

# **Conserving Biodiversity in the Mabou Highlands**

**Land-use planning as an approach to conservation**



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Prepared for:

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**Foreword:**

## **Margaree Environmental Association**

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For approximately 30 years the Margaree Environmental Association (MEA) has been associated with the cutting edge of ideas for transforming and changing forestry practices, and the protection of wilderness on Cape Breton Island.

In the 1970's MEA was an important participant in the successful community lobby to stop Budworm spraying on Cape Breton Island, which was followed by a 15 year battle to stop the spraying of herbicides in forestry. Eight years ago STORA ENSO Port Hawkesbury (SEPH) made the precedent setting decision to stop using herbicides in Eastern Nova Scotia. For several years now, both the MEA co-chairs sit on the SEPH Forest Advisory Committee.

In the 1980's the MEA led the fight for new wilderness areas on Cape Breton Island, when the official Nova Scotia government position was that there was no forest wilderness or old growth left to protect. This fight was also focused in the late 1980's against large scale hardwood clearcutting on Crown land in Cape Breton, which was thereafter significantly reduced.

By the early 1990's major new wilderness areas were created across Nova Scotia. In the 1990's the MEA was one of the lead groups that fought and won the return of one of these areas, the Jim Campbell's Barren to protected status.

In 2008 we are very proud to present what we feel is a timely solution to the problem of how Nova Scotia can create new protected areas on a landscape level, so that Nova Scotians will be able to live in a province with an appropriate level of landscape and viewscape preservation.

Protection of old-growth forest landscapes is an immediate need and this can be accomplished efficiently by using progressive governance through zoning regulations. This strategy proposes multiple benefits to landowners whose lands are within landscapes that are in need of protection as natural areas, through such means as reduced land taxation rates, and carbon credits for the landowners. It is important to point out that much of these lands that are worthy of protection are already essentially protected by the non-activity of the landowners, mostly by virtue of these landowners, and that the lands are difficult to access for commercial logging purposes.

This study brings forward ideas for governance and legislative practices that are based on 40 years experience in the Niagara Escarpment Region of Ontario, and modified to be appropriate for Nova Scotia today.

The study is written by Dr. Chris Miller of Halifax, based on an idea conceived by Neal Livingston, and with the participation of Brian Peters and Neal Livingston. The ideas are inspired by the need for the protection of the natural landscape of the Mabou Highlands in order to conserve its bio-diversity, and employ zoning and land-use planning as the approach to conservation of this important bio-region.

Zoning or land-use planning can be an effective way to protect not only the Mabou Highlands, but also other areas in Nova Scotia, the Maritimes and the Atlantic Region.

This study and report were made possible with the generous assistance of the Sage Environmental Program. Sage is a Nova Scotia based foundation that supports projects related to environmental protection.

The adoption of the recommendations of this report can set a new direction for our Province and region, so that today and in the future the natural environment can be preserved to the fullest extent possible.

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## Executive Summary

The Mabou Highlands contain ecologically significant natural features of importance to conservation, particularly unfragmented coastal ecosystems, forested steep-sided river valleys and gorges, old growth tolerant hardwood forests, mountain cove ecosystems, seep wetlands, and various types of alkaline plant communities, among others. The inland eastern slopes are also important because of the continuous nature of the forested ecosystems, with very little habitat fragmentation penetrating the steep slopes. These values have made the Mabou Highlands a principle area of focus for several conservation initiatives. The Nature Conservancy of Canada and the Nova Scotia Nature Trust, for instance, have both established protected areas in this region, and the provincial government is currently assessing the viability of establishing a protected wilderness area or nature reserve on public lands in the Mabou Highlands, as part of a broader province-wide scientific analysis.

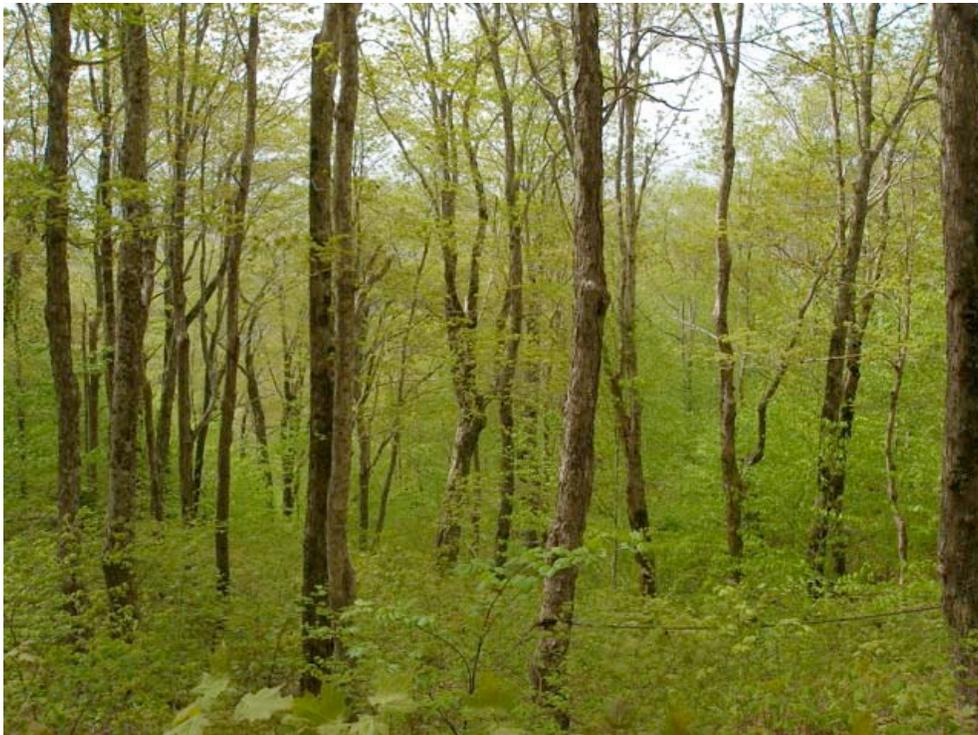
One of the principle challenges facing the protection of significant natural features in the Mabou Highlands region is the current mixture of public and private lands. Clearly, different approaches are needed for different types of land ownership. Wilderness area and nature reserve designations are well-suited for protecting natural systems located on public lands, but in the Mabou Highlands, public lands cover only a small proportion of the region and include only a small fraction of the significant natural features in need of protection. By comparison, private lands contain most of the significant natural features in the region, but their protection requires the voluntary interest of the private landowner, and the process for protecting private properties using conservation easements or outright purchases can require a substantial amount of time and can be prohibitively expensive for charitable organizations. It can also still result in a patchy distribution of protected sites, leaving ecologically significant natural areas unprotected and vulnerable to the effects of landscape fragmentation. Additional and new conservation approaches may be needed in the Mabou Highlands region to supplement the current suite of conservation efforts.

Other jurisdictions in Canada have developed a provincial zoning strategy to protect ecologically significant areas where there is a mixture of public and private lands. This approach regulates various types of activities and development using a land-use strategy. One such example is the Niagara Escarpment region of southern Ontario, where the provincial government has enacted legislation to protect the ecological integrity of the escarpment using a land-use plan, various types of zoning, and an arm's length regulatory authority. The province has also developed a parkland strategy for the escarpment to protect the most significant natural sites for conservation and recreation. Since its inception in the 1970's, the Niagara Escarpment policies have helped control rates of landscape fragmentation on the escarpment amid overwhelming developmental pressures from the exurban sprawl of communities in southwestern Ontario.

