NEPTIS STUDIES ON THE
TORONTO METROPOLITAN REGION

THE STATE OF GREENLANDS PROTECTION IN SOUTH-CENTRAL ONTARIO

JULY 2004

DONALD M. FRASER AND
BERNARD P. NEARY
GARTNER LEE LIMITED

NEPTIS THE ARCHITECTURE OF URBAN REGIONS

THE STATE OF GREENLANDS PROTECTION IN SOUTH-CENTRAL ONTARIO

Donald M. Fraser and Bernard P. Neary
Gartner Lee Limited

Neptis is an independent Canadian foundation that conducts and publishes nonpartisan research on the past, present and futures of urban regions. By contributing reliable information, expert analysis and fresh policy ideas, Neptis seeks to inform and catalyze debate and decision-making on regional urban development.

NEPTIS FOUNDATION
50 Park Road
Toronto, Ontario
M4W 2N5

www.neptis.org

NEPTIS
THE ARCHITECTURE OF URBAN REGIONS

Library and Archives Canada Cataloguing in Publication

Fraser, Donald M., 1955-
The state of greenlands protection in south-central Ontario : Neptis studies of the Toronto Metropolitan region / Donald M. Fraser and Bernard P. Neary.

Includes bibliographical references.
ISBN 0-9733314-7-X

1. Nature conservation–Ontario, Southern. 2. Natural areas–Ontario, Southern. I. Neary, B. P. II. Neptis Foundation III. Title.

QH77.C3F72 2004 333.72'09713 C2004-905194-6

Neptis is an independent Canadian foundation that conducts and publishes nonpartisan research on the past, present and futures of urban regions. By contributing reliable information, expert analysis and fresh policy ideas, Neptis seeks to inform and catalyze debate and decision-making on regional urban development.

Neptis Foundation
50 Park Road
Toronto, Ontario
M4W 2N5
www.neptis.org

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

Executive summary

The State of Greenlands Protection in South-Central Ontario provides an inventory of the extent and distribution of designated Greenlands in south-central Ontario, and an assessment of the likelihood that they will persist in the future.

"Greenlands" are defined as natural heritage features such as woodlands, wetlands, valleys, watercourses, and waterbodies, as well as conservation areas, agricultural preserves, or Crown land. Agricultural areas are included only if protected by municipal policy.

Using information from provincial and municipal governments, conservation authorities, and non-governmental organizations, the researchers compiled the inventory in a digital (i.e., GIS-compatible) format. They then assigned each individual greenland area to one of four levels of protection, on the basis of policy and recent precedents:

- **Level 1: Fully Protected**. These are the features most likely to persist, because they are subject to policies that prevent or tightly restrict development on them.
- **Level 2: Generally Protected**. The policies governing these features permit development or site alteration if it can be demonstrated that there will be no negative impacts on the features or their ecological functions.
- **Level 3: Partially Protected**. These are given some mention in upper-tier municipal Official Plans, but the degree of policy protection is not high.
- **Level 4: Not Protected**. These are Greenlands that are recognized but receive absolutely no protection at the Region or County level.

These four levels are assigned different colours on the map of the region as a whole and are also shown in more detail in maps of the 14 single- or upper-tier municipalities that make up the region. For each of the 14 municipalities, the report also provides a description of the natural environment setting of the municipality; a table summarizing the level of Greenlands protection according to the applicable Official Plan; and a pie chart that illustrates the percentage of land within each municipality by level of protection.

A summary of the findings by municipality is shown in Table E.1.

Table E.1: Percentage of Land by Level of Protection

Upper-tier Municipality	% LEVEL 1	% LEVEL 2	% LEVEL 3	% LEVEL 4	% NON-GREENLAND
County of Dufferin	6.0	4.5	4.2	14.1	71.2
Regional Municipality of Durham	18.0	5.3	24.7	5.3	46.7
Regional Municipality of Halton	4.1	13.0	8.0	13.6	61.4
City of Hamilton	6.5	13.7	4.8	2.1	72.9
City of Kawartha Lakes	8.9	2.0	11.3	27.0	50.8
Regional Municipality of Niagara	3.5	3.7	12.8	9.6	70.4
County of Northumberland	10.6	4.8	7.4	21.3	56.0
Regional Municipality of Peel	7.0	13.5	7.6	3.9	67.9
County of Peterborough	6.8	2.2	7.7	54.0	29.3
County of Simcoe	8.3	4.5	28.6	12.5	46.1
City of Toronto	0.3	17.9	0.0	0.2	82.0
Regional Municipality of Waterloo	3.6	4.2	1.3	8.6	82.4
County of Wellington	8.8	22.2	1.1	1.5	66.3
Regional Municipality of York	15.1	11.1	14.0	4.1	55.8
Total	8.5	7.2	12.3	17.1	54.9

* Includes urban and agricultural land.

The report also contains four case studies that illustrate different approaches to protection and highlight current policy issues.

Trafalgar Moraine: This subtle moraine in the northern part of Oakville was recently included in the town's plan for urbanization, an action that prompted some Oakville residents and environmental groups to lobby for its preservation on the grounds of its environmental sensitivity. Hydrogeological studies subsequently showed that, unlike the Oak Ridges Moraine, the Trafalgar Moraine is not important for groundwater recharge. A proposed *Trafalgar Moraine Protection Act* was defeated in the legislature in 2003, but the various parties agreed to allow development provided that part of the land would be protected as public parkland. This case suggests that, at present, ecological arguments may be the only way citizens can fight unwanted urban expansion, and that lands adjacent to those of property owners who are able to mobilize opposition are more likely to be protected than lands elsewhere.

Pickering–Richmond Hill Land Exchange: Following the passage of legislation to protect lands on the Oak Ridges Moraine, the provincial government announced a proposal to exchange lands on the Moraine that had been slated for development for lands in north Pickering known as Seaton that were in public ownership. The proposal pitted the City of Pickering, which supported urban development on the lands, against the Region of Durham, which advocated preservation of this rural area. It is not yet known whether and to what extent natural features on the lands will be

protected. The situation illustrates the fact that provincial ownership is no guarantee of protection.

The Oro Moraine: This feature, which runs northwest of Lake Simcoe between Barrie and Orillia, provides groundwater recharge for the area and habitat for plants and animals that are rare elsewhere in central Ontario. The moraine is threatened by sand and gravel extraction, rural estate development, and the expansion of recreational facilities. Following a development proposal for a water-bottling plant, the local municipality of Oro-Medonte amended its Official Plan to include a land-use plan for the moraine that would restrict development. This is a case of a local municipality taking the initiative in securing protection for a natural heritage feature.

The Cameron Ranch: was a privately owned ranch on the Carden Plain in the City of Kawartha Lakes. The land is an alvar, a unique landform on which some rare plant and animal species flourish. When the owners put the ranch up for sale in 2001, a group of non-government organizations purchased it with funds raised from private and public sources. The ranch is now owned by the Nature Conservancy of Canada, and is the largest privately protected natural area in central Ontario. The case is interesting because the protection of the ranch is a result of private efforts rather than government initiative.

The authors conclude with four observations about the state of Greenlands protection in the region.

1. A relatively small percentage of the Region's Greenlands are fully protected: only 19% of south-central Ontario's Greenlands can be considered fully protected under current municipal and provincial policy. The rest are subject to policies that permit development and site alteration if it can be demonstrated that this can occur without resulting in any negative impacts on the feature and its functions. However, it is difficult to conclusively demonstrate negative impacts, especially where development is proposed adjacent to but not actually within a feature.
2. With the exception of the Oak Ridges Moraine and the Niagara Escarpment and a few protected agricultural areas, the protection of Greenlands in south-central Ontario is largely based on preserving specific natural heritage *features,* usually because of their ecological significance, rather than on protecting, or curtailing land uses within, specified areas for social purposes or for reasons of good regional design.
3. There is currently no overall provincial vision of a protected Greenlands system. Protection is fragmented among many jurisdictions (upper- and lower-tier municipalities, conservation authorities, the province) and as a result similar Greenlands may be treated differently from one municipality to the next.
4. The level of Greenlands protection is strongly influenced by the amount of development pressure. In rapidly urbanizing areas, environmental features of little ecological importance may be protected in municipal Official Plans, simply because they are in short supply. Meanwhile, in more remote areas, highly significant features may be lost because of the lack of strong policy protection and a lack of knowledge about the presence of the feature or its sensitivity.

Introduction

This study has arisen out of a need to better understand the extent and distribution of Greenlands in south-central Ontario and the factors influencing their loss, maintenance, and security. Security, in this context, means the likelihood that the Greenlands will persist in the future.

For the purposes of this study "Greenlands" are defined as natural heritage features such as woodlands, wetlands, valleys, watercourses, and waterbodies, as well as areas such as conservation areas, agricultural preserves, or Crown land. Agricultural areas that are recognized in municipal Official Plans as agricultural preserves or specialty croplands are also included, but only if protected by municipal policy.

There is a widespread and growing concern among the public that the natural environment of the Central Ontario Zone is slowly being lost or degraded in the face of urban sprawl and scattered, unfocused development.

South-central Ontario is the fastest-growing area in Canada, with an expected increase in population of about 3.5 million people by 2035 (Central Ontario Smart Growth Panel 2003). This growth is fuelling demand for developable land and exerting pressure on the natural heritage resources of the region. There is a widespread and growing concern among the public that the natural environment of the Central Ontario Zone is slowly being lost or degraded in the face of urban sprawl and scattered, unfocused development. This concern is reflected in one of the six goals of Ontario's Smart Growth initiative, announced in 2001:

> *Smart Growth will work to protect the quality of our air, our land and our water by steering growth pressures away from significant agricultural lands and natural areas.*

The Province's Smart Growth Consultation Paper (released in fall 2001), recommended that Ontario "**create permanent protection for significant natural areas.**" Recent initiatives such as the Oak Ridges Moraine Conservation Plan represent a step in this direction, but there is still a long way to go. This study is an attempt to survey the status of Greenlands that are currently designated as such in official documents.

