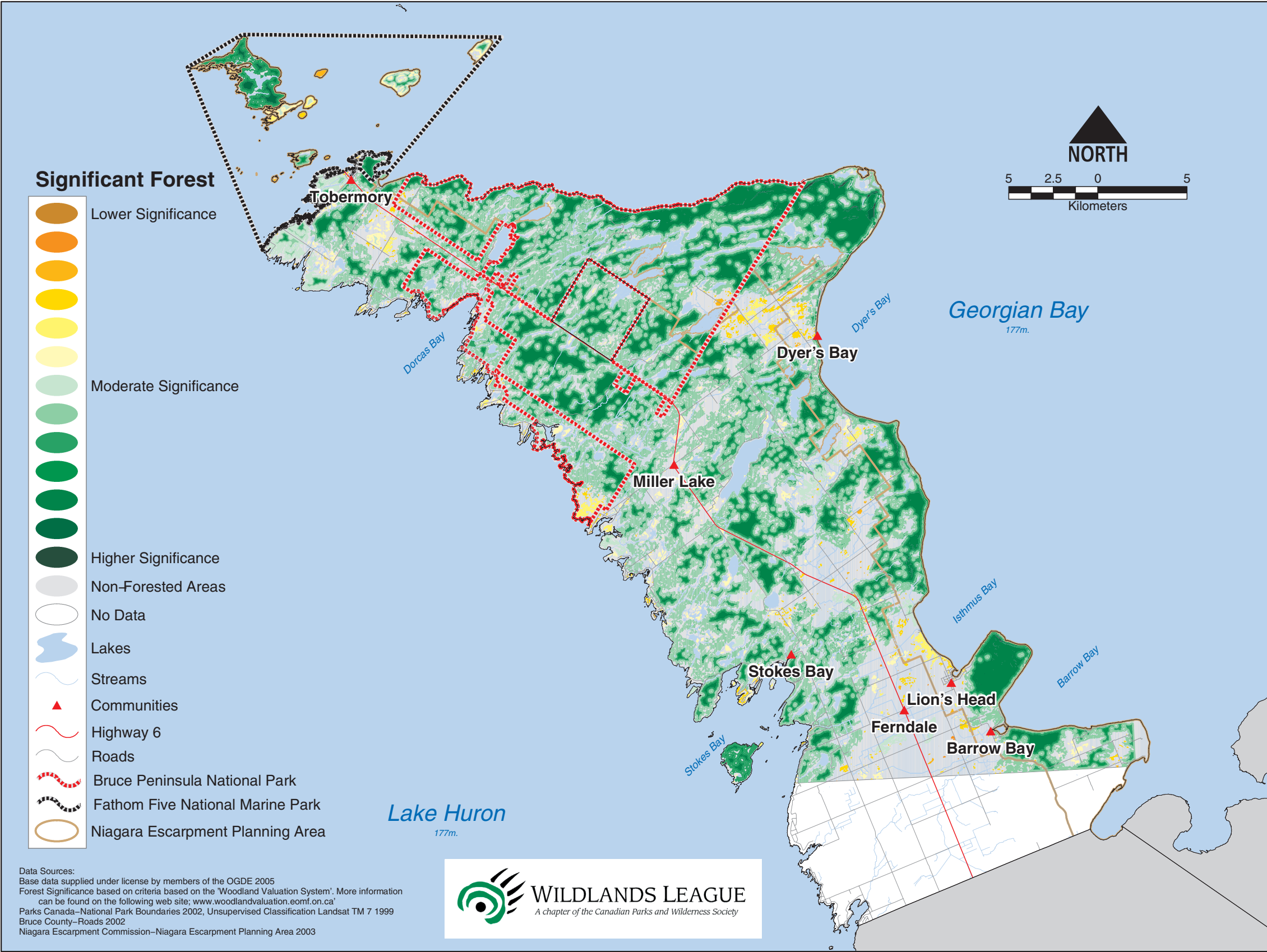


1995

Development footprint grows

Development, particularly residential and recreational development, is probably the largest landscape-altering force on the Northern Bruce today. These aerial photos show how habitat in the Stokes Bay area has been fragmented by subdivision development. Careful choices about when and where to locate such developments will have to be made to ensure the continued integrity of wildlife habitat both outside and within the national park.