Provincial zoning enacted in Nova Scotia to protect natural areas and deter the loss of landscape connectivity could be beneficial for areas such as the Mabou Highlands, where ecologically significant and intact landscapes occur and there is a mixture of public and private land ownership. Conservation zones could be developed in such a way as to

provide economic incentives for private landowners to voluntarily protect ecological features on their properties, particularly when combined with conservation easements or designations as an ecologically-significant area, which could allow for additional economic incentives.

A provincial zoning strategy approach to conservation could also be expanded to other regions of the province, to include additional ecologically significant areas, vulnerable coastal sites, areas important for landscape connectivity, or sites experiencing rapid rates of development near Metro Halifax. For the Mabou Highlands, the operationalization of a provincial zoning strategy would not have to be as cumbersome as that of the Niagara Escarpment model, given the low rate of developmental pressure in this region. This approach would supplement other conservation initiatives aimed at establishing protected areas in the Mabou Highlands to maximize landscape connectivity and provide for the protection of critical areas of biodiversity.



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Photo credits (Neal Livingston)

# **Conserving biodiversity in the Mabou Highlands: Land-use planning as an approach to conservation**

## **1.0 Introduction**

The Mabou Highlands are a group of hills located in southwestern Cape Breton that exhibit interesting qualities of importance to conservation. They are disjunct from other highland areas in the region and maintain a very sharp topographic contrast with adjacent low-lying areas, rising abruptly from the valley floor and dropping off quickly to the sea. The highlands are comprised of steep-sided slopes with many sharp valleys and gorges, and a highly incised plateau which covers only a small proportion of the area relative to the valleys and slopes.

The area also supports a number of distinct features that are important for the preservation of biological diversity in Nova Scotia. The landscape itself is different from other places in the province, including even nearby highland areas, with its combination of heavily-eroded hills, incised plateau, steep transition to low-lying areas, and proximity to the coastal environment. The diverse physiography of the Mabou Highlands supports a similarly diverse mosaic of ecosystem-types, which increases its overall importance for conservation. Here, a large number of different ecosystem-types can be protected in a relatively small area.

The Mabou Highlands also support a number of rarer landscape features of particular importance to conservation, including stands of old-growth tolerant hardwood forest, mountain-cove ecosystems, rare forested seep wetlands, alkaline peatland ecosystems, and gypsum-associated plant communities. The inland eastern slopes portion of the Mabou Highlands are also important because of the continuous nature of the forested ecosystems, with very little habitat fragmentation penetrating the steep slopes. Similarly, the coastal portion of the Mabou Highlands is important because it is one of only a few places in Nova Scotia where the coastline is not encroached upon by highways or secondary roads.

Due to the diversity of ecosystem-types present in the Mabou Highlands, coupled with its interesting physiography and the presence of an array of rare ecosystem elements, this area has long been of importance for conservation and the creation of protected areas. Many initiatives have been undertaken to protect these important and special natural features. These include provincial government initiatives examining the feasibility of the Mabou Highlands for a protected wilderness area designation as part of a broader systems planning exercise; efforts by non-governmental organizations such as the Nature Conservancy of Canada (NCC) and the Nova Scotia Nature Trust (NSNT) to work collaboratively with private landowners to develop stewardship agreements; and on-going efforts of individual private landowners to voluntarily protect important ecosystems located on their properties.

Each option has its strengths and weaknesses from a conservation perspective. A wilderness area designation by the province would engage the *Wilderness Areas Protection Act*, which was designed to protect representative and outstanding areas for conservation, while still allowing for a full range of traditional wilderness activities. The Mabou Highlands, however, are principally in private ownership, with only a portion of the plateau and the edge of the eastern slopes owned by the public. This means that a wilderness area established on the public lands of the Mabou Highlands would not capture the full range of ecosystem-types or features of outstanding significance alone. Critical areas on private lands would still be located outside of any designated protected wilderness area. To properly conserve the diversity of the Mabou Highlands, therefore, a protected wilderness area would have to be established in concert with additional conservation initiatives on private lands as well.

In that regard, the NCC and the NSNT have each embarked on separate campaigns to protect significant areas of the Mabou Highlands that are in private ownership. Working collaboratively with local landowners, a number of properties have been formally designated as protected areas using stewardship agreements. Most of these properties are located on the coastal slopes of the Mabou Highlands, on the western side of the hills near Sight Point. The principle strength of this option is the legal permanency it provides to the conservation arrangement, associated with economic incentives to the private landowners. The principle drawback is that it can sometimes take a large amount of time and money to secure formal agreements with interested landowners and it can also result in a patchy distribution of protected sites, with key areas from a conservation perspective potentially being left unprotected depending upon the willingness of private landowners to enter into formal agreements.

Perhaps an additional option is needed to protect the Mabou Highlands. Other jurisdictions have used innovative provincial zoning strategies to encourage conservation across very large areas. One such system has been in place for several decades in the Niagara Escarpment region of Southern Ontario.

This paper will examine (1) the ecological significance of the Mabou Highlands, (2) assess the range of existing conservation options available to protect this important natural area, and (3) explore potential alternatives that could address some of the drawbacks of the other conservation approaches. The Mabou Highlands may also provide an important case study for examining how provincial zoning similar to the Niagara Escarpment approach might work for other areas of Nova Scotia, particularly other environmentally significant regions with a mix of public and private land ownership or areas important for landscape connectivity.

## 2.0 Study Area

### 2.1 Mabou Highlands

The Mabou Highlands are located in Inverness County, on Cape Breton Island, between the communities of Inverness and Mabou, near the western shores of Lake Ainslie. The area is approximately 120 km<sup>2</sup> in size (~12,000 hectares) and is orientated roughly in a southwest-northeast direction, with a maximum length of approximately 15 km and a maximum width of 8 km. The highlands contain numerous steep-sided slopes, with many valleys and gorges, and a highly indented plateau incised by several fast-flowing streams. The highest point of land is located near the centre of the plateau, reaching 411 metres in height.

Steep valleys separate two isolated portions of the Mabou Highlands in the south and southwest portion the main upland body. These adjuncts include Mabou Mountain with an elevation of 230 metres and a disjunct upland area near the mouth of Mabou Harbour, reaching an elevation of 170 metres. The Nova Scotia Department of Environment and Labour considers the Mabou Highlands to be a distinct landscape in Nova Scotia, different from any other area in the province including nearby highlands to the north.

Communities located around the edges of the highlands include Mabou, Northeast Mabou, Mabou Harbour, Mabou Mines, MacDonalds Glen, Sight Point, Port Ban, Broad Cove Banks, Foot Cape, Strathlorne, Glenville, Riverville, and Glenora Falls. The region was colonized by Scottish settlers during the mid-nineteenth century, where they established an agricultural industry, as well as a timber trade and one of the earliest coal mines in Nova Scotia.