The specific objectives of the study are:

1. To complete an inventory of the Greenlands of the central Ontario Region, involving the compilation of the most current data available in a digital (i.e., GIS-compatible) format from a variety of sources, including provincial and municipal governments, Conservation Authorities, and non-governmental organizations;

2. To develop a four-level hierarchy of Greenlands protection ranging from "***Full protection***" to "***No protection***" based on federal, provincial, and municipal natural heritage policies, including the Provincial Policy Statement, municipal Official Plans, and the Oak Ridges Moraine Conservation Plan;

3. To apply these rankings to Greenlands in each of the 14 upper-tier municipalities that constitute the central Ontario study area in order to illustrate the relative level of protection assigned to each feature;

4. To depict the spatial distribution of the Region's Greenlands using colour maps (one for each of the upper-tier municipalities that make up the study area);

5. To comment on important issues related to the protection of Greenlands in the region.

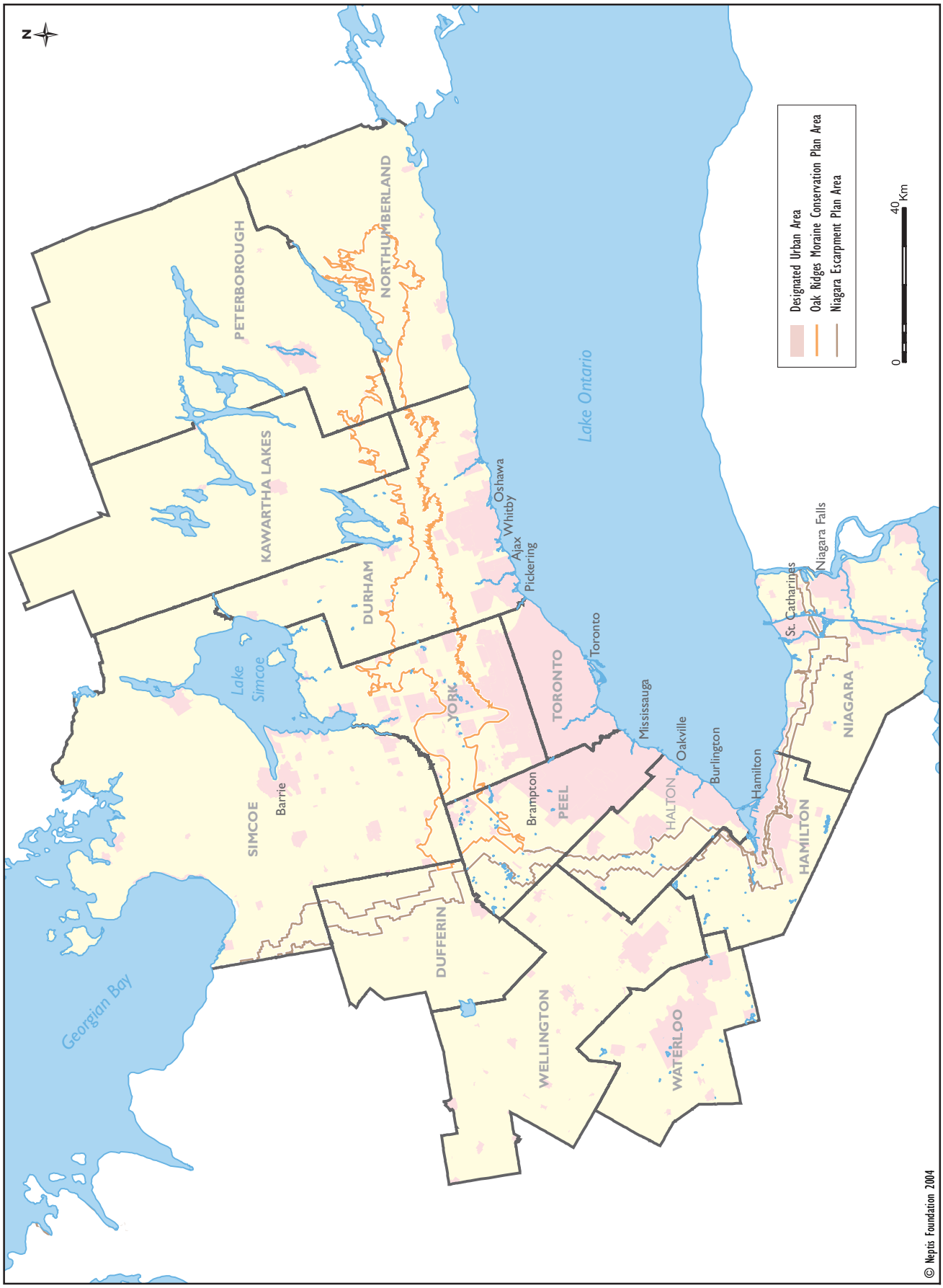
This study presents a four-level hierarchy of Greenlands protection ranging from "*Full protection*" to "*No protection*" based on federal, provincial, and municipal natural heritage policies, including the Provincial Policy Statement, municipal Official Plans, and the Oak Ridges Moraine Conservation Plan.

Study area

The study area occupies about 31,285 km^2, from Lake Erie to Georgian Bay and from the Carolinian Life Zone of southern Ontario north to the Precambrian (Canadian) Shield, an area slightly larger than the country of Belgium. It encompasses 14 upper-tier municipalities in central Ontario (Figure 1). The municipalities are, in alphabetical order:

- County of Dufferin
- Regional Municipality of Durham
- Regional Municipality of Halton
- City of Hamilton
- City of Kawartha Lakes
- Regional Municipality of Niagara
- County of Northumberland
- Regional Municipality of Peel
- County of Peterborough
- County of Simcoe
- City of Toronto
- Regional Municipality of Waterloo
- County of Wellington
- Regional Municipality of York

Figure 1: The Study Area



Three of these municipalities – the City of Hamilton (formerly the Regional Municipality of Hamilton-Wentworth), the City of Toronto (formerly Metropolitan Toronto), and the City of Kawartha Lakes (formerly the County of Victoria) – are single-tier municipalities, formed by the amalgamation of the lower-tier municipalities within each. The other 11 contain a total of 93 lower-tier municipalities (listed in the Appendix).

This study area is very similar to the Central Ontario Zone defined as part of the provincial Smart Growth initiative, which contains 17 upper-tier municipalities: the 14 listed above, as well as the Counties of Brant and Haldimand to the west and the County of Haliburton to the east.

The study area consists of 14 upper- or single-tier municipalities in south-central Ontario and covers 31,285 km^2, an area slightly larger than the country of Belgium. The population of the area is over 7.3 million people, which represents 64% of Ontario's population and over 24% of the population of Canada.

According to the 2001 census, the population of the study area is over 7.3 million people, which represents 64% of Ontario's population and over 24% of the population of Canada.

The area includes a variety of physiographic regions and life zones, including a significant portion of the Niagara Escarpment, the entire length of the Oak Ridges Moraine, extensive till plains, limestone plains, and open rock barrens. The forest types range from deciduous forests in the south, dominated by species with Carolinian affinities, to the mixed forests of the Great Lakes Region (Rowe 1972).

Definition of Greenlands

In a 1990 report titled *Space For All: Options for A Greater Toronto Area Greenlands Strategy* (Kanter 1990), Greenlands were defined as various elements of the natural environment (e.g., wetlands, woodlands, etc.) or as specific areas (e.g., ESAs, ANSIs, etc.) that have been recognized by a provincial ministry, conservation authority, or municipality on the basis of exhibiting some intrinsic ecological significance or sensitivity. This recognition is generally translated into some degree of protective status being assigned to the feature, either through provincial or municipal land use policy.

In the present study, this definition of Greenlands has been expanded to include not only the terrestrial or land-based elements of the ecosystem, but also water-based features such as streams, creeks, rivers, ponds, and lakes.

The term Greenlands, therefore, as used in this study, collectively refers to the following features:

- Provincially Significant Wetlands*
- Non-provincially (Locally) Significant Wetlands
- Unevaluated Wetlands[1]
- Provincially Significant Areas of Natural and Scientific Interest (ANSIs)*

1. Wetlands that have not been evaluated following the protocol of the Ontario Wetland Evaluation System (OWES). These wetlands tend to be very small wetlands or northern wetlands situated on the Canadian Shield.

- Regionally Significant ANSIs
- Significant Woodlands*
- Other Woodlands
- Significant Valleylands*
- Significant Wildlife Habitat*
- Critical Habitat of Threatened and Endangered Species*
- Fish Habitat*
- Watercourses (streams, creeks, rivers) and Waterbodies (ponds, lakes)
- Environmentally Significant/Sensitive Areas (ESAs)
- Other miscellaneous municipal designations (see below)

Those features marked with an asterisk are considered significant elements of the Province's Natural Heritage System under Section 2.3 of the 1997 Provincial Policy Statement (PPS). These features are deemed to be significant at a provincial level, the loss of which would have an adverse impact on the Natural Heritage System of Ontario.

In many cases the lands referred to generically as "Greenlands" in this report represent more than one feature of ecological significance. For example, it is not unusual for a Provincially Significant Wetland to also be classified as an ANSI and/or ESA, while Fish Habitat is typically associated with a Watercourse, which may flow through a Significant Valleyland.

In many cases the lands referred to generically as "Greenlands" in this report represent more than one feature of ecological significance. For example, it is not unusual for a Provincially Significant Wetland to also be classified as an ANSI and/or ESA, while Fish Habitat is typically associated with a Watercourse, which may flow through a Significant Valleyland.

In this study the term "Greenlands" excludes active and fallow agricultural land,[2] vacant (cleared) land, and open space parkland with a recreational focus, such as municipal parks, none of which can be considered a natural heritage feature possessing intrinsic ecological function or value.

See **Appendix A** for more detailed definitions of the Greenlands features discussed here.

Study Method

The study involved two main tasks: 1) to assemble an inventory of the Greenlands in the study area; and 2) to classify the Greenlands based on categories of protection.

2. Agricultural land should be considered as a land use type distinct from Greenlands, with its own set of unique issues as they relate to urban expansion and land development. However, if left to undergo natural succession, abandoned agricultural land will eventually revert to an old field or cultural thicket community. Depending on the age, composition, and structure of the vegetation communities they support, these areas may possess enough ecological value to be considered Greenlands. In these cases, however, the definition of Greenlands is based on actual land cover rather than on Official Plan designation or ownership, since many lands zoned Agricultural and/or Rural in an Official Plan may contain Greenlands features such as woodlands, wetlands, and old field habitats.

Inventory the Greenlands system

This task involved:

- Compiling existing Greenlands data in a GIS-compatible format from the following sources: Ministry of Natural Resources; Ministry of Agriculture and Food; Ministry of Municipal Affairs and Housing; local Conservation Authorities; Niagara Escarpment Commission; regional and local municipalities; and non-governmental organizations (e.g., Nature Conservancy of Canada);
- Assembling a GIS database of the data, with separate layers for each of the elements of the Greenlands system (e.g., woodlands, wetlands, watercourses, Environmentally Significant/Sensitive Areas, Areas of Natural and Scientific Interest, provincial parks and conservation areas, etc.);
- Overlaying the Greenlands database with comparable land use data for the Greater Toronto Area (GTA) portion of the study area (i.e., the City of Toronto and the regional Municipalities of Halton, Peel, York, and Durham), which classifies land using the following categories: urban; employment lands (industrial/commercial); major open space; rural; agricultural; and special study area (e.g., the Seaton Lands in north Pickering);
- Developing a common typology for the elements of the Greenlands system, to achieve consistency throughout the study area, since the extent to which Greenlands are afforded protection differs from municipality to municipality and in some cases is strongly influenced by the presence of physiographic features that are subject to special provisions – the Oak Ridges Moraine and the Niagara Escarpment.

The extent to which Greenlands are afforded protection differs from municipality to municipality and in some cases is strongly influenced by the presence of physiographic features that are subject to special provisions – the Oak Ridges Moraine and the Niagara Escarpment.

Assess the current status of the Region's Greenlands

This task involved:

- Developing a system for ranking each Greenland feature on the basis of its "security" (or degree of protection) given the current policy framework;
- Applying the digital information on Greenlands and land use designations to develop a hierarchy of "policy protection," largely based on the protective status provided by Official Plan policies;
- Creating a datafile on the information amassed by Gartner Lee and Neptis through this study, in order to document where the data came from, how they were manipulated or described, how accurate the data are, and where further information can be found.