Map 5.1 — Significant forests of the Northern Bruce Peninsula



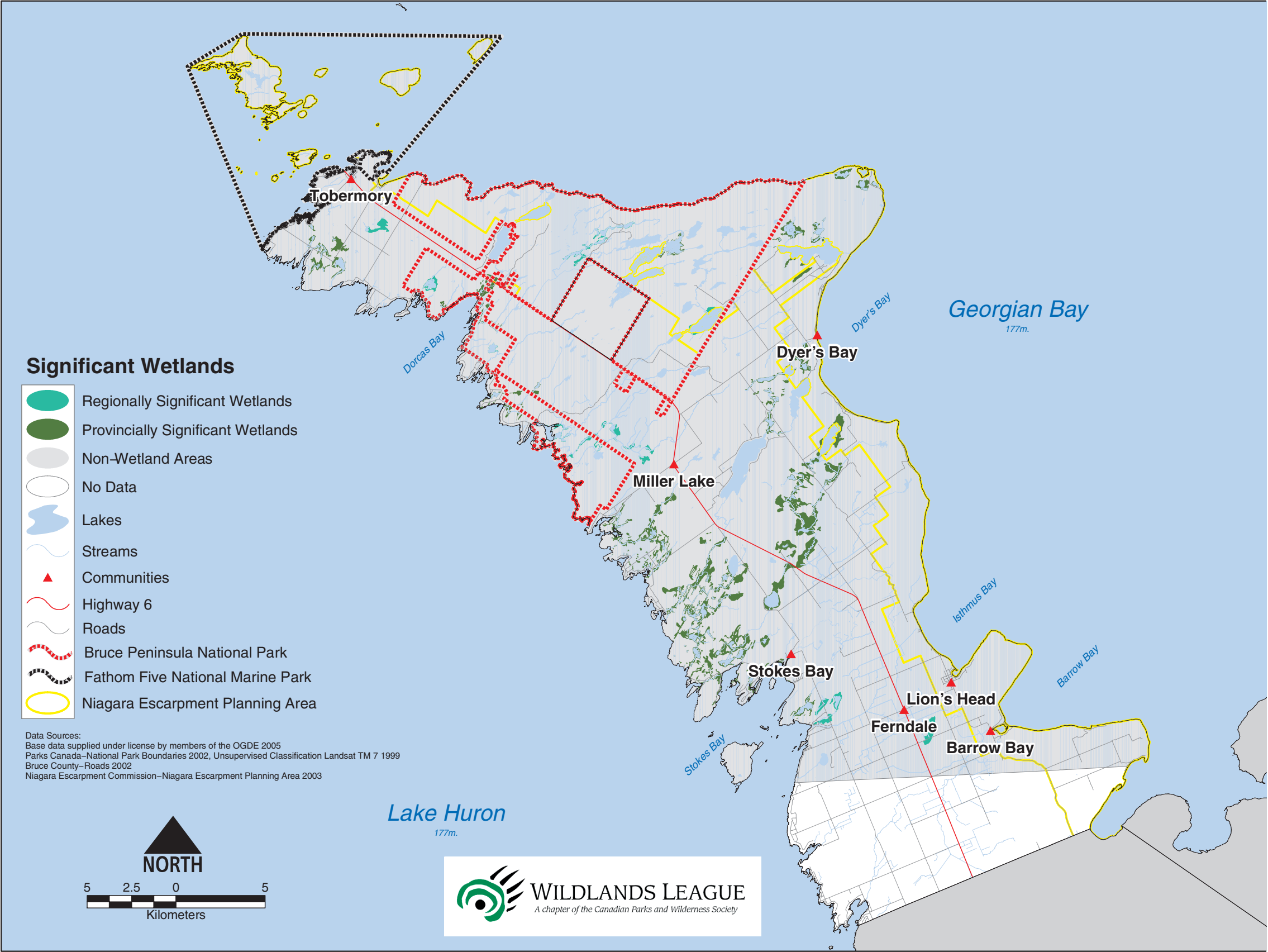
This map uses mapping protocols and criteria developed by the Eastern Ontario Natural Heritage Working Group for the identification of significant woodlands. The system developed by the working group is weighted toward woodlands that have greater size, greater intact interior area, and good proximity to other forest areas. Essentially, the system uses a set of general scientific rules about factors that determine ecosystem health to score woodland areas. At a finer scale, other factors, such as the presence of a rare or threatened species, could also make a woodland significant, so this map is meant only as a general guide to identifying potentially high-value areas. For a description of the scoring criteria, see table on next page. For more details on the evaluation system, visit woodlandvaluation.eomf.on.ca.