### *2.1.1 Bedrock*

The uplands of the Mabou Highlands have been severely eroded and incised by numerous rivers and streams that have formed steep-sided valleys and gorges. The durable nature of the bedrock, however, has resisted much of this erosion, creating a sharp topographic contrast between the Mabou Highlands and the adjacent lowlands.

The Mabou Highlands are comprised of three main lithological units of different ages. The oldest rocks are of Precambrian age and transverse the centre of the highlands as a wide band of metamorphic and intrusive igneous bedrock. The northeastern portion of the Mabou Highlands is slightly younger, being underlain predominately by granites of late Precambrian or early Cambrian age, while the south and southwestern portions are formed predominately of conglomerate, sandstone, and volcanic strata deposited during the late Devonian and early Carboniferous Periods. Low-lying areas adjacent to the highlands are comprised of limestone and gypsum deposits of the Horton strata, laid down in the basins of Cape Breton during the Carboniferous period. Some of these Carboniferous deposits have been severely metamorphosed and deformed along the edges of the uplands of the Mabou Highlands.

### *2.1.2 Glacial features*

Nova Scotia has been glaciated numerous times during the Quaternary Period, but only the two most recent glaciations have left discernable sedimentary deposits on land. The most recent glaciation occurred during the Wisconsin stage, and lasted from approximately 75,000 years ago until approximately 10,000 years ago. Glacial advances during this time period involved four distinct phases, with the first phase being the most extensive and characterized by the eastward and southeastward movement of a massive continental ice sheet. Subsequent glacial advances were smaller in magnitude and increasingly more localized in spatial extent. By approximately 11,000 years ago, glacial ice had retreated from most places in Nova Scotia, but likely persisted in more upland areas such as the Mabou Highlands until approximately 10,000 years ago. The steep-sided, V-shaped river valleys of the Mabou Highlands suggest that secondary glacial movements in this area may have been somewhat tempered compared to other areas of Cape Breton where U-shaped river valleys are more common.

Glacial deposits from the Wisconsin stage abut the edges of the Mabou Highlands. These glacial tills are largely comprised of stratified sand and gravel deposits, and outcrop along the edge of the sea at the base of the western slopes of the Mabou Highlands providing source material to the beaches. In places, the glacial deposits can be quite thick, particularly near the northeastern edge of the Mabou Highlands, near Strathlorne, where sandy glacial deposits up to 150m in thickness have prevented Lake Ainslie, at Loch Ban, from flowing directly to the sea at Inverness Harbour. Instead, Lake Ainslie drains to the ocean much farther to the north, at Margaree Harbour via the Margaree River system. Drumlin deposits that are quite common in southwestern Cape Breton are absent from the Mabou area.

### *2.1.3 Climate*

The climate of the Mabou Highlands is strongly influenced by the coastal environment, with moderated summer and winter temperatures. The average temperature in July is 18°C, while the average temperature in January is -4°C. The Mabou Highlands receive between 1200 and 1400 mm of precipitation per year, with an average total annual snowfall amount of approximately 300 cm. Strong variations in climate exist within the Mabou Highlands region, particularly between the coastal slopes and inland slopes. The inland slopes will typically receive greater amounts of direct sunshine and will experience a slightly longer growing season than the coastal slopes. Similarly, the coastal slopes are more exposed to oceanic influences, particularly onshore winds and coastal fog.

### *2.1.4 Dominant vegetation cover*

The Mabou Highlands contain a wide diversity of ecosystem-types, with tolerant hardwoods dominating the inland slopes, coniferous- and mixed-stands dominating the plateau, and mixed and intolerant hardwood stands occupying the western slopes. White spruce and balsam fir forests are located at the lower portion of the coastal slopes. Re-vegetating old field sites are present on the plateau and at spots along the lower slopes of the eastern edge of the Mabou Highlands, as well as along the lower portions of the hills along the coast. Coastal ecosystems include pocket gravel beaches, headlands, and eroding bluffs, with tidal brackish marshes located in some isolated sites. Interesting outcrops of gypsum are present along the coast in the Mabou Mines area, containing plants associated with this alkaline environment. Similarly, rare alkaline peatlands are present in the low-lying areas just east of the eastern slopes, in the area between Mabou Highlands and Lake Ainslie, along the shores of Loch Ban.

Incised steep-sided valleys are carved into the slopes across the Mabou Highlands. On the eastern inland slopes, many of these V-shaped valleys and gorges contain old-growth hardwood forest, with sugar maple, American beech, and yellow birch trees. In places, these forests are very fertile and productive, forming mountain-cove ecosystems, which are very rare in Nova Scotia. In other places, wetlands have formed on the forest floor of the eastern slopes where groundwater flows to the surface. Seep wetland ecosystems are under-studied in Nova Scotia, and those on the eastern slopes of the Mabou Highlands may contain unusual and important combinations of plant species, particularly where these features are located in the old-growth mountain-cove sites.

## 2.2 Coastal Slopes

The coastal slopes of the Mabou Highlands are located on the shores of the Gulf of St. Lawrence, near the outer reaches of the Northumberland Strait. Here, the coastline contains many pocket gravel beaches, backed by flat eroding glacial deposits or steep-sided slopes. The area is of particular interest for conservation initiatives because it is one of only a few places in Nova Scotia where highways or secondary roads are not located near the shoreline. It also contains an important mosaic of ecosystem-types located within a relatively small area, including entire watersheds still remaining largely in a natural condition. Both the Nature Conservancy of Canada and the Nova Scotia Nature Trust have been working collaboratively with local landowners to conserve the natural values of this area through stewardship agreements. The coastal slopes of the Mabou Hills also contain an extensive network of wilderness hiking trails, providing some of the best hiking opportunities in this part of Cape Breton.



### 2.3 Inland Slopes

The inland slopes of the Mabou Highlands contain examples of some of the best remaining old-growth tolerant hardwood forest in Cape Breton, including rich mountain-cove ecosystems and slope wetlands. The inland slopes are indented with several small streams and tributaries, with some draining to Broad Cove River and ultimately to Inverness Harbour, others to Lake Ainslie via Black River and ultimately to Margaree Harbour, and others to Northeast Mabou River and draining into Mabou Harbour. This area is interesting from a conservation perspective because of the presence of significant and rare ecosystem-types including mountain-coves and seep wetlands, old-growth hardwood forest, and the unfragmented nature of the inland eastern slopes running most of the length of the Mabou Highlands.



### 2.4 Plateau

The Mabou Highlands plateau is relatively small in size, accounting for only about 10-15% of the total highlands area (~1200 ha to 1800 ha). The plateau contains important headwaters for the streams that transverse the eastern and western slopes of the Mabou Highlands. The plateau is dissimilar to most other plateaus in Cape Breton, due to its highly indented nature where several steep-sided valleys from the coastal slopes nearly reach the steep-sided valleys from the inland slopes. The plateau is accessed via a number of small dirt roads and old cart tracks, and contains a high proportion of public lands unlike the coastal and inland slopes of the highlands that are largely in private ownership. Certain portions of the Mabou Highlands plateau may be an excellent candidate site for a future protected wilderness area designation, particularly the upper reaches of the tributaries for the inland slopes. Some of the lands on the plateau adjacent to this area are currently being used as a common pasture for grazing.