Greenlands categories

Through the Ontario Geospatial Data Exchange (OGDE),[3] Gartner Lee and Neptis were able to obtain the digital NRVIS (Natural Resource

3. The Ontario government set up the Ontario Geospatial Data Exchange (OGDE), a data-sharing organization, in the 1990s to facilitate data exchange among various levels of government and the broader public sector. The Neptis Foundation joined the OGDE in 2002 in order to acquire digital spatial data for this study.

Values Information System) data from the Ontario Ministry of Natural Resources' Land Information Ontario (LIO) warehouse for the entire study area. NRVIS is the most recent and most comprehensive land database for southern Ontario. When the data were acquired in 2002, there were 712 "layers" of land information in the system. The layers of most relevance to this study were:

Digital NRVIS (Natural Resource Values Information System) data from the Ontario Ministry of Natural Resources' Land Information Ontario (LIO) were collected for the entire study area. NRVIS is the most recent and comprehensive land database for southern Ontario.

- **Wooded areas.** Derived from aerial photo-interpretation, primarily during the 1980s, wooded areas represent contiguous areas of forested land. Because of the expansion of urban areas, some of the wooded areas derived from the land database no longer exist. Reforestation efforts in other areas have created new wooded areas. Overall, however, this data layer represents the most up-to-date representation of forests in South-central Ontario.
- **Water features.** These include permanent and intermittent streams, lakes, ponds and "cartographic wetlands." Cartographic wetlands are determined through aerial photo-interpretation, and often are located in the same area as evaluated wetlands. These wetlands may have been formally evaluated by the OMNR; however, the spatial limits of these features rarely coincide with the mapped boundaries of evaluated wetlands. These discrepancies are often due to differences in the scale, date, and quality of the aerial photography used, as well as the protocol of the Province's Ontario Wetland Evaluation System (OWES), which identifies wetlands primarily on the basis of vegetation rather than topography or hydrology. The "cartographic wetland" layer includes many more wetlands (albeit generally the smaller ones) than have been evaluated by the Ministry of Natural Resources and some Conservation Authorities, particularly in the outer parts of the study area (e.g., northern Simcoe and Peterborough counties and the City of Kawartha Lakes).
- **Evaluated wetlands.** These wetland features have been visited and ranked by experts in wetland evaluation using the Ontario Wetland Evaluation System (OMNR 1993), which categorizes wetlands into varying levels of significance. Those with higher scores are considered provincially significant, while those with lower scores are not considered provincially significant.

Evaluated wetlands have been visited and ranked by experts in wetland evaluation using the Ontario Wetland Evaluation System.

- **ANSIs (Areas of Natural or Scientific Interest).** OMNR (1987) designates ANSIs as areas "of land and water containing natural landscapes or features which have been identified as having values related to protection, natural heritage appreciation, scientific study or education. Where ANSIs occur on public lands managed by the Ministry, it will ensure that the land uses and activities which occur provide for the protection of the identified values. On private lands, the Ministry will, through cooperation with others, attempt to ensure that landowners are aware of significant features on their properties and seek the owner's cooperation in protecting such features." ANSIs can be either Life Science or Earth Science areas and are classified as being Provincially Significant or Regionally Significant.
- **ESAs (Environmentally Sensitive/Significant Areas).** Municipalities, often in cooperation with the local Conservation Authority, may designate ESAs (sometimes referred to in Official Plans as Environmentally

Sensitive Policy Areas). Because they are designated locally, different criteria are used from jurisdiction to jurisdiction. Not all upper-tier municipalities in the study area use this designation.

- **Provincial Parks.** Provincial Park boundaries are defined by the Ministry of Natural Resources.
- **Conservation Areas.** These are lands owned and managed by local Conservation Authorities. Most are natural to semi-natural areas, with limited development in the form of access roads, picnicking areas, trails, interpretive facilities, etc.
- **Crown Land.** This is provincially owned land, administered by the Ontario Ministry of Natural Resources, which may be managed for resources or as natural recreation areas. Crown Land is significant only in the northern part of the study area (e.g., the County of Simcoe, the County of Peterborough, and the City of Kawartha Lakes).
- **Oak Ridges Moraine Land Use.** The Oak Ridges Moraine Conservation Plan (ORMCP) has a significant impact on the status and distribution of Greenlands in the study area.
- **Niagara Escarpment Plan.** The Niagara Escarpment Plan (NEP) includes land use designations and policies administered by the Niagara Escarpment Commission.

Municipalities, often in cooperation with the local Conservation Authority, may designate ESAs (Environmentally Sensitive/Significant Areas). Because they are designated locally, different criteria are used from jurisdiction to jurisdiction.

Crown Land is provincially owned land, administered by the Ontario Ministry of Natural Resources, which may be managed for resources or as natural recreation areas.

Data integration issues

There has been no standardization of the storage of land-related information among the three single-tier, 11 upper-tier, and 93 lower-tier municipalities in the study area. Some municipalities use Geographic Information Systems to manage their data; others do not. Most smaller municipalities do not maintain zoning or by-law information in a format that is easy to integrate with other spatial data sets.

Digital mapping was obtained from the Central Lake Ontario Conservation Authority (CLOCA), the City of Hamilton, and the Region of Peel. In many cases, however, municipal information was available only through maps from Official Plans posted on municipal websites in Portable Document Format (PDF), which does not allow for data manipulation. Using various software tools, the lines were extracted from these documents, positioned spatially in the GIS, and assigned attributes based on the Official Plan designations.

Each natural heritage feature was identified by element type (wetland, woodland, ANSI, etc.) and status (e.g., provincially significant, locally significant, designated "Environmental Protection" in an Official Plan, etc.). Many of the natural heritage Greenlands features have multiple labels. For example, many ANSIs are also recognized as ESAs (and vice versa), while swamp wetlands may be mapped as woodlands, since swamps are often forested wetlands.

Each natural heritage feature was identified by element type (wetland, woodland, ANSI, etc.) and status (e.g., provincially significant, locally significant, designated "Environmental Protection" in an Official Plan, etc.).

Most of the mapping was obtained at a scale of 1:10,000. The Provincial Government and most Conservation Authorities maintain data using the NRVIS mapping as a base, so there is usually reasonably good alignment of features. Difficulties arose when regions and municipalities used map-

ping at differing scales. Occasionally, the maps attached to Official Plans graphically presented features that were obviously generalizations of particular areas. Regional mapping may have been done at a much larger scale at a time before the widespread adoption of GIS. Rather than make assumptions about the specific features that may have been intended by these drawings, the illustrations were imported and located spatially with as little modification of boundaries as possible.

Difficulties in mapping arose when regions and municipalities used mapping at differing scales.

A related issue was the imperfect overlay of boundaries. Often, wetland, ANSI, or ESA boundaries would align closely, but not perfectly. In the analysis stage of this study, boundaries were not modified. For the final maps, however, small inconsistencies between boundaries were removed.

Consultation with municipal planners

During the summer of 2003, the authors of this report held individual meetings with senior planning staff of 11 of the 14 upper-tier municipalities (all except the Regional Municipality of Niagara, the County of Dufferin, and the County of Northumberland). The purpose of the meetings was to introduce the project to staff, describe the approach taken, and review preliminary mapping. These sessions gave the municipal planners an opportunity to discuss specific issues facing Greenlands in their municipality, identify "hotspots," and review both the accuracy of the mapping and the appropriateness of the "security" designations. The comments received were used to make revisions to some of the Greenlands maps and summary tables.

Policy Framework

The major influences on Greenlands policy are exerted at the provincial and municipal levels, although some important environmental policy initiatives are imposed through federal legislation. In much of southern Ontario, Conservation Authorities also play a vital role in Greenlands protection, through guidelines, policies, and regulations.

The Planning Act

The Provincial Policy Statement (PPS) contains polices that deal with the use and protection of the province's resources, including agricultural land, mineral resources, natural heritage resources, ground and surface water and cultural heritage resources. It is currently under review.

The *Planning Act* (Government of Ontario 1990a) is the legislation that establishes the "ground rules" for land use planning in Ontario. It enables municipalities to control land use and provides for the mechanisms through which this control is exercised. The Act also sets out the framework for the *Provincial Policy Statement* (PPS), by which the province sets overall policy directions. However, the Act gives a great deal of autonomy to municipal councils when it comes to making decisions affecting land use.

Provincial Policy Statement

The current Provincial Policy Statement (PPS) has been in place since 1997 and is currently under review (as of summer 2004). It provides overall policy directions on matters of provincial interest related to land use planning and development. The PPS contains polices that deal with the use and

protection of the province's resources, including agricultural land, mineral resources, natural heritage resources, ground and surface water and cultural heritage resources.

Natural heritage policies are addressed in Section 2.3 of the PPS:

> ***2.3 Natural Heritage***
>
> *2.3.1 Natural heritage features and areas will be protected from incompatible development.*
>
> *a. Develotpment and site alteration will not be permitted in:*
>
> – *significant wetlands south and east of the Canadian Shield; and*
>
> – *significant portions of the habitat of endangered and threatened species.*
>
> *b. Development and site alteration may be permitted in:*
>
> – *fish habitat;*
>
> – *significant wetlands in the Canadian Shield;*
>
> – *significant woodlands south and east of the Canadian Shield;*
>
> – *significant valleylands south and east of the Canadian Shield;*
>
> – *significant wildlife habitat; and*
>
> – *significant areas of natural and scientific interest*
>
> *if it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified.*
>
> *2.3.2 Development and site alteration may be permitted on adjacent lands to a) and b) if it has been demonstrated that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified.*
>
> *2.3.3 The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible.*
>
> *2.3.4 Nothing in policy 2.3 is intended to limit the ability of agricultural uses to continue.*

The *Planning Act* currently requires that decisions made by municipalities "shall have regard to" the PPS, meaning that staff and/or council have an obligation to consider how the specific policy provisions of the PPS apply when carrying out any planning responsibility.

Official Plans

Each municipality in Ontario (upper-, lower-, or single-tier) is required to produce an Official Plan that, according to the *Planning Act* (Section 16.1):

> *a) shall contain goals, objectives and policies established primarily to manage and direct physical change and the effects on the social, economic and natural environment of the municipality or part of it, or an area that is without municipal organization; and*
>
> *b) may contain a description of the measures and procedures proposed to attain the objectives of the plan and a description of the measures and procedures for informing and obtaining the views of the public in respect of a proposed amendment to the official plan or proposed revision of the plan or in respect of a proposed zoning by-law.*

The Official Plan determines where all forms of development (residential, industrial, and commercial) will occur and sets timelines for this development. It also identifies the location and type of infrastructure (e.g., major roads, sewers, and water mains) and public facilities (e.g., parks, schools, recreation centres, etc.) in the municipality. Once an Official Plan is in effect:

Official Plans determine where all forms of development (residential, industrial, and commercial) will occur and set timelines for this development.

- local council and municipal staff decisions must follow the plan;
- all new services (e.g., sewers or watermains) must conform to the plan;
- all zoning by-laws must comply with the Official Plan.

Official Plans for upper-tier municipalities (Counties and Regions) deal with broad planning issues that affect the lower-tier municipalities. All local Official Plans and zoning by-laws must conform to the County or Regional Official Plan.

Zoning By-laws

Zoning by-laws are enacted at the local municipal level and set the rules and regulations that control development. Specifically, zoning defines how land can be used, the types of buildings and other structures permitted and where they can be located, and such details as the height of buildings and setbacks from other properties. Zoning by-laws provide the tools to implement and legally enforce the Official Plan. If a proposed development fails to comply with a zoning by-law, the municipality may refuse to issue a building permit. Many lower-tier municipalities have a comprehensive zoning by-law that divides the municipality into different land use zones according to permitted uses (e.g., commercial or residential) and required standards (e.g., building size and location).