Table 5.2 — Significant forest criteria

Criterion	General principle	Why it matters	How we measured it	Thresholds		Scores
				Urban	Rural	
Patch Size	Bigger is better	A larger forest patch can provide habitat for a wider range of species. A small patch can only provide habitat to species with more limited habitat requirements. Different thresholds were used for woodlands in urban areas and in rural areas.	Size of patch in hectares (ha) as determined by geographic information system (GIS) analysis.	≥ 4 ha > 2 and < 4 ≤ 2 ha	≥ 200 ha > 20 and < 200 ha ≤ 20 ha	3 2 1
Forest Interior	More interior forest is better	The species composition and structure of a forest is quite different around the edge of a patch compared to deep in a continuous forest, because the growing conditions are quite different. Human activity has fragmented forests into smaller patches, creating much more edge forest and less interior forest. As a result, there is less habitat for plant and animal species that depend on interior habitat. Patches that provide forest interior have become more rare and more valuable.	The presence of at least 4 ha of interior forest, after allowing for an increasingly deeper zone of edge (from 100 to 200 metres)	≥ 4 ha interior within a 200 m edge ≥ 4 ha interior within a 150 m edge ≥ 4 ha interior within a 100 m edge < 4 ha interior within a 100 m edge		3 2 1 0
Proximity to Other Woodlands	Closer is better	Many species will make use of habitat in several patches if they are able to move among them.	Distance between closest edges of a patch and the next nearest patch.	≤ 100 m > 100 and < 250 m ≥ 250 m		3 2 1
Proximity to Water	Closer is better	Many wildlife species need access to both forest habitat and water. Nearby forest also helps maintain water quality.	Distance of woodland from a water feature's shore	≤ 30 m > 30 and < 50 m ≥ 50 m		3 2 1
Slope	Steeper is more valuable	Forest cover is very important on steep slopes to prevent soil erosion, which in turn prevents harmful sedimentation of water.	Slope angle (%) as determined by GIS analysis.	≥ 30% > 15 and < 30% ≤ 15%		3 2 1
Islands	Forested islands have high value	Woodlands on islands help maintain valuable shoreline habitat, but islands are highly susceptible to development in some regions.	Islands are given additional points	Island		3