### 3.0 Current Conservation Initiatives

The presence of outstanding natural features in the Mabou Highlands has made this area a priority for several conservation initiatives. Representative elements of this landscape merit protection, as well as the rarer features, such as the old growth forests, seep wetlands, mountain-cove ecosystems, and others. The Mabou Highlands are a significant place from a conservation perspective, yet the combination of public and private ownership poses certain challenges to conserving these natural areas. Different approaches are needed for different types of land ownership.

Public lands in the Mabou Highlands consist largely of a single Crown block on the plateau with some coverage on the tops of the steep river valleys on the eastern slopes. By comparison, private land is more abundant in the Mabou Highlands and comprises the majority of the inland slopes and coastal slopes, and some of the inland plateau. Most of the rarer ecosystem elements in the Mabou Highlands are clustered on private lands, including most of the old-growth hardwood forests, mountain-cove ecosystems, seep wetlands, gypsum plant communities, and coastal features.

#### 3.1 Conservation initiatives on public land

In 1998, the Provincial government passed the *Wilderness Areas Protection Act*, legislation aimed at protecting important wilderness areas in the province, principally on public lands. When this legislation was enacted, 31 wilderness areas scattered across the province came into existence, protecting approximately 300,000 hectares of public lands in Nova Scotia from industrial activities. This total area amounts to approximately 6% of the province. Since then, a couple of additional wilderness areas have been established, and several others have been enlarged (Fig. 1).

The *Wilderness Areas Protection Act* excludes activities such as forestry, mining, road-building, development, or other types of industrial activities from designated wilderness areas, but allows for activities such as hunting, fishing, and wilderness recreation. Educational pursuits and scientific research are also permitted within the boundaries of protected sites. The wilderness areas program is administered by the Protected Areas Branch of the Nova Scotia Department of Environment and Labour (NSDEL).

The *Special Places Protection Act* is the other principal conservation tool used by the Provincial government to protect important natural areas on public lands in Nova Scotia. This piece of legislation pre-dates the *Wilderness Areas Protection Act*, and provides a greater level of protection from incompatible uses. Nature reserves have been established using this legislation to protect some of the most critical areas of the province for conservation, including old-growth forest stands, significant wetlands, intervalle forests, rare coastal plain flora sites, important wildlife areas, and other significant ecological sites.

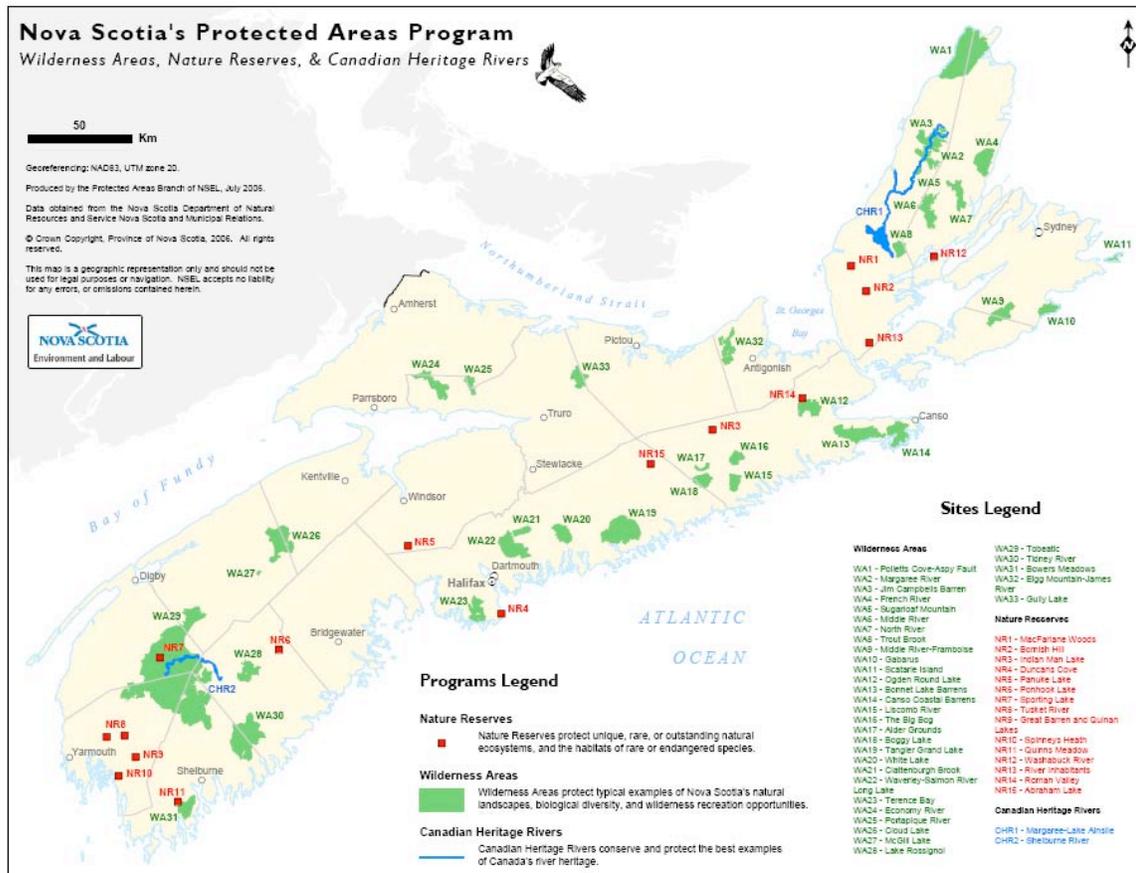


Fig. 2. Nova Scotia's system of protected areas; wilderness areas, nature reserves, heritage rivers (Source: NSDEL)

The nature reserve component of the *Special Places Protection Act* was previously administered by the Nova Scotia Department of Education and the Nova Scotia Department of Natural Resources, but is currently the responsibility of the Protected Areas Branch of NSDEL.

Currently, there are sixteen designated nature reserves in Nova Scotia, principally on public lands. Some, however, are designated on private lands where the landowners have requested this type of protection. Legislative changes brought about to the *Special Places Protection Act* in 2004 have made it easier for interested landowners to place nature reserve designations on their private lands. Similarly, the *Wilderness Areas Protection Act* can also establish protected wilderness areas on private lands. A number of inholdings acquired by the Nova Scotia Nature Trust and the Nature Conservancy of Canada, for example, have been designated as wilderness areas, as well as Municipal lands owned by the Town of Antigonish in portions of the Eigg Mountain – James River Wilderness Area.

The provincial system of protected wilderness areas was designed using principles of conservation biology, choosing sites with representative examples of the natural diversity

of Nova Scotia. The first step of this analysis was to divide Nova Scotia into a series of distinct ‘natural landscapes’, areas possessing a unique set of enduring features and ecosystems. This exercise divided the province into 80 natural landscapes. One of the goals of the protected areas program of NSDEL is to establish at least one representative protected area in each of the natural landscapes, of sufficient size to capture the full range of diversity within that landscape unit. Currently, only 23 of the 80 natural landscapes have a sufficient amount of protected areas to be considered satisfactorily represented (Fig. 2). Sizeable gaps still exist in the protected area system that will need to be filled with newly established protected wilderness areas and nature reserves.