Zoning by-laws provide the tools to implement and legally enforce the Official Plan.

Niagara Escarpment Plan (NEP)

The Niagara Escarpment crosses the study area from Queenston in the Regional Municipality of Niagara west and north through the City of Hamilton, the Region of Peel, and the Counties of Dufferin and Simcoe.

The Niagara Escarpment Planning and Development Act (1990) established a regulatory framework and planning process to protect the Escarpment from incompatible land use activities that might compromise its ecological integrity. The Niagara Escarpment Plan (NEP), considered by many to be Canada's first, large-scale environmental land-use plan, followed from the Act. Originally approved by the Province in 1985 (and revised as a result of a review initiated in 1990), the specific objectives of the Niagara Escarpment Plan are:

***The Niagara Escarpment Planning and Development Act* (1990) established a regulatory framework and planning process to protect the Escarpment from incompatible land use activities that might compromise its ecological integrity.**

> *a) to protect unique ecologic and historic areas;*
>
> *b) to maintain and enhance the quality and character of natural streams and water supplies;*
>
> *c) to provide adequate opportunities for outdoor recreation;*
>
> *d) to maintain and enhance the open landscape character of the Niagara Escarpment in so far as possible, by such means as compatible farming or forestry and by preserving the natural scenery;*
>
> *e) to ensure that all new development is compatible with the purpose of the Plan;*
>
> *f) to provide for adequate public access to the Niagara Escarpment; and*
>
> *g) to support municipalities within the Niagara Escarpment Plan Area in their exercise of the planning functions conferred upon them by the Planning Act.*

The land covered by the Niagara Escarpment Plan has been classified into one of the following seven land use designations:

- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Rural Area
- Minor Urban Centre
- Urban Area
- Escarpment Recreation Area
- Mineral Resource Extraction Area

The three land use categories that provide the greatest level of protection are Escarpment Natural Area, Escarpment Protection Area, and Escarpment Rural Area.

- **Escarpment Natural Area:** This designation is assigned to features such as stream valleys, wetlands, and forests (including Provincially Significant Life Science ANSIs) that are either "relatively undisturbed" or in a "relatively natural state." These areas are considered to repre-

sent the most significant natural and scenic areas of the Escarpment. This designation provides the highest level of Greenlands protection and the associated policies of the Plan are intended to maintain these natural areas.

- **Escarpment Protection Area:** Although the name of this designation suggests that a higher degree of protection is accorded to these areas than Escarpment Natural Areas, this is not the case. Escarpment Protection Areas include features that have been significantly modified by land-use activities such as agriculture or residential development, land needed to buffer prominent Escarpment Natural Areas, and natural areas of regional significance (e.g., Regionally Significant Life Science ANSIs). The policies in the Plan are aimed at maintaining the remaining natural features and the open, rural landscape character of the Escarpment and lands in its vicinity.
- **Escarpment Rural Area:** Escarpment Rural Areas help to maintain the open, rural, and scenic landscape character of the area. The Plan policies encourage predominantly agricultural and forestry uses for these lands, which are seen as compatible "buffers" to the more ecologically sensitive areas of the Escarpment.

The Niagara Escarpment Plan gives the highest level of protection to features such as stream valleys, wetlands, and forests (including Provincially Significant Life Science ANSIs) that are either "relatively undisturbed" or in a "relatively natural state."

Oak Ridges Moraine Conservation Plan (ORMCP)

The Oak Ridges Moraine is an irregularly-shaped ridge formed from glacial sands and gravel that stretches for 160 km across the study area: from the Trent River (County of Northumberland) in the east to the Niagara Escarpment (Region of Peel) in the west. Located north of and parallel to Lake Ontario, the Moraine divides the watersheds draining south into western Lake Ontario from those draining north into Georgian Bay, Lake Simcoe, and the Trent River system.

In May 2001, the Province introduced the *Oak Ridges Moraine Protection Act, 2001*, which established a six-month moratorium on development on the Moraine. A period of extensive study and public and stakeholder consultation ensued, as the government sought input on the development of a long-term strategy to protect the Moraine. In November 2001, the Province released a comprehensive strategy for the Oak Ridges Moraine, which included the *Oak Ridges Moraine Conservation Act, 2001* and the regulations of the Oak Ridges Moraine Conservation Plan (MMAH 2002).

The ORMCP was established to provide land use and resource management direction for the Moraine. It identifies key natural heritage features (e.g., wetlands, woodlands, fish habitat, and significant wildlife habitat) and hydrologically sensitive features (e.g., kettle lakes and springs). Decisions regarding land use planning that affect the ORM, whether made at the provincial or municipal level, must conform to the specific provisions of the Plan. The ORMCP takes precedence over municipal Official Plans.

The Oak Ridges Moraine Conservation Plan identifies key natural heritage features (e.g., wetlands, woodlands, fish habitat, and significant wildlife habitat) and hydrologically sensitive features (e.g., kettle lakes and springs). Decisions regarding land use planning that affect the ORM, whether made at the provincial or municipal level, must conform with the specific provisions of the Plan.

The Oak Ridges Moraine Conservation Plan has the following objectives:

> *(a) protecting the ecological and hydrological integrity of the Oak Ridges Moraine Area;*
>
> *(b) ensuring that only land and resource uses that maintain, improve or restore the ecological and hydrological functions of the Oak Ridges Moraine Area are permitted;*
>
> *(c) maintaining, improving or restoring all the elements that contribute to the ecological and hydrological functions of the Oak Ridges Moraine Area, including the quality and quantity of its water and its other resources;*
>
> *(d) ensuring that the Oak Ridges Moraine Area is maintained as a continuous natural landform and environment for the benefit of present and future generations;*
>
> *(e) providing for land and resource uses and development that are compatible with the other objectives of the Plan;*
>
> *(f) providing for continued development within existing urban settlement areas and recognizing existing rural settlements;*
>
> *(g) providing for a continuous recreational trail through the Oak Ridges Moraine Area that is accessible to all including persons with disabilities; and*
>
> *(h) providing for other public recreational access to the Oak Ridges Moraine Area.*

An oft-heard criticism of the natural heritage policies in the PPS is that the definitions are vague. By comparison, the regulations related to natural heritage protection in the ORMCP are highly specific and rigidly applied. One of the fundamental differences between the PPS and the ORMCP is that the former document is an expression of provincial policy, while the latter is a regulation and takes precedence over the policies of an Official Plan.

The Plan classifies the Moraine into four land use designations:

- **Natural Core Areas** occupy 38% of the Moraine and protect lands with the greatest concentrations of key natural heritage features that are critical to maintaining the integrity of the Moraine as a whole. Only existing uses and very restricted new uses are allowed in these areas.
- **Natural Linkage Areas** occupy 24% of the Moraine and protect critical natural and open space linkages between the Natural Core Areas. They are also associated with major watercourses. Some limited aggregate resource extraction (sand and gravel pits) is allowed in Natural Linkage Areas, subject to stringent review and approval standards.
- **Countryside Areas** occupy 30% of the Moraine and are typically agricultural lands that act as a rural transition and buffer between the Natural Core and Natural Linkage Areas and the urbanized Settlement Areas. Recreation developments such as golf courses are permitted in the Countryside Areas. Limited residential development is also allowed in Countryside Areas, contingent on the municipality completing an approved growth management study, a rural economic development study, a water budget, and a water conservation plan.
- **Settlement Areas** occupy 8% of the Moraine and are generally those portions of the Oak Ridges Moraine that are already urbanized or approved for future urban development in municipal Official Plans.

The ORMCP is to be reviewed every 10 years to determine whether any policy or mapping revisions should be made. However, the 10-year review cannot consider removing land from either *Natural Core Areas* or the *Natural Linkage Areas*.

An oft-heard criticism of the natural heritage policies in the PPS is that the definitions are vague. By comparison, the regulations related to natural heritage protection contained in the ORMCP are highly specific and rigidly applied. One of the fundamental differences between the PPS and the ORMCP is that the former document is an expression of provincial *policy*, while the latter is a *regulation* and takes precedence over the policies of an Official Plan.[4] It is a requirement of the *Oak Ridges Moraine Conservation Act, 2001* that the Official Plans of all the upper- and lower-tier municipalities that contain a portion of the ORM be amended to bring them into conformity with the Plan.

Strong Communities Act (Bill 26)

The *Strong Communities Act* proposes that decisions made by municipal councils and the Ontario Municipal Board (OMB) must be "consistent with" the PPS, rather than having "regard to" it. If this change is adopted, planning authorities will have to ensure that the PPS is enforced to the fullest extent possible.

The *Strong Communities Act*, also known as Bill 26, was introduced by the Provincial Government in December 2003. Bill 26 proposes several key amendments to the *Planning Act*, perhaps most notably the requirement that decisions made by municipal councils and the Ontario Municipal Board (OMB) must be "consistent with" the PPS, rather than having "regard to" it. If this change is adopted, planning authorities will not merely be allowed to pay lip service to the protection of significant natural heritage features, they will have to ensure that the PPS is enforced to the fullest extent possible.

Another key aspect of Bill 26 is that while landowners can still apply to expand or change the boundary of an urban settlement area, they will no longer have the right to appeal to the OMB if a municipality rejects or fails to make a decision on the application. From a Greenlands perspective, there will now be a greater degree of certainty that natural heritage features falling outside approved, designated urban settlement areas will not be put under development pressure prematurely.

Greenbelt Protection Act (Bill 27)

The *Greenbelt Protection Act* imposes a one-year moratorium on urban development on rural and agricultural lands in the Regional Municipalities of Halton, Peel, York, and Durham, the Cities of Hamilton and Toronto, the "tender fruit belt" of the Regional Municipality of Niagara, and all lands within the jurisdiction of the Niagara Escarpment Plan and the Oak Ridges Moraine Area.

---

4. In an attempt to eliminate ambiguity surrounding the definitions of what significant aspects of the natural environment need to be protected on the Oak Ridges Moraine, the Ministry of Natural Resources has produced eight technical memoranda on issues related to implementation of the ORMCP. ttAlthough these papers have not yet been officially sanctioned or approved for use by the Province of Ontario, they are being widely applied by municipalities, Conservation Authorities, and land development proponents to identify and protect important features throughout the moraine.

This means that, at least for the time being, all applications for development outside urban settlement areas will be put on hold. New development is permitted to occur only within areas designated for urban use. Furthermore, Bill 27 "stays" any proceedings already before the OMB that deal with an Official Plan, Official Plan Amendment (OPA), zoning, holding or interim control by-law, or plan of subdivision within the Greenbelt area. All such hearings have been adjourned and will remain in limbo during the moratorium, which is due to expire December 16, 2004.

The *Greenbelt Protection Act* imposes a one-year moratorium on urban development on rural and agricultural lands in the GTA, Hamilton, the "tender fruit belt" of the Regional Municipality of Niagara, and all lands within the jurisdiction of the Niagara Escarpment Plan and the Oak Ridges Moraine Area.