Source: CPAWS Ottawa Valley

Map 5.2 — Significant wetlands of the Northern Bruce Peninsula

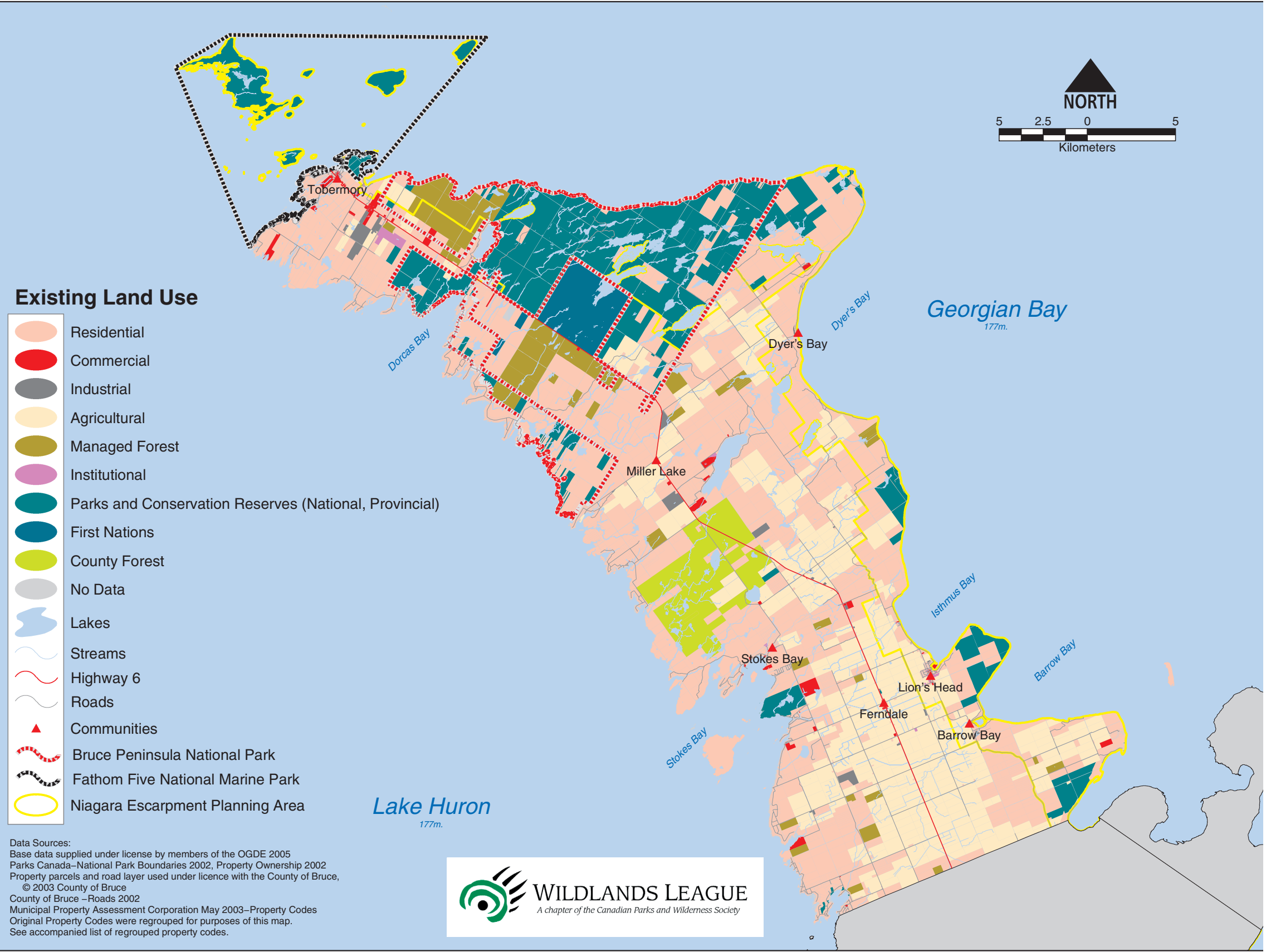


Under provincial planning rules, all wetlands south of the Canadian Shield that are deemed provincially significant are off-limits to development. (For example, bogs and fens found in off-shield areas are almost always considered provincially significant.) This policy, in part, reflects the dramatic loss in wetlands around the southern Great Lakes since European settlement began – it is estimated that the southern region of the province has lost 80-90% of its original wetlands. The Bruce County Official Plan puts additional restrictions on development adjacent to provincially significant wetlands (within 120 metres).