In that regard, the Natural Landscape in the Mabou Highlands region is currently underrepresented with provincially designated protected areas. This landscape is considered to have only a partial amount of representation, well short of satisfactory. Any expansion of the protected area system in Nova Scotia must consider including a representative example from this landscape to properly increase the representation value from partial to satisfactory.

The provincial government has committed to expanding the protected area system to 12% of the provincial landmass by the year 2015 through the passage and proclamation of the *Environmental Goals and Sustainable Prosperity Act* in 2007. Currently, only 8.2% of the province is legally designated as protected, principally as wilderness areas, nature reserves, or national parks. The Province is currently evaluating the entire province to objectively determine the best sites for new protected area designations. In that regard, a wilderness area candidate selected from the Mabou Highlands region would help increase the overall representation of the landscape from inadequate to a higher level of protection, and in the process move the Province closer to the 12% minimum. Given that several of the most significant features in the Mabou Highlands occur on private lands, however, additional approaches must be developed as well, to augment a provincial protected areas designation in this region. Failure to adequately consider conservation on private lands will leave critical elements of the Mabou Highlands unprotected, creating a gap in the provincial protected areas network.

### 3.2 Conservation initiatives on private land

Many of the significant natural features in the Mabou Highlands region are located on privately-owned lands, including the best old growth hardwood forest stands, mountain-cove sites, and coastal ecosystems, as well as certain gypsum plant communities and seep wetlands. Therefore, it can be reasonably concluded that any protected area established solely on public lands in this area will ultimately exclude certain important natural features in the Mabou Highlands. Additional conservation measures are needed to address conservation on private lands to properly protect the natural values in this region. Several initiatives have already been undertaken in this regard, principally by the Nature Conservancy of Canada and the Nova Scotia Nature Trust. Together, these two non-governmental organizations have protected 1048 hectares of the Mabou Highlands.

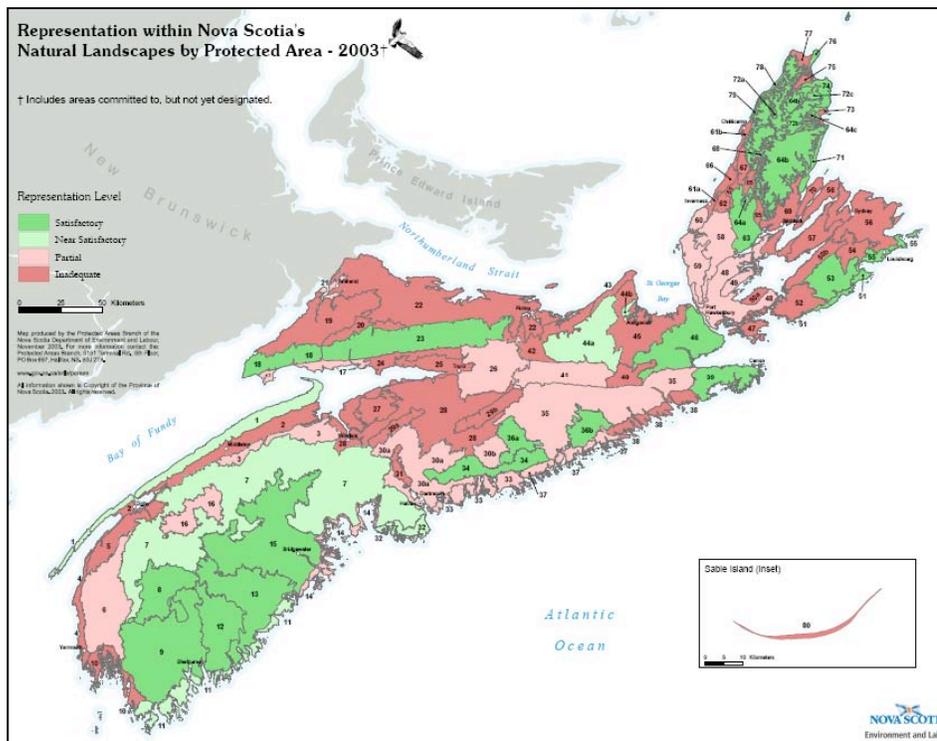


Fig. 2. Landscape representation levels in Nova Scotia (Source: NSDEL)

The Nature Conservancy of Canada has acquired 823 hectares in the Mabou Highlands, at Sight Point on the western side of the highlands. Part of this property was acquired in 1971, and was the first project undertaken by the Nature Conservancy in Atlantic Canada. The property contains coastal areas and a portion of the western slopes of the Mabou Highlands. Because the property is controlled by the Nature Conservancy of Canada and is intended for strict conservation, NSDEL has subsequently recognized the contribution made by this property in addressing provincial protected areas targets.

The Nova Scotia Nature Trust has acquired two properties on the western side of the Mabou Highlands. The first property is also located at Sight Point and measures 111 hectares in size. A conservation easement was placed on this property by the Treat family, who bought the property and made a commitment to protect its natural features. The property protects a rugged section of coastline, with several cobble and gravel beaches, a portion of the steep coastal slopes, and a climax-dominated hardwood forest stand.

The second conservation property of the Nova Scotia Nature Trust in this area was acquired in 2006. It measures 114 hectares in size and is located at MacKinnons Brook, also on the western side of the Mabou Highlands along the coast. This property contains pockets of old growth hardwood forest and an undeveloped stretch of coastline with cliffs and cobble beaches. Together with the property at Sight Point, the Nova Scotia Nature Trust has protected a total of 225 hectares of the Mabou Highlands region.

*Refer to Appendix I for a detailed description of conservation options for private lands.*

## **4.0 Provincial zoning as an approach to conservation**

The combination of public and private lands in the Mabou Highlands poses certain challenges to protecting biodiversity in this region. On public lands, creating protected wilderness areas and nature reserves is an effective means of conserving biodiversity and controlling incompatible anthropogenic activities, such as clearcutting and open-pit mining, yet this approach is largely limited by the spatial scope of the public lands themselves. In the Mabou Highlands, where public lands are only located on the plateau and the tops of the eastern inland slopes, sizeable gaps would still exist within the system of protected areas, leaving significant ecosystems unprotected on private lands. Clearly, conservation options must also be considered on private lands, to properly protect biodiversity in the Mabou Highlands.

On private lands, a number of economic incentives are already in place to create an environment where an interested landowner can protect natural features on their land using conservation easements or other means, potentially filling gaps created by the lack of public lands in the Mabou Highlands region. This has worked in places, particularly near Sight Point and MacKinnons Brook, where several conservation easements have been established on private lands or donated to a land trust. Concerns have been raised, however, about the length of time often required to establish protected sites on private lands, due to the complexity of the legal arrangements and other factors. It can also lead to a situation with a patchy distribution of protected sites, due to variable landowner interest. Discontinuous protected areas are not advantageous from a conservation perspective. Rather, protected areas should be clustered together, so as to buffer ecosystems targeted for protection from incompatible anthropogenic activities on adjacent properties. They should not be widely scattered, as sometimes happens when only certain landowners are interested in participating in a conservation program in a certain geographic area.