The Ontario Municipal Board (OMB)

The Ontario Municipal Board (OMB) is an independent tribunal that hears appeals of decisions made by planning authorities such as local and regional councils, committees of adjustment, expropriating authorities, and the Ministry of Municipal Affairs. Appeals to the OMB may be launched by individuals, public agencies, and non-governmental organizations. The members of the OMB are appointed by the Ontario government.

The OMB deals with appeals related to:

- Official Plans;
- zoning by-laws;
- plans of subdivision;
- consents to sever land;
- minor variances;
- development charges;
- applications for aggregate licences;
- compensation for expropriated land.

OMB decisions may affirm natural heritage polices contained in the PPS or an Official Plan or approve land use changes that result in the loss of an environmental feature.

In resolving disputes, the OMB hears evidence pertaining to environmental, social, and economic issues, the applicability of provincial legislation, and policy statements and municipal planning documents such as official plans or zoning by-laws. The Board is also required to consider the rights of individuals as well as the best interests of the community as a whole.

OMB decisions often have implications for Greenlands protection, both positive and negative. In some cases a decision may affirm natural heritage polices contained in the PPS or an Official Plan; in others, the decision results in the approval of land use change that results in the loss of an environmental feature.

The Current State of Greenlands Protection in Central Ontario

For this study, we have developed a four-level hierarchy of Greenlands protection, based entirely on the degree of "security" that various Greenlands features receive through provincial and municipal policy instruments. This hierarchy is based on a combination of:

- legal protection through government policy instruments and legislation;
- patterns of historical development and land use changes in south-central Ontario (that is, the Greenland types that have typically been protected and those that have not);

- consultation with municipal planners from single- and upper-tier municipalities on the extent to which Greenlands are protected as a consequence of urban development.

The four different levels of protection we have given to Greenlands in south-central Ontario are:

- Level 1: Fully Protected
- Level 2: Generally Protected
- Level 3: Partially Protected
- Level 4: Not Protected

We distinguish between Greenland features that lack protection (Level 4) and non-Greenland areas, which appear as pale grey on the accompanying maps. These areas may consist of urbanized or cleared agricultural land.

When we refer to Greenlands protection in this context we are talking about the degree of protection given to specific natural heritage features or areas that have been inventoried and designated as significant by some authoritative body as worthy of at least some form of protection. Some such lands are classified in this study as "Not Protected" (Level 4), but these unprotected Greenlands should not be confused with lands that have no Greenland designation whatsoever, which of course also have no protection. These latter lands are shown as pale grey on the accompanying maps. They are primarily cleared agricultural land, although they are not necessarily currently under cultivation.

Level 1: Fully Protected

The main features in this category are:

- Provincially Significant Wetlands that are not on the Canadian Shield;
- Habitat of Endangered and Threatened Species that are not on the Canadian Shield;
- features fully protected under the Oak Ridges Moraine Conservation Plan.

Provincially Significant Wetlands and Habitat of Endangered and Threatened Species

The only consistency among the Official Plans of the municipalities south and east of the Canadian Shield is that, at least on paper, they give full protection to the two features within which development is prohibited under the Provincial Policy Statement: Provincially Significant Wetlands and the significant portions of the Habitat of Endangered and Threatened Species.

The only true consistency among the Official Plans of the municipalities located south and east of the Canadian Shield is that, at least on paper, they give full protection to the two features of provincial interest within which development is prohibited under the Provincial Policy Statement: Provincially Significant Wetlands and the significant portions of the Habitat of Endangered and Threatened Species.[5] It is generally accepted by developers, environmentalists, and land use planners that these features are protected from "incompatible development."

Municipal Official Plans do not show the locations of Habitat of Endangered and Threatened Species on maps, for two reasons: 1) these areas are invariably far too small to depict, and 2) in order to protect these

5. All the upper-tier Official Plans reviewed for this study provide full policy protection to Significant Wetlands. Although the Regional Municipality of Halton fails to recognize Significant Habitat of Endangered and Threatened Species as fully protected features, this is apparently just an oversight and not a reflection of Halton's lack of interest or lack of intent in protecting these areas.

plants and animals, it is imperative that specific information regarding their habitat not be publicly divulged. Accordingly, Significant Habitat of Endangered and Threatened Species is not mapped on the figures that accompany this report.

Although Significant Wetlands receive Level 1 protection from development and site alteration under Section 2.3.1 of the PPS, infrastructure projects such as roads, sewers, pipelines, and utility corridors are not considered "development." Since infrastructure is subject to legislation other than the *Planning Act* (e.g., the *Environmental Assessment Act*, the *Ontario Energy Board Act*, and the *Ontario Water Resources Act*), transportation and utility corridors may pass through Provincially Significant Wetlands, resulting in some permanent loss of the feature.[6]

Key Natural Heritage Features (KNHFs) or Hydrologically Sensitive Features (HSFs) protected by the Oak Ridges Moraine Conservation Plan

Development and site alteration is prohibited for Key Natural Heritage Features (KNHFs) or Hydrologically Sensitive Features (HSFs) on the Oak Ridges Moraine.

Many Level 1 features and areas are protected by the Oak Ridges Moraine Conservation Plan (ORMCP), which offers a level of protection greater than that provided by the PPS or an Official Plan for similar features off the Moraine. Development and site alteration is prohibited for Key Natural Heritage Features (KNHFs) or Hydrologically Sensitive Features (HSFs) on the Moraine.

KNHFs include:

- Wetlands;
- Significant Portions of the Habitat of Endangered, Rare and Threatened Species;
- Fish Habitat;
- Areas of Natural and Scientific Interest (Life Science);
- Significant Valleylands;
- Significant Woodlands;
- Significant Wildlife Habitat;
- Sand Barrens, Savannas and Tallgrass Prairies.

The Oak Ridges Moraine Conservation Plan defines certain features more broadly than the Provincial Policy Statement. For example, under the ORMCP, any wetland greater than 0.5 ha, regardless of whether it has been evaluated or not, is deemed significant.

The ORMCP defines some of these features more broadly than the PPS. For example:

- The PPS protects only Provincially Significant Wetlands (PSWs) that have been evaluated and classified in accordance with the Ontario Wetland Evaluation System. Under the ORMCP, any wetland greater than 0.5 ha, regardless of whether it has been evaluated or not, is deemed significant.
- The PPS defines Significant Woodlands as areas that have been identified and designated by a municipality, using evaluation procedures established by the Ministry of Natural Resources. On the ORM, a

6. This was the case with the northward extension of Highway 404 through the northern part of the Regional Municipality of York; it was impossible to route the highway corridor without encroaching upon portions of several large provincially significant wetlands.

Significant Woodland is any stand of trees (excluding stands of fruit and nut trees and Christmas tree plantations) greater than 0.5 ha located in a Natural Core or Natural Linkage Area, or greater than 4.0 ha if located in a Countryside or Settlement Area.

- The ORMCP protects significant portions of the habitat of provincially rare species of plants and animals, whereas the PPS addresses only those considered Threatened or Endangered.
- Regionally Significant ANSIs are given full protection under the ORMCP, whereas the PPS recognizes only Provincially Significant ANSIs.
- Sand Barrens, Savannas, and Tallgrass Prairies are three habitat types given full protection under the ORMCP that are not even recognized by the PPS.

Hydrologically Sensitive Features (HSFs) on the Oak Ridges Moraine are defined as:

- Permanent and Intermittent Streams;
- Wetlands;
- Kettle Lakes[7];
- Seepage Areas and Springs.

Sand Barrens, Savannas, and Tallgrass Prairies are three habitat types given full protection under the Oak Ridges Moraine Conservation Plan that are not even recognized by the Provincial Policy Statement.

None of these HSFs, with the exception of wetlands, is specifically addressed by the PPS. Under the ORMCP, Significant Wetlands are defined as any wetlands greater than 0.5 ha, and not simply those that have been classified as PSWs. The only exceptions to the prohibition on development within these areas are forest, fish, and wildlife management activities; low-intensity recreational uses; conservation, flood, and erosion control projects; roads, infrastructure, and utilities such as hydro lines.[8]

Kettle lakes may be included within provincially significant wetland complexes; however, there are many that are not considered PSWs that nevertheless receive full protection under the ORMCP. The same is true of Seepage Areas and Springs that, although typically very small features, are scattered throughout the Moraine.

Not only are KNHFs and HSFs given full protection, but the ORMCP provides for minimum 30-metre-wide buffers (known as Vegetation Protection Zones) for these features, which are also fully protected from development. Any site alteration or development proposed within 120 metres of a KNHF or an HSF must be supported by a Natural Heritage Evaluation to demonstrate that the development will not have any adverse effects on the features and their ecological functions. The evaluation may conclude that a more generous buffer (greater than 30 metres wide) is needed to protect the feature from nearby development. Over time, therefore, considerably more land than that occupied by the actual KNHFs and HSFs will receive full protection. Level 1 (full) protection is given to all KNHFs and HSFs found

7. Kettle Lakes, depressional areas formed by glacial action that hold water throughout the year, are characteristic physiographic features of the ORM.

8. Roads, infrastructure and utilities will only be considered if the need has been demonstrated and there is no "reasonable" alternative available.

within those portions of the Counties of Dufferin, Simcoe, Peterborough, and Northumberland and the Regional Municipalities of Peel, York, and Durham that fall within the Oak Ridges Moraine Plan Area.[9]

Level 2: Generally Protected

Outside the Oak Ridges Moraine, most of the Greenlands in the study area receive Level 2 (general) protection. These include the following features:

- Provincially Significant Wetlands on the Canadian Shield;
- Fish Habitat;
- Significant Valleylands;
- Significant Woodlands;
- Significant Wildlife Habitat;
- Escarpment Natural Areas;
- Provincial Parks and Conservation Areas;
- Provincially Significant (Life Science) ANSIs.

Level 2 features are considered "generally protected" because "development and site alteration" may be permitted on or beside these features "if it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified."

We consider these features to be "generally protected" because most of the Official Plans adopt the same approach and wording as the PPS – "development and site alteration" may be permitted on or next to these features "if it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified."

The vehicle for demonstrating "no negative impact" is typically an Environmental Impact Statement (EIS), a study carried out by a qualified environmental consultant on behalf of a development proponent. The EIS is submitted for review and approval by the municipality, which may circulate the EIS to the local Conservation Authority for technical review. In areas where there are no Conservation Authorities, such as the northern portions of the Counties of Simcoe and Peterborough and the City of Kawartha Lakes, this technical review function may be performed by consultants hired by the municipality.

When a municipality is satisfied that development or site alteration will not result in a negative impact on the features and grants approval for the development to proceed, there may nonetheless be some physical loss of Greenlands or impairment of ecological function.

One possible outcome of an EIS is that the proponent is able to demonstrate, to the satisfaction of the municipality and other review agencies, that development or site alteration will not result in a negative impact on the features. When the municipality grants approval for the development to proceed, there may nonetheless be some physical loss of Greenlands or impairment of ecological function. For this reason, we consider these natural heritage features to be generally protected.

---

9. Note that more land than that occupied by the specific Greenlands features is given full protection under both the Natural Core Area and Natural Linkage Area designations. For example, any existing agricultural lands within these designations are intended to remain in an undeveloped state.

Provincially Significant Wetlands on the Canadian Shield

Provincially Significant Wetlands that lie on the Canadian Shield[10] are not fully protected under the PPS to the same extent as those occurring south and east of the Shield and thus are not given Level 1 protection. The PPS permits development or site alteration in Provincially Significant Wetlands on the Canadian Shield, subject to the "no negative impacts" test. Therefore, Shield PSWs are also given Level 2 protection.