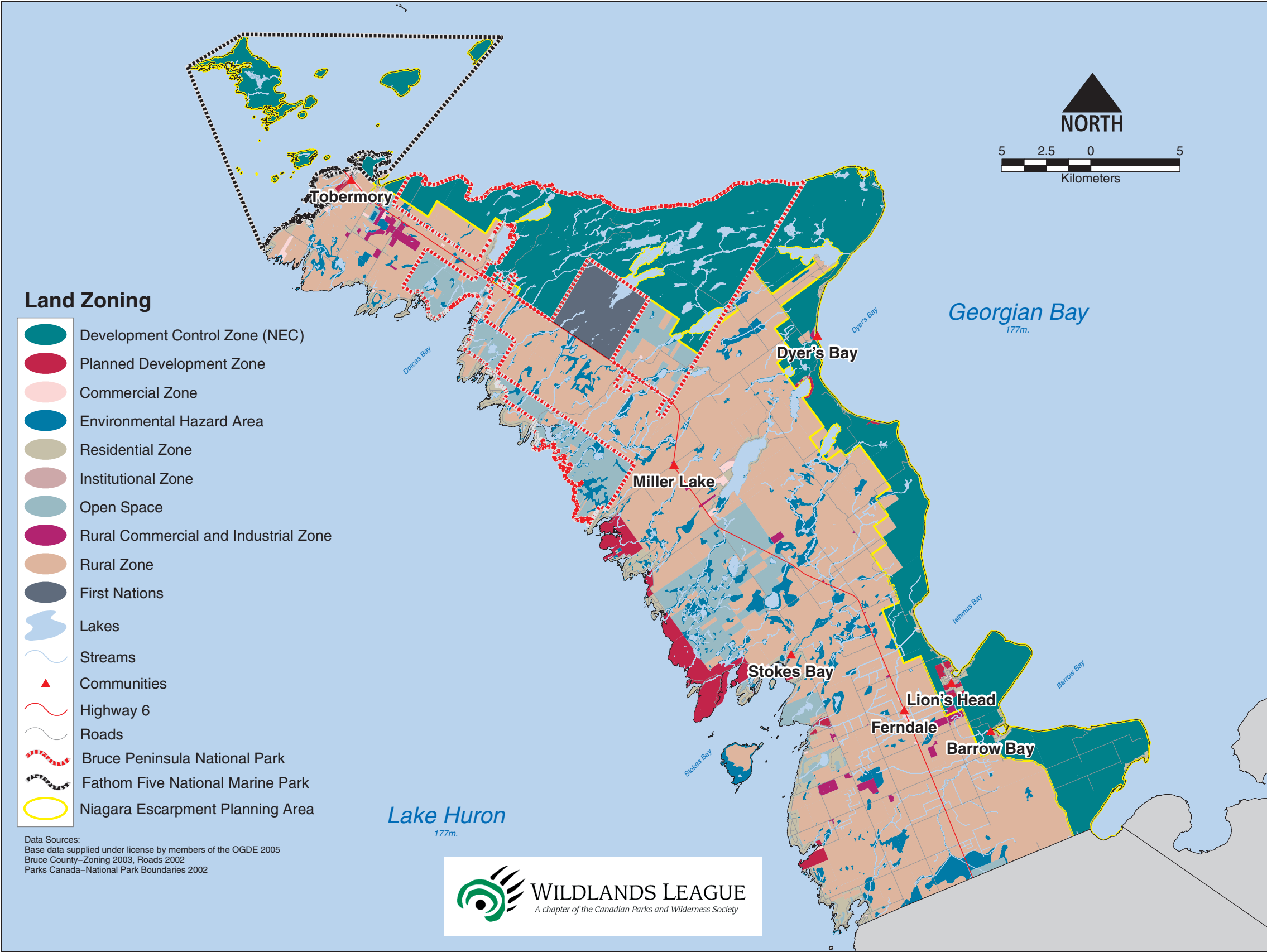
The status of regionally or locally significant wetlands is determined through municipal plans. The Bruce County official plan “encourages” the protection of such wetlands and says an environmental impact statement may be required for development that is likely to have a significant impact on such wetlands. See the Planning Policy table on page 30 for more details on provincial rules regarding wetlands.

Map 5.3 — Existing land uses of the Northern Bruce Peninsula

This map categorizes the actual current land uses for lands within the Northern Bruce study area. Some of these uses may be “non-conforming” – in other words, they date back to earlier plans or eras and are not in line with what is called for in the current official plan, but are allowed nonetheless.



Map 5.4 — Land-use zoning for the Northern Bruce Peninsula



This map reflects the intent of the Northern Bruce Peninsula zoning bylaw, which has the overall objective of retaining the “rural character” of the region while concentrating urban growth around existing urban centres such as Lion’s Head and Tobermory. This map represents what the County would like land uses to be in each area, whereas the previous map reflects what land uses in each area currently are.

Map 5.5 — Lot density for the Northern Bruce Peninsula

This map is another way of picturing the potential for development on the Northern Bruce Peninsula. It is based on the number of individual property parcels (lots) found within the squares of a one kilometre by one kilometre grid. A high-density square does not mean that this is an area with high-density development, but simply that the potential for such development may exist (in other words, not all lots in any one square have actually been developed and some squares with fewer lots may have experienced greater actual development to date. The arbitrary nature of the grid can also lead to slightly lower or higher scores for individual areas. Finally, in other cases, an area with a high lot density may occur within the boundaries of the national park where no development will occur, simply because the park has bought up individual lots to add to its landbase.)