It would seem therefore, that additional conservation approaches may be needed to properly protect the full spectrum of natural ecosystems in the Mabou Highlands; approaches that provide new conservation tools that build upon the strengths of the other existing approaches, yet also address their potential drawbacks, particularly those associated with issues of public and private ownership, economic costs, and time constraints.

In the context of the Mabou Highlands, this could mean developing innovative strategies to encourage private landowners to maintain certain natural features on their properties using effective provincial land use zoning, to provide better continuity across the landscape and to add greater protection to significant ecosystems. In this way, issues of time delays and the potential patchy distribution of protected sites in private lands can be partially alleviated, while at the same time potentially providing economic incentives to private landowners, in lieu of full conservation easements or land donation. Similar approaches have been used successfully in Ontario to protect the landscape connectivity of the Niagara Escarpment.

## 4.1 Niagara Escarpment Model

The Niagara Escarpment is a long, prominent topographic feature in southern Ontario and parts of the United States. It measures 725 km in length and runs from western Upstate New York, through the Niagara region passed St. Catherine's and Hamilton up to the Bruce Peninsula, and then along the entire length of Manitoulin Island and on to parts of Michigan and Illinois. The cliffs of the Niagara Escarpment are comprised mostly of dolomitic limestone that was deposited during the Ordovician and Silurian, when a large tropical sea covered a large proportion of the interior of North America. The escarpment itself formed from differential erosion rates between the more durable dolomitic limestone and the more easily eroded shales underneath. The escarpment is part of a geologic feature referred to as a cuesta; a ridge-like system formed from gently tilted rock layers with a steep slope or cliff on one side. For the Niagara Escarpment, the escarpment feature (or the steep side portion of the cuesta) is located mostly along the northern and eastern edges.

In 1973, the Ontario government took the first steps to protect the natural environment of the Niagara Escarpment, passing the *Niagara Escarpment Planning and Development Act*. This piece of legislation was developed, in part, from the concerns raised by local residents of the cumulative impacts of aggregate extraction and sprawling development near the escarpment. The purpose of the Act is to “...provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment.”

The *Niagara Escarpment Planning and Development Act* required the formation of the Niagara Escarpment Commission and the development of a Niagara Escarpment Plan to develop land use policies that protect unique ecological and historic areas, maintain and enhance the quality of natural rivers and streams, provide opportunities for outdoor recreation, maintain the character of the landscape by promoting compatible forestry and farming, ensure development is compatible with the purposes of the Act, provide adequate public access, and support activities of the Municipalities. Where potential conflicts arise with other provincial Acts or municipal bylaws, the provisions of the *Niagara Escarpment Planning and Development Act* are generally over-riding. The Act also establishes the plan area for the Niagara Escarpment and allows for regulations for the successful implementation of the Act.

The Niagara Escarpment Commission (NEC) is a provincial agency comprised of a seventeen member board appointed by the Ontario Government, with nine members representing the public at large and eight members representing the counties and regions. The Chair of the commission is always a member of the public at large. The NEC reports directly to the Minister of the Ontario Ministry of Natural Resources (MNR), who reports directly to Cabinet. There are several principle responsibilities of the NEC, including (1) to promote the objectives of the plan, (2) to make decisions on development permit applications, (3) to review and consider recommendations on plan amendments, (4) to review and comment on all proposed developments within the plan area, (5) to comment on proposed land uses, development proposals, consent applications, and environmental assessments, and (6) to review plan policies issues, including working with other government agencies regarding land acquisition and management.

The Niagara Escarpment Plan (NEP) was initiated in 1973 with the enactment of the Niagara Escarpment Planning and Development Act and, following many years of public consultation and round table discussions, was approved by the provincial cabinet in 1985. Since then, the plan has been reviewed every five years. The Niagara Escarpment plan area covers 183,311 hectares from the border of the United States near Niagara Falls to the tip of the Bruce Peninsula on Lake Huron (Fig. 2). The outer boundary of the Niagara Escarpment plan area is fixed, and can only be changed with an amendment to the NEP.

The NEP establishes seven land-use designations for the Niagara Escarpment plan area. These include, (1) Escarpment Natural Area, (2) Escarpment Protection Area, (3) Escarpment Rural Area, (4) Escarpment Recreation Area, (5) Urban Area, (6) Minor Urban Centre, and (7) Mineral Resource Extraction Area. Within each land use designation, the NEP clearly states which types of uses are permitted to ensure that the purpose of the *Niagara Escarpment Planning and Development Act* is followed. Refer to Appendix II for a detailed description of permitted land-uses within each designation.

In addition to the land-use designations and the associated permitted uses, the NEP also defines a number of development criteria to ensure that the plan provides for the maintenance of the Niagara Escarpment as a continuous natural environment and allows only such development that is compatible with that natural environment, as per the purpose of the *Niagara Escarpment Planning and Development Act*. These development criteria explicitly define what type of development is appropriate on the Niagara Escarpment, and within which land-use designations. There are general criteria governing residential, commercial, and industrial development, and specific criteria for existing uses, lot creation, new development affecting steep slopes and ravines, new development affecting water resources (water quality, water quantity, wetlands, fisheries, floodplains, and ponds), new development within wooded areas, wildlife habitat, forest management, agriculture, mineral resources, heritage, recreation, areas of natural and scientific interest, transportation and utilities, and the Bruce Trail.

The *Niagara Escarpment Planning and Development Act* defines development as a change in the use of any land, building, or structure. A permit is required to undertake development within the Niagara Escarpment planning area. The NEC is responsible for reviewing and making decisions on permit applications, according to the policies of the NEP and the development criteria and land-use categories. In this way, any development in the Niagara Escarpment plan area is regulated, so that cumulative impacts of unchecked sprawl and development are lessened.

Studies comparing sites within the Niagara Escarpment plan area and sites in the unregulated adjacent areas have shown that the *Niagara Escarpment Planning and Development Act*, with the formation of the NEC and the NEP, have helped to control sprawl and maintain natural ecosystem connectivity. The percent forest cover within the Niagara Escarpment plan area has actually increased since the enactment of the *Niagara Escarpment Planning and Development Act*. Similarly, studies from certain areas of the escarpment have shown that the land values for properties within the Niagara Escarpment

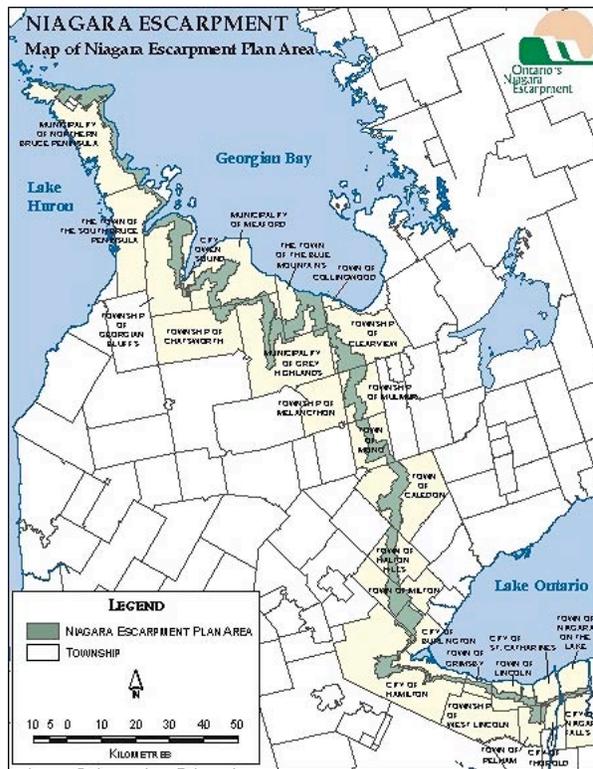


Fig. 2. Niagara Escarpment Plan Area, Southwestern Ontario (Source: NEP 2005)

plan area are statistically higher than land values of adjacent properties outside the plan area. The *Niagara Escarpment Planning and Development Act* has also had a positive effect at controlling development in shoreline areas of Georgian Bay, with significantly lower rates of development in natural shoreline areas within the Niagara Escarpment plan area as compared with unregulated adjacent natural shoreline areas just outside the plan area.