Fish Habitat

Fish Habitat is also governed by the federal *Fisheries Act* (1985). The test of the *Fisheries Act* is whether a proposed undertaking is likely to result in a "HADD" – the "Harmful Alteration, Disruption and Destruction" of fish habitat.

Fish Habitat is usually given Level 2 protection in the Official Plans we reviewed, because under the PPS "development and site alteration" may be permitted within this natural heritage feature. However, Fish Habitat is also governed by the federal *Fisheries Act* (1985). The test of the *Fisheries Act* is whether a proposed undertaking is likely to result in a "HADD" – the "Harmful Alteration, Disruption and Destruction" of fish habitat. Any activity is considered harmful if it reduces the productive capacity of the habitat, therefore the federal Department of Fisheries and Oceans (DFO) has adopted a principle of "no net loss of productive capacity" (DFO 1986). If a HADD is expected, the proponent must demonstrate how the impact will be mitigated (e.g., through alterations to the design of the proposed development, etc.). If the HADD cannot be avoided or adequately mitigated, there is an opportunity to compensate for the loss of Fish Habitat through replacement or increasing Fish Habitat productivity. Ultimately, an authorization must be secured from DFO before an undertaking affecting Fish Habitat is allowed to proceed.

Significant Valleylands

As a general rule, development or site alteration is prohibited from occurring below the top-of-bank of all well-defined valleylands (not just those defined as "significant").

Significant Valleylands are invariably given Level 2 protection in municipal Official Plans, in accordance with the PPS. As a general rule, however, development or site alteration is prohibited from occurring below the top-of-bank of *all* well-defined valleylands (not just those defined as "significant"). Flood and fill line regulations (enforced by Conservation Authorities) are typically imposed on sections of watercourses that drain an area greater than 125 ha. These regulations restrict development in areas subject to flooding or on steep, potentially unstable slopes. Valleylands are only "generally protected" because public policies allow for development subject to the findings of supporting geotechnical studies and an EIS. In reality, however, new development rarely occurs in valleylands.

Although the physical form of a valley receives policy protection, there is no guarantee that the quality and quantity of the water within the watercourse that occupies the valleyland will not deteriorate as a result of adjacent or upstream land use activities. Headwater areas are extremely important to an aquatic system and are most often at risk because they tend

10. This applies to portions of the Counties of Simcoe and Peterborough and the City of Kawartha Lakes.

to be smaller, intermittent tributaries that are not typically associated with valley features and that do not always provide fish habitat. Furthermore, floodline mapping is not required for those watercourses whose upstream catchment area is less than 125 ha. In recognition of the vulnerability of these important headwater tributaries, some Conservation Authorities and municipalities (e.g., the Town of Markham, a lower-tier municipality in the Region of York) have begun to develop specific policies to address the protection of these features.

Although the physical form of a valley receives policy protection, there is no guarantee that the quality and quantity of the water within the watercourse that occupies the valleyland will not deteriorate as a result of adjacent or upstream land use activities.

Significant Woodlands and Significant Wildlife Habitat

Two types of natural heritage features addressed by the PPS have consistently "fallen through the cracks" in terms of environmental protection: Significant Woodlands and Significant Wildlife Habitat. We have classified both of these Greenlands types as having Level 2 (general) protection because virtually all 12 of the municipal Official Plans reviewed follow the policy direction of the PPS, namely that site alteration and development is permitted in Significant Woodland and Significant Wildlife Habitat subject to demonstration of no loss of feature or function.

Under the PPS, full responsibility for the identification of these features is given to the planning authority (i.e., the municipality). Despite the fact that the upper-tier municipalities of south-central Ontario mention these features in their Official Plans, to date none has completed the municipal-wide studies necessary to define these resources at a regional or County level. At the time of writing, the only examples of upper-tier municipalities which have embarked on an initiative to define Significant Woodlands at a regional level are the Regional Municipalities of Waterloo, Halton, and Niagara. The Province has produced technical "guidelines" to help identify Significant Wildlife Habitat (OMNR 2000), but has not yet done so for Significant Woodlands. These two Greenlands types, although technically Level 2 based on policy, therefore remain largely unrecognized, unmapped, and unprotected throughout much of the study area.

Significant Woodlands and Significant Wildlife Habitat have consistently "fallen through the cracks" in terms of environmental protection.

Escarpment Natural Areas

The Official Plans of the municipalities within the Niagara Escarpment Plan assign Level 2 protection to areas designated as Escarpment Natural Areas, which represent ecologically important lands, such as stream valleys, wetlands, and forests that are either "relatively undisturbed" or in a "relatively natural state."

Conservation Areas and Provincial Parks

Most Conservation Areas and Provincial Parks are classified as Recreation parks and offer recreational opportunities for the public.

Conservation Areas and Provincial Parks are usually natural areas, at least in part, and some are also recognized as ANSIs and ESAs. Because one of the principal objectives of these public places is the protection of natural environments, it would not seem unreasonable to assume that these areas should be considered to have Level 1 policy protection. However, relatively few of the Provincial Parks found in the study area are classified as Natural Environment parks, where the principal management objective is natural

heritage protection.[11] Most are classified as Recreation parks and offer recreational opportunities for the public (e.g., camping, picnicking, hiking, nature appreciation, boating, etc.). Examples include Wasaga Beach and Earl Rowe (Simcoe), Bronte (Halton), Balsam Lake (Kawartha Lakes), Emily (Peterborough), and Sibbald Point (York). Some facility or infrastructure development is required within Recreation parks in order to support these activities.

Several Conservation Authorities in south-central Ontario have sold off some of their landholdings to generate the revenue needed to support other conservation initiatives.

Furthermore, there is no guarantee that these Level 2 public lands will remain in public ownership or in a predominantly natural state in perpetuity. Several Conservation Authorities in south-central Ontario have sold off some of their landholdings to generate the revenue needed to support other conservation initiatives. For these reasons, Conservation Areas and Provincial Parks are examples of Greenlands with Level 2 protection.

Level 3: Partially Protected

The term "**partial protection**" refers to the relatively small number of Natural Heritage Features that are given some mention in upper-tier municipal Official Plans, but for which the degree of policy protection is not high. "Partial protection" is not intended to imply that only portions of these features are protected. Rather, the term is used to describe the relatively low level of policy protection given to these features, which generally include the following:

"Partial protection" is not intended to imply that only portions of these features are protected. Rather, the term is used to describe the relatively low level of policy protection given to these features.

- Non-provincially Significant Wetlands;
- Environmentally Significant/Sensitive Areas;
- Regionally Significant Life Science ANSIs;
- Earth Science ANSIs;
- Crown Land.

Municipally designated features

Although the upper-tier municipalities of south-central Ontario are quite consistent in the protection of Level 1 and 2 Greenlands, at Level 3 there is considerable variation as to what features receive some protection. For example, the following miscellaneous features/areas are assigned Level 3 protection:

11. Some notable examples of Natural Environment parks include Short Hills (Niagara), Awenda (Simcoe), Wolf Island (Peterborough), and Indian Point (Kawartha Lakes).

Feature	Municipality
Public Open Space in the Parkway Belt West	Region of Halton
Woodlands within Escarpment Protection Areas	City of Hamilton, Region of Niagara, County of Dufferin
Open Space, Recreation Reserves, Shorelines	City of Kawartha Lakes
Significant Wildlife Habitat	Region of Niagara, County of Peterborough
Woodlands between 3 and 30 ha (off-Moraine), Valley and Stream Corridors (draining >125 ha), Shorelines	Region of Peel
County Greenlands	County of Simcoe
Significant Forested Land	Region of York
County/Regional Forests	County of Dufferin
Crown Land	County of Simcoe, County of Peterborough, City of Kawartha Lakes

Crown Land

Eighty-seven percent of Ontario's land mass is Crown Land. In the study area, with the exception of Provincial Parks and Nature Reserves, Crown Land is generally confined to the northern (Canadian Shield) portions of the Counties of Simcoe and Peterborough and the City of Kawartha Lakes. Most Crown Land is situated away from the shorelines of the major lakes and rivers (much of which is occupied by privately owned cottage lots). These areas are characterized by many wetlands (mostly swamps and bogs) and tracts of dense, native forest.

The Province, at its discretion, can sell or lease Crown Land to private interests. Over the last 25 years, an average of 2,000 ha of Crown Land has been sold off every year in Ontario.

It could be argued that as Greenlands, Crown Land deserves to be given Level 1 (full) protection because most of it is in an undisturbed state and cannot be developed. However, the Province, at its discretion, can sell or lease Crown Land to private interests. Over the last 25 years, an average of 2,000 ha of Crown Land has been sold off every year in Ontario. In most cases, the Crown Land put up for sale is identified by the Ministry of Natural Resources, although the Province will entertain unsolicited requests for particular properties. Once sold, the property can be developed under the applicable local Official Plan policies. On this basis, therefore, we have classified Crown Land as Level 3.

Level 4: Not Protected

Relatively few recognized Greenlands features in central Ontario receive absolutely **no protection** at the Region or County level. For the most part,

Level 4 protection relates to:

- small woodland areas on and off the Oak Ridges Moraine;
- woodlands on the Canadian Shield that are not otherwise identified as Provincially Significant Wetlands or Life Science ANSIs;
- cartographic (unevaluated) wetlands.

Woodlands and woodlots

In most cases, the distinction between partially protected and unprotected woodlands is made by municipalities on the basis of size of the forest unit.

Many of the larger woodlands in the study area have some protected status; only the smaller woodlots have none. In most cases, the distinction between partially protected and unprotected woodlands is made by municipalities on the basis of size of the forest unit. The following table provides examples of the minimum size a woodland must be to warrant some protection (usually partial):

Feature	Municipality
Woodlands < 0.5 ha on the Oak Ridges Moraine	All municipalities subject to the ORMCP
Woodlands < 0.8 ha outside urban areas	City of Hamilton
Woodlands < 3 ha	Region of Peel
Woodlands < 4 ha on or off the Oak Ridges Moraine	Durham

Woodlots smaller than these have no policy protection. In rural areas, small isolated woodland patches are found scattered throughout a mosaic of agricultural fields. Because these woodlots lack protection, even in many GTA municipalities, they are viewed as future development land. On the other hand, these features may be the only Greenlands remaining on the rural landscape and, as such, are seen as strong candidates for protection by the local populace.

Cartographic (unevaluated) wetlands

Most of the wetlands on the Canadian Shield are cartographic wetlands because they have never been evaluated using the Ontario Wetland Evaluation System.

Cartographic wetlands are wetlands that have been identified remotely through the interpretation of aerial photographs and mapped on Ontario Base Mapping. Most of the wetlands on the Canadian Shield are cartographic wetlands because they have never been evaluated using the Ontario Wetland Evaluation System. Wetlands are so prevalent on the Canadian Shield that typically only the largest, most prominent and most easily accessible ones have been evaluated. Because these wetlands have no formal status they receive no policy protection.

There are many unevaluated wetlands found throughout the study area, particularly in its more northern reaches. Unevaluated wetlands not only lack any protective status under the PPS, they are also unrecognized in most Official Plans.