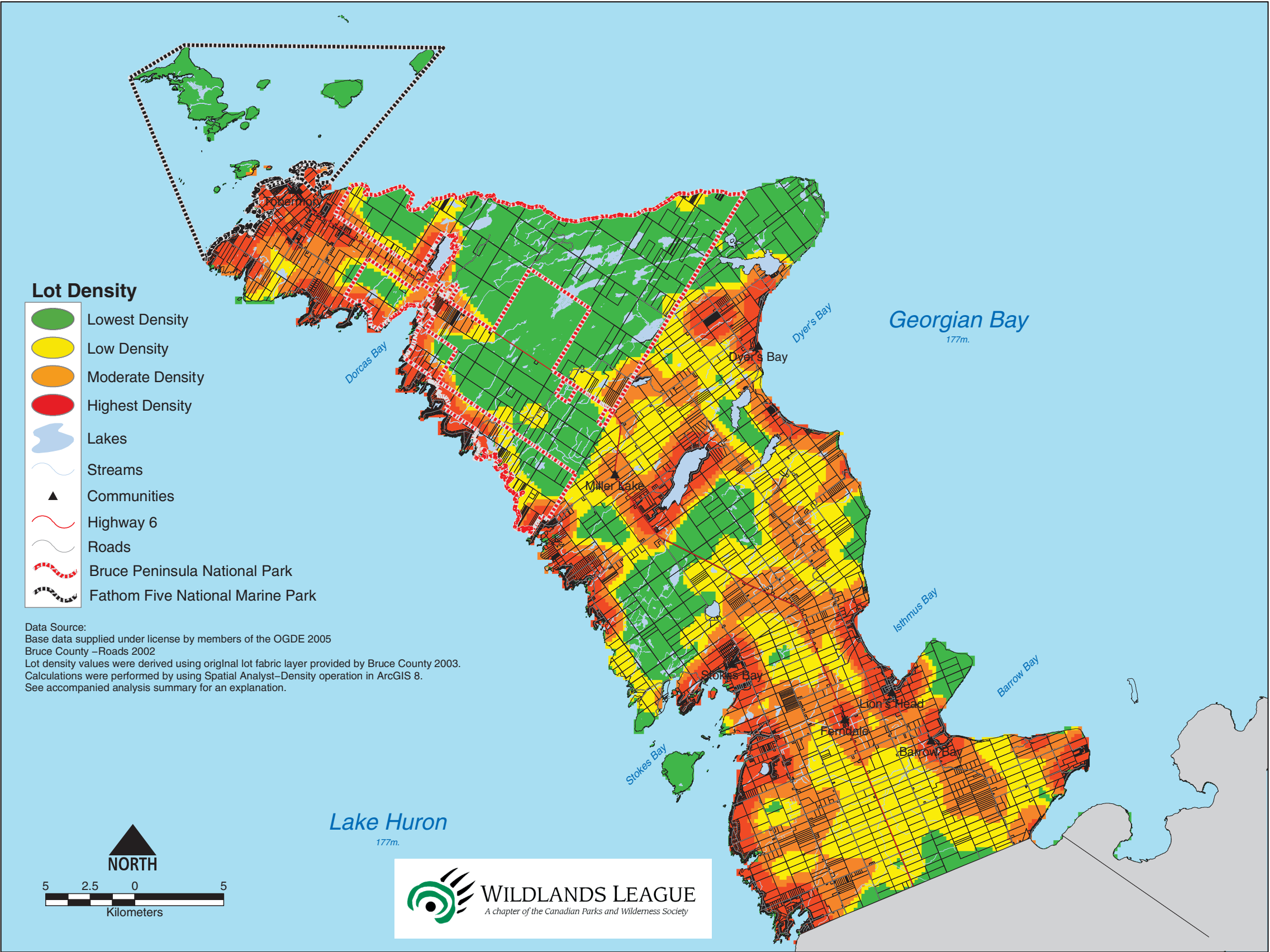


Table 5.3 — Natural heritage feature protection

Categories of natural areas				Protection is required through municipal Official Plans		Protection must be through other means	Authority / Information sources
				Strictly protected (see PPS 2.1.3)	Somewhat protected (see PPS 2.1.4)		
Natural Heritage Features	Wetlands	Provincially Significant	Ecoregions 5E, 6E,7E1	●			Ontario Ministry of Natural Resources (MNR) identifies wetlands and determines significance.
			Coastal wetlands	●			
			On Shield other than above		●		
		Locally Significant				●	
	Woodlands	Significant	Off Shield		●		Municipalities and others must make their own determination. The Eastern Ontario Natural Heritage Working Group (EONHWG) report and the Eastern Ontario Model Forest (EOMF) are good sources of information.
			On Shield			●	
		Not Significant		Source: CPAWS Ottawa Valley			
	Valleylands	Significant	Off Shield		●		Municipalities and others must make their own determination.
			On Shield			●	
		Not Significant				●	
	Areas of Natural and Scientific Interest (ANSI)	Provincially Significant			●		MNR identifies ANSIs and determines significance.
		Regionally Significant				●	
	Habitat of endangered and threatened species			●			MNR provides information to authorized users such as municipal planners.
	Fish habitat				●		MNR and the federal Fisheries and Oceans department identify fish habitat.
	Wildlife habitat	Significant			●		Municipalities and others must make their own determination. MNR provides guidelines.
		Not Significant				●	
Lands adjacent to Significant Natural Heritage Features					●	●	Municipalities and others must make their own determination.
Other natural areas (not officially designated as Natural Heritage Features)						●	Municipalities and others must make their own determination. Non-government conservation organizations are good sources of information.

Source: CPAWS Ottawa Valley & 2005 Provincial Policy Statement

APPENDIX A — SELECTED SOURCES

Publications

Brownell, V. The Alvars of Ontario: Significant Alvar Natural Areas in the Ontario Great Lakes Region. Federation of Ontario Naturalists, 2000.

Bruce County Official Plan. Bruce County, 1997.

Bruce Peninsula National Park Management Plan. Parks Canada, 1998.

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Canadians’ Perceptions of Parks, Canada National Public Opinion Research 2002: Sub-sample Report, Bruce Peninsula and Fathom Five. Parks Canada, April 2003.