In 1990, the Niagara Escarpment was also designated as a UNESCO World Biosphere Reserve, in recognition of its important natural attributes. The escarpment contains the headwaters and aquifers of numerous river systems, particularly in Southern Ontario, and contains some of the oldest living trees in eastern North America (e.g. stunted eastern white cedar (*Thuja occidentalis*) on the cliffs of the escarpment can be more than 1000 years old). The area also contains intact forest ecosystems in a landscape otherwise devoid of continuous forest from the progressive encroachment of agriculture and residential development. Approximately seven million people live within 100 kilometres of the escarpment, creating immense pressure on the natural ecosystems of the geological feature.

UNESCO World Biosphere Reserves contain core conservation areas, buffer zones, and transition areas. There are currently thirteen biosphere reserves in Canada, including one in Nova Scotia; the Southwest Nova Biosphere Reserve in southwestern Nova Scotia with a core zone of Kejimikujik National Park and the adjacent Tobeatic Wilderness Area. The Niagara Escarpment Biosphere Reserve measures a total of 190,270 hectares in size, and includes 131 existing or proposed natural parks. The biosphere reserve also covers portions of eight separate counties in southern Ontario and twenty-two local municipalities.

Because the plan to protect the natural environment of the Niagara Escarpment against a backdrop of intense pressure for development has generally been seen as being quite effective, similar plans have been developed for other natural areas of southern Ontario facing similar pressures. In 2001, the Ontario government passed the *Oak Ridges Moraine Conservation Act* to protect the environment of the Oak Ridges Moraine in the fast-growing area just north of Toronto. This Act requires the formation of the Oak Ridges Moraine Conservation Plan. Similarly, in 2005, the Ontario government also passed the *Green Belt Act*, which includes the Niagara Escarpment and Oak Ridges Moraine areas, but expands the area to include the vicinity of Rouge Park just east of Toronto.

## 5.0 Discussion

Although the Niagara Escarpment model has worked well to control urban sprawl and other types of development in Southern Ontario, this model with its top-heavy regulatory framework, is less applicable to areas such as the Mabou Highlands that are not experiencing the same types of developmental pressures associated with sprawl. Certain elements of the Niagara Escarpment model, however, could be adapted to the Mabou Highlands area, particularly for areas along the steep sided slopes where connectivity still exists and the topography already precludes certain types of development. A conservation zone established along the slopes might help maintain connectivity, while also providing an opportunity for private landowners to enter into conservation agreements that could provide certain types of economic incentives.

The first step in this process should be to develop a land-use plan for the Mabou Highlands region that uses a series of zones for conservation and development. This should be done in an open and transparent manner and in full collaboration with the local community using the best available information. The plan must identify sites for the creation of new protected areas and zones critical for maintaining connectivity across this landscape, between protected areas and along steep-sided slopes. A series of workshops and roundtable discussions should be held with representatives from the community and the provincial government, so that a reasonable plan can be developed that balances the need for biological conservation and protection of the environment with the need for continued development opportunities where it is most compatible and least damaging for ecologically-significant areas and connectivity zones.

## 6.0 Recommendations

- Additional protected areas need to be established in the Mabou Highlands to properly conserve its biodiversity. The provincial government should designate a core wilderness area on public lands in this region. The Province should also establish a land securement fund that could be used to help facilitate the protection of key ecosystems on private lands where private landowners are interested in protecting the natural features on their properties. Conservation organizations such as the Nature Conservancy of Canada and the Nova Scotia Nature Trust should continue to engage private landowners interested in conserving natural features on their properties.
- The provincial government should explore the option of using provincial regulations and land-use zoning to help maintain connectivity between protected sites and particularly along the steep-sided slopes of the Mabou Highlands region. Such a system could be adapted from the Niagara Escarpment model, but modified to better suit the low developmental pressures of the Mabou Highlands region. This should involve establishing a multi-stakeholder committee with a mandate to develop a land use plan across the entire Mabou Highlands region, as well as exploring what economic incentives might be available to encourage private landowner participation, and developing an implementation strategy to put the land-use plan into action. Conservation zones must be clearly defined and mapped using the best available scientific information and analyses.



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## Appendix I

### Conservation options on private lands in Nova Scotia

#### *Conservation easements*

A conservation easement is a tool that a private landowner can use to protect the natural values of their property. It is a voluntary, legal arrangement between a private landowner and a land trust or conservation organization, such as the Nature Conservancy of Canada or the Nova Scotia Nature Trust, that places restrictions on certain activities that can be undertaken on the property in order to protect its natural values. The restrictions are registered with the property deed, so they automatically apply to any subsequent landowners of that property. In this way, the private landowner can have confidence that the features they intend on conserving will be well protected into the future. Private lands with conservation easements can also be protected by the provincial government using the appropriate legislation, such as the *Special Places Protection Act* to establish the private property as a nature reserve.

Conservation easements can be designed to protect the specific natural features identified on the property, and can be applied to the entire property or only a portion thereof. The restrictions can also be designed to address the needs of the private landowner, while also ensuring the ecological integrity of the natural values of the property are still met. The easement may restrict certain activities, but allow for others. The land trust or conservation organization holding the easement is required to survey the property each year to ensure that the terms and conditions of the easement are being adhered.

When a conservation easement is placed on a property, it may lower the overall market value of the land due to the restrictions registered with the deed. This will reduce the overall capital gain that will have to be paid when the property is sold or passed on through inheritance, and it could decrease the amount of property tax that will have to be paid each year. When a conservation easement is placed on a property to protect a natural area or important ecosystem, the private landowner is voluntarily foregoing opportunities to develop some, or all, of the property for the benefit of the natural environment and the broader public good. In recognition of this, various levels of governments have developed economic incentives to the private landowner who voluntarily places a conservation easement on their land. The private landowner is eligible to receive a tax credit for the difference between the fair market value of the property and the reduced value created by the restrictions imposed by the conservation easement. In this way, there is no penalty for voluntarily protecting one's land.

In addition, the private landowner who places a conservation easement on their property may also be eligible for a reduction in the amount of tax owing from capital gains on the property. Through Environment Canada's ecological gifts program, the federal government has provided favourable income tax treatment for private landowners with conservation easements, for lands determined to be ecologically sensitive, using an income tax credit and a reduction in capital gains taxes. As of 2006, taxes owing on capital gains have been

reduced to zero for properties that have been protected with a conservation easement and determined to be ecologically sensitive. This program has helped remove economic disincentives for private landowners wishing to protect the natural features of their properties using a conservation easement.