Greenlands Protection by Municipality

This section provides a more detailed discussion of the current state of Greenlands protection in each of the three single-tier and 11 upper-tier municipalities that make up the study area. The municipalities are presented starting with an inner core of six municipalities, organized from west to east: Hamilton, Halton, Peel, Toronto, York, and Durham. These are followed by an outer ring consisting of, from west to east: Niagara, Wellington, Waterloo, Dufferin, Simcoe, Kawartha Lakes, Peterborough, and Northumberland.

The following information is provided for each municipality:

- a brief description of the natural environment setting of the municipality;
- a table which summarizes the level of Greenlands protection according to the applicable Official Plan;
- a pie chart that illustrates the percentage of land within each municipality by level of protection;
- a colour map that graphically depicts each Greenlands feature/area by level of protection.

City of Hamilton

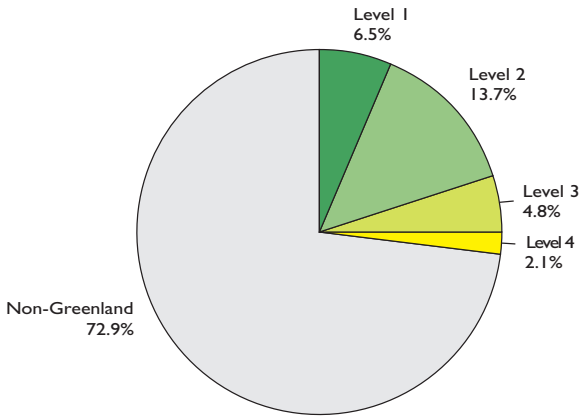
Before January 1, 2001, the name "City of Hamilton" referred to the urban area at the eastern end of Lake Ontario. Following municipal restructuring, the city limits were expanded to include the former rural and semi-rural municipalities of Ancaster, Flamborough, Dundas, Stoney Creek, and Glanbrook. The amalgamated City of Hamilton has an area of 112,781 ha.

Much of the northwest portion of the City of Hamilton (formerly the Township of Flamborough) is still well wooded and the landscape is dominated by many large, provincially significant swamp wetland complexes.

The Niagara Escarpment crosses the municipality parallel to the Lake Ontario shoreline. Much of the northwest portion of the City (formerly the Township of Flamborough) is still well wooded and the landscape is dominated by many large, provincially significant swamp wetland complexes receiving Level 1 protection (Figure 2). The densely forested Dundas Valley, extending due west of the built-up part of Hamilton, is also highly significant from an environmental point of view.

The large number of provincially significant wetlands in the northwest of the City and the woodlots on the Niagara Escarpment give Level 1 protection to 6.5% of the land. Other Escarpment policies and urban parks provide Level 2 protection for about 13.6% of the land base. Only a small percentage of the land base (2.05%) constitutes scattered Greenlands (mostly small wooded areas) with no protection.

The City of Hamilton recently completed an extensive Natural Areas Inventory (Heagy 1995) that has identified literally hundreds of Environmentally Significant Areas deemed worthy of recognition and protection. The City is currently carrying out an update of its Official Plan and it is anticipated that these areas will be identified as Environmentally Significant Areas and afforded some degree of environmental protection (level not known at this time) under the new plan. At present, however, these areas are given Level 2 protection (Table 1).



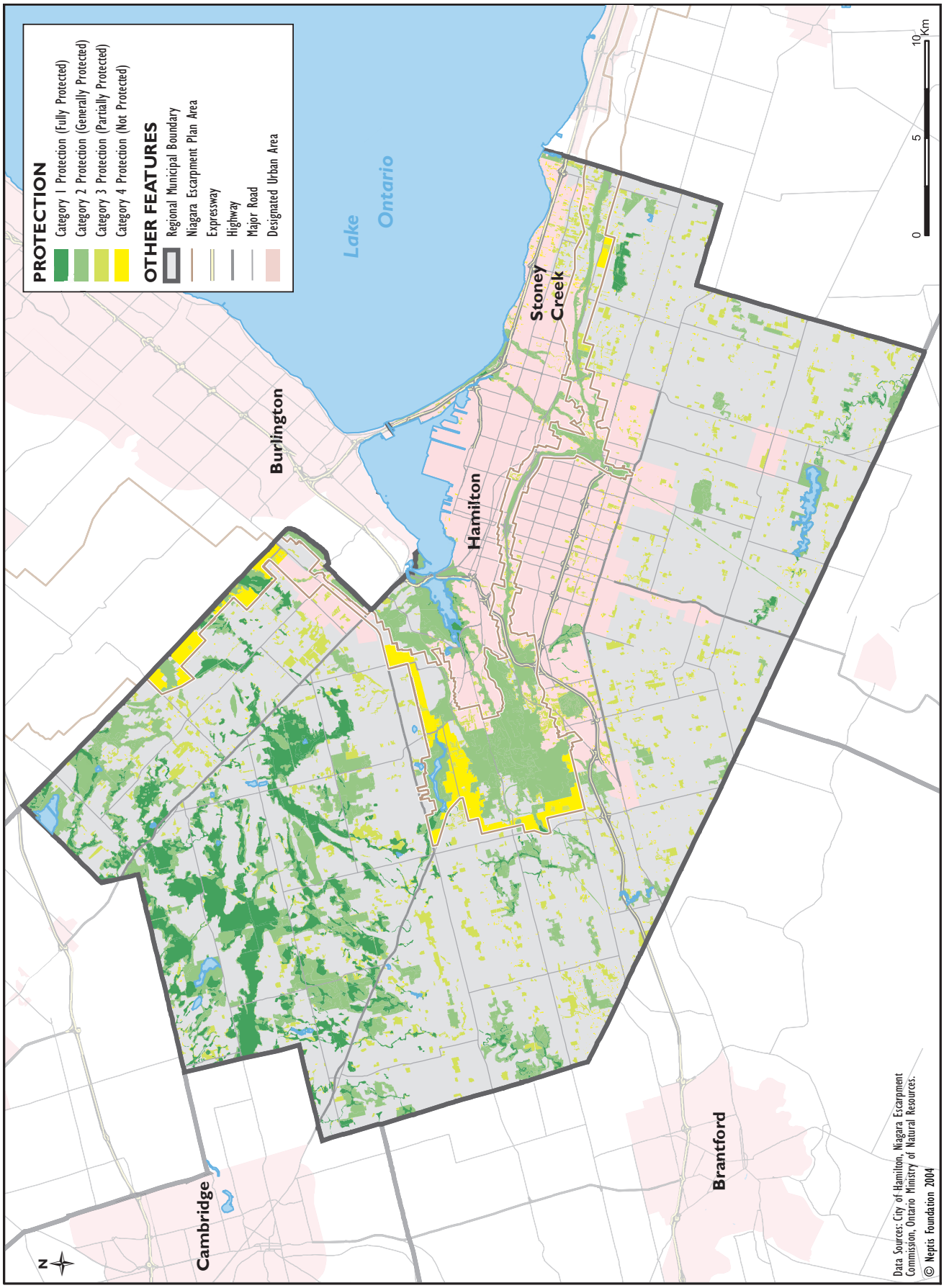
City of Hamilton

Table 1: Levels of Greenlands Protection for the City of Hamilton

Level of Protection	**1**	**2**	**3**	**4**
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Core Natural Areas				
1. Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
2. Provincially Significant Life Science ANSI (PPS)		x		
3. Provincially Significant Wetland (MNR) (PPS)	x			
4. Environmentally Significant Areas (CA)		x		
5. Significant Woodlands		x		
6. Significant Fish Habitat		x		
7. Niagara Escarpment Plan (NEP) Natural Areas		x		
8. Groundwater Recharge and Discharge Areas		x		
9. Regionally Rare Habitat		x		
10. Shorelines		x		
Linkages (no policy)				
1. Regionally Significant Life Science ANSI (MNR)		x		
2. Earth Science ANSI (MNR)		x		
3. Locally Significant Wetland (MNR)				x
4. Woodland Linkages				x
5. Significant Wildlife Habitat (PPS) **not in OP**				x
6. Habitat of Vulnerable Species			x	
7. NEP Protection Areas			x	
8. Other Vegetation Types (within 50 m of Core Areas)				x
9. Continuous Lands (within 50 m of Core Areas)				x
Hazard Lands		x		
Unevaluated Cartographic Wetland **not in OP**				x
Significant Valleylands (PPS) **not in OP**				x
Niagara Escarpment Parks and Open space Systems Zones **not in OP**		x		
NEP Rural Areas			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		

Region of Hamilton-Wentworth Official Plan, 1994.

Figure 2: City of Hamilton



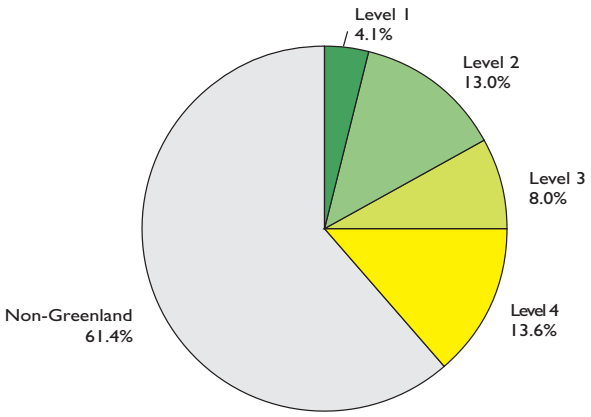
Regional Municipality of Halton

Halton Region has an area of 97,287 ha. The Niagara Escarpment cuts diagonally across Halton Region from southwest to northeast. Above the Escarpment the landscape is dominated by hundreds of small to medium-sized wetlands, all of which are part of provincially significant wetland complexes and thus are fully protected from development (Level 1). The face of the Escarpment and the deeply incised valleys of some of the major creeks that originate atop this height of land are Escarpment Natural Area woodlands with Level 2 protection (Figure 3).

At present, much of Halton's urban development is concentrated in the southern portion of the Region, along the Lake Ontario waterfront in the City of Burlington and Town of Oakville. Another major urban node is the Town of Milton, located in the central part of the Region, and to a lesser extent Georgetown (Town of Halton Hills) in the northeast corner. The Region has already designated a substantial area of land around Milton for urban uses to accommodate future growth, as well as along the north side of the Highway 407 corridor.

Lands situated between the south end of Milton and the north end of Oakville are predominantly agricultural at present, but some are proposed for development. However, the presence of a feature known as the Trafalgar Moraine, as well as associated wetlands and woodlands in this area may result in a higher level of protection (Level 1 or Level 2 depending on the specific feature) being given to a portion of it. A proposal to dedicate 170 ha of the 445 ha Trafalgar Moraine area to the Town of Oakville as public parkland is currently being considered (see page 79 for more information on the Trafalgar Moraine and its recent planning history).

There are relatively few unprotected Greenlands in Halton Region. Away from the Niagara Escarpment there are scattered tableland woodlots that are classified as either Level 3 (partial protection) or Level 4 (no protection), as well as a few unevaluated (Level 4) wetlands (Table 2).