Chapman, L. J. and D. F. Putnam. The Physiography of Southern Ontario: Special Volume 2. Ministry of Natural Resources, Government of Ontario, 1984.

Coady, M..Visitor Use and Visitor Impacts. A Summary of Visitor Statistics, Impacts and Monitoring Strategies at Bruce and Fathom Five Parks. 2002.

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Geomatics International Inc. Wetland Evaluation: Bruce Peninsula National Park. Final Report, April 1995.

Hoffman, D.W. and N.R. Richards. Soil Survey of Bruce County. Report No. 16 of the Ontario Soil Survey, 1954.

Larson, D.W. The Extent of Ancient Cliff-Edge Forests of the Niagara Escarpment. Department of Botany, University of Guelph, 1989.

Larson, D, Matthes, U. and P.E. Kelly. Cliffs as Natural Refuges. American Scientist, September-October 1999: 410-417.



Websites

The Beautiful Bruce Peninsula: www.brucepeninsula.ca

Bruce County: www.brucecounty.on.ca

Bruce Trail Association: www.bruce-trail.org

The Canadian Eastern Massassauga Rattlesnake Recovery Team: www.massassauga.ca

Canadian Parks: www.canadianparks.com/ontario/brucenp/

Coalition on the Niagara Escarpment: www.niagaraescarpment.org

CPAWS Wildlands League: www.wildlandsleague.org

Eastern Ontario Model Forest - Significant woodland evaluation: woodlandvaluation.eomf.on.ca.

Environment Canada - Species at Risk: www.speciesatrisk.gc.ca

Environmental Protection Agency - Great Lakes alvars: www.epa.gov/glnpo/ecopage/shore/alvars/

Escarpment Biosphere Conservancy: www.escarpment.ca

Guide to the Bruce Peninsula: www.northbruce.cck.ca/bruce_peninsula/wildlife/birds_bruce_peninsula.htm

Hamilton Field Naturalists - Escarpment geology: www.hamiltonnature.org/habitats/escarpment/escarpment_geology.htm

The Lake Huron Centre for Coastal Conservation: www.lakehuron.on.ca/biodiversity/

McMaster University - Massassauga rattlesnakes research: www.science.mcmaster.ca/biology/faculty/gibbs/massassauga-en.htm

Municipality of Northern Bruce Peninsula: www.northbrucepeninsula.ca

Niagara Escarpment Commission: www.escarpment.org

Parks Canada - Bruce Peninsula National Park: www.pc.gc.ca/pn-np/on/bruce/natcul/natcul1_e.asp

Parks Canada - State of the Parks reports: www.pc.gc.ca/docs/pc/rpts/etat-state/state-etat_toc_e.asp

Saugeen Ojibway: www.saugeenfirstnation.ca, www.nawash.ca, www.bmts.com/~dibaudjimoh

Statistics Canada - Community profiles: www.statscan.ca



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