### *Government designations*

In Nova Scotia, private landowners wishing to protect the natural features on their property can now enter into an agreement directly with the provincial government to establish a nature reserve or protected wilderness area on their property using appropriate legislation. This avenue will result in an additional level of protection being added to a privately owned property and will help ensure that the site will be permanently recognized as part of the provincial system of protected areas. Placing a provincial designation on a private property can also provide a means for the private landowner to draw public attention to a particular protected areas program in which they may feel quite strongly, and in so doing, help other private landowners learn about conservation options for their land. The private landowner also has the right to place a conservation easement on the property in addition to the provincial designation, which provides even greater certainty that the property will be permanently protected into the future.

The private landowner who places a government designation on their property will have an opportunity to qualify for the same economic incentives as a private landowner who places a conservation easement on their property or donates the property to a land trust or conservation organization, via the federal government's ecological gifts program. The provincial government can also help the private landowner in a number of ways, bringing greater resources to the table than a land trust or some other non-governmental organization. For example, the provincial government can help with the assessment of the natural values of the property, address boundary issues and adjacent land use activities, work collaboratively developing management plans, and monitor the property so that it is not degraded in the future. Currently, six privately-owned nature reserves have been legally established in Nova Scotia.

### *Conservation donations*

Private landowners wishing to permanently protect the natural features on their properties have the option of donating their property to a land trust or conservation organization, such as the Nature Conservancy of Canada or the Nova Scotia Nature Trust. In addition to the donation, a conservation easement can also be placed on the donated lands for added protection, giving the private landowner greater assurances that the intent of the donation will be respected by the land trust receiving the property. Similarly, a private landowner could also donate their property directly to the provincial government for the purpose of being established as a nature reserve or wilderness area using the appropriate legislation.

Land donations are an attractive option to private landowners intending on voluntarily protecting the natural values on their land anyway, but do not wish to continue paying taxes on their property. As with conservation easements, a private landowner can be eligible to receive income tax credits and a complete reduction in capital gains taxes through the federal government's ecological gifts program, if the donated property is recognized as being environmentally sensitive. Outright land donations to a land trust are the most common form of legally recognized private land protection in Nova Scotia.

Land donations can be bequeathed to a land trust using a will, with the subsequent income and property tax breaks benefiting the heirs. Or, land donations can be made using a remainder interest, which allows the private landowner to be eligible for the same up-front tax incentives as with a regular land donation, but allows the landowner to continue to live on their land for the remainder of their life before being donated to a land trust. Properties of lesser conservation value can still be donated to a land trust with the intention that the conservation organization be allowed to sell the land to raise funds to acquire ecologically significant lands elsewhere. Any tax credits resulting from land donations or conservation easements can also be forwarded to a charitable land trust, which in turn, can be reinvested by the land trust and used to acquire additional conservation lands.

### *Conservation purchases*

In some cases, a land trust or conservation organization may be interested in purchasing an ecologically significant property outright. Both the Nature Conservancy of Canada and the Nova Scotia Nature Trust have acquired properties in Nova Scotia in this way. In this case, the private landowner will not necessarily qualify for the same tax incentives that they would have if the land was donated outright or a conservation easement was placed on the property. Properties sold to a land trust could also have a sizeable capital gain that will be taxed, if the property has appreciated significantly since it was originally purchased or otherwise acquired.

To avoid these problems, the landowner has the option of placing a conservation easement on the sold property as with a donated property, which registers certain restrictions on activities within the property deed. This would allow the landowner to qualify for certain tax incentives through the ecological gifts program that, otherwise, would not be available to the landowner if the property were sold without a conservation easement. The conservation easement also adds an extra level of protection to the property sold to the land trust and provides greater assurances to the private landowner that property will be permanently protected.

A private landowner can also give a land trust or conservation organization the right of first refusal on a property, should they wish to sell the property at some point in the future. A property could also be sold at a reduced cost to a land trust or conservation organization using a remainder interest, which would allow a landowner or their heirs to continue to live on the land for a period of time, so long as the natural values of the property are not degraded. It should also be noted that conservation purchases could be applied either to the entire property, or only the portion containing the natural features targeted for protection.

## **Appendix II**

### Niagara Escarpment model: land-use designations

#### *Escarpment Natural Area*

The Escarpment Natural Area land-use designation includes sites that are in a relatively natural state and include important features such as streams, valleys, wetlands, and forests. The criteria for designation include escarpment slopes and related landforms in a relatively natural state, forested lands abutting the escarpment, the most significant areas of natural and scientific interest, or the most significant stream valleys and wetlands associated with the escarpment. The Escarpment Natural Area land-use designation is used to maintain these natural areas and typically includes the most significant natural and scenic areas on the escarpment.

#### *Escarpment Protection Area*

The Escarpment Protection Area land-use designation includes sites that are important because of their environmental significance and aesthetic values. It includes portions of the working landscape, agricultural areas, certain types of residential developments, and buffers for the Escarpment Natural Area land-use designation. The criteria for designation include escarpment slopes and related landforms where existing land uses have significantly altered the natural environment, areas in close proximity to the Escarpment slopes which visually are part of the landscape, regionally significant areas for natural and scientific interest, or areas designated as environmentally sensitive by municipalities or conservation authorities.

#### *Escarpment Rural Area*

The Escarpment Rural Area land-use designation includes sites that are part of the working landscape, principally agricultural areas and residential areas, or sites where buffers are needed for ecologically significant areas of the escarpment. The criteria for designation include minor escarpment slopes and landforms, or lands in the vicinity of the escarpment that are ecologically important or provide open space values.

#### *Escarpment Recreation Area*

The Escarpment Recreation Area land-use designation includes sites that are important for outdoor recreation. The criteria for designation include sites that are established, identified, or approved recreation areas, including ski hills, lakeshore cottage areas, and certain types of resorts.

### *Urban Area*

The Urban Area land-use designation includes sites with existing or committed urban development. These include areas within the cities of St. Catharines, Hamilton, Burlington, and Owen Sound, as well as the towns of Grimsby and South Bruce Peninsula, and the Township of Georgian Bluffs and the Municipality of Northern Bruce Peninsula. This land-use designation will typically accommodate the highest rates of residential, commercial, and industrial development near the Niagara Escarpment. By focusing development in growth areas, the environment of the Niagara Escarpment will be subject to fewer pressures from sprawl.

### *Minor Urban Centre*

The Minor Urban Centre land-use designation includes sites where existing rural settlements, villages, and hamlets are located or are planned. This land use category accommodates new residential developments, encouraging concentration near existing centres so as to ensure long-term environmental sustainability. Thirty-three areas have been designated as minor urban centres within the Niagara Escarpment plan area.

### *Mineral Resource Extraction Area*

The Mineral Resource Extraction Area land-use designation includes sites that are important for aggregate extraction. It includes areas with pits and quarries that are licensed pursuant to the *Aggregate Resources Act* and areas where resource extraction may be permitted in the future. This particular land-use designation is intended to help minimize the environmental impact of mining on the Niagara Escarpment. The criterion for designation is principally an existing licensed area.