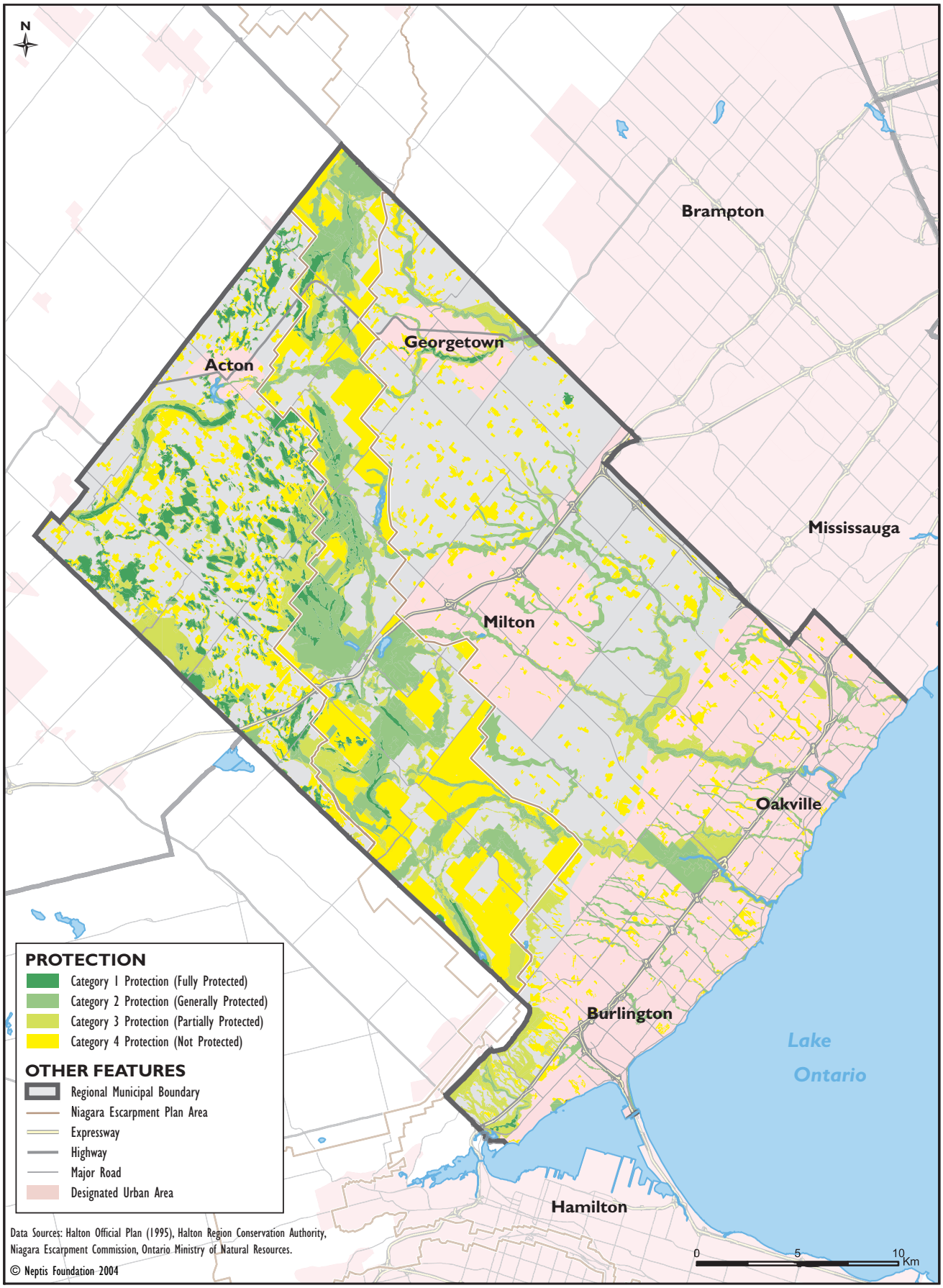
Regional Municipality of Halton

Table 2: Levels of Greenlands Protection for the Region of Halton

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Greenlands A				
1. Provincially Significant Wetland (MNR) (PPS)	x			
2. Regional Waterfront Parks		x		
3. Regulatory Floodplains		x		
4. Fish Habitat (PPS)		x		
Greenlands B				
1. Locally Significant Wetland (MNR)			x	
2. Provincially and Locally Significant Life Science ANSI (PPS)			x	
3. Provincially and Locally Significant Earth Science ANSI (MNR) (PPS)			x	
4. Environmentally Sensitive Areas			x	
5. Public Open Space in the Parkway Belt West Plan			x	
6. Carolinian Canada Sites			x	
7. Halton Agreement Forest			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		
Unevaluated Cartographic Wetland				x
Woodlands <0.5ha				x
NEP Rural Areas			x	
Woodlands in NEP Protection Areas		x		
NEP Natural Areas		x		

Region of Halton Official Plan, 1995.

Figure 3: Regional Municipality of Halton



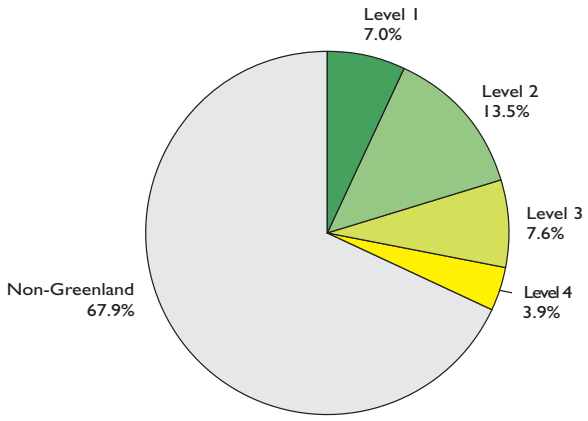
Regional Municipality of Peel

Peel Region occupies an area of 125,408 ha. Virtually the entire northern one-third of the municipality (Town of Caledon) is occupied by the Niagara Escarpment in the west and the Oak Ridges Moraine to the east (Figure 4). These are the only remaining areas within Peel that boast large intact tableland woodlots and many wetlands (Level 1 features) scattered across the landscape (Table 3).

Given the rapid northward growth experienced by Peel Region, it is likely that much of the land south of the Escarpment and Moraine has already been secured by land developers in anticipation of future demand for urban expansion.

The southern half of the Region is already fully urbanized (Cities of Mississauga and Brampton) or committed to future urban expansion. The intervening lands are still in active agricultural production, although the thick till soils on what is known as the Peel Plain are predominantly Class 6 and therefore not ideal for growing crops. These agricultural lands have been cleared for several generations and accordingly there is very little in the way of remaining forest cover throughout much of Peel.

Other than a number of small headwater tributaries of the Humber and Credit Rivers, there are relatively few natural heritage features associated with these urban fringe lands. Given the rapid northward growth experienced by Peel Region, it is likely that much of the land south of the Escarpment and Moraine has already been secured by land developers in anticipation of future demand for urban expansion.



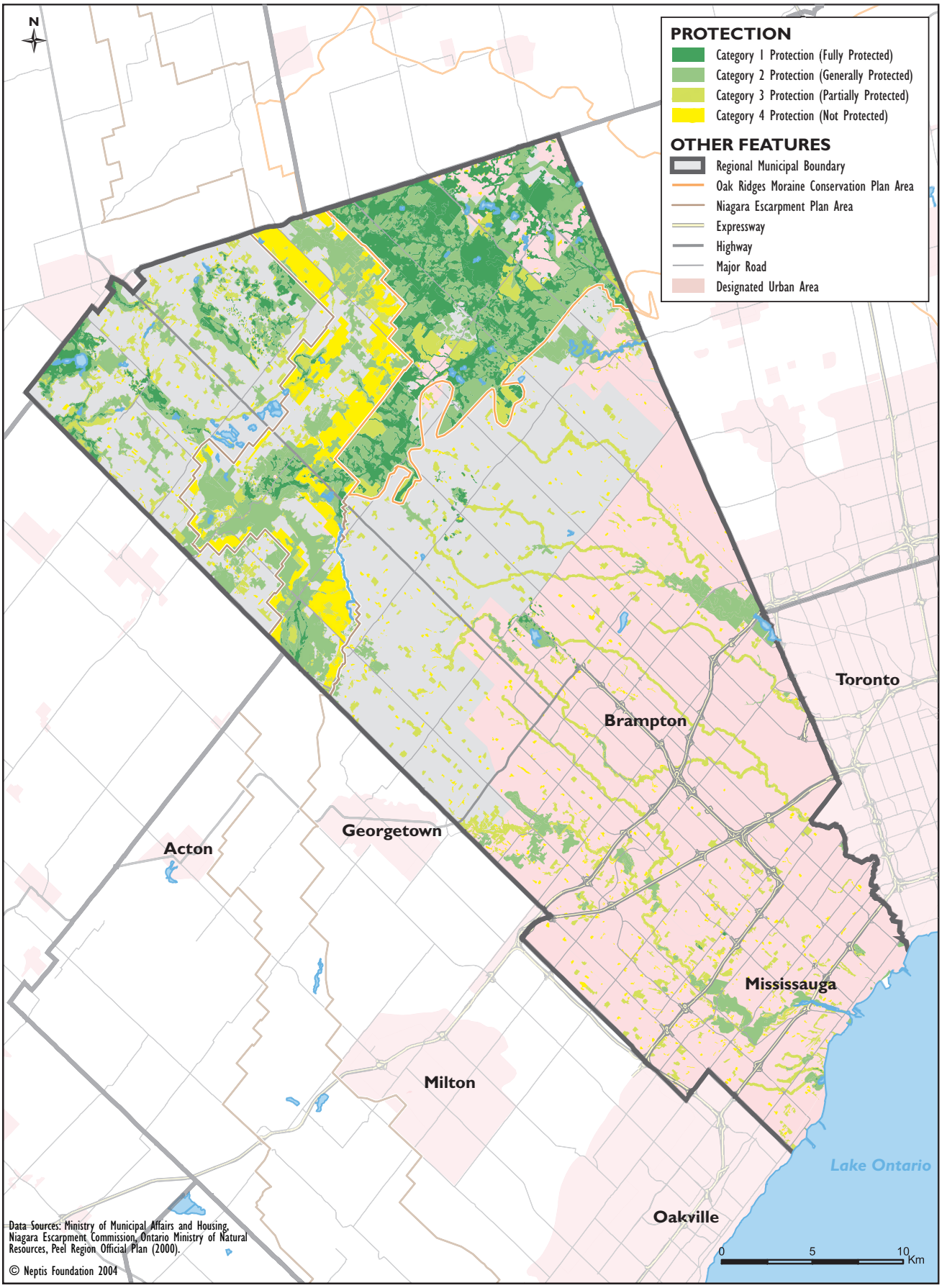
Regional Municipality of Peel

Table 3: Levels of Greenlands Protection for the Region of Peel

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Core Areas				
1. Provincially Significant Wetland (MNR) (PPS)	x			
2. Significant Woodlands (PPS)	x (ORM)	x (>30 ha)		
3. Environmentally Sensitive / Significant Areas (TRCA, CVC)		x		
4. Provincially Significant Life Science ANSI (PPS)	x (ORM)	x		
5. Valleys and Streams in Schedule A			x	
6. Niagara Escarpment Plan (NEP) Natural Areas		x		
7. Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Natural Areas and Corridors				
1. Locally Significant Wetland (MNR)	x (ORM)		x	
2. Woodlands (3 to 30 ha)	x (ORM)		x	
3. NEP Protection Areas			x	
4. Shoreline and Littoral Zone			x	
5. Valley and Stream Corridors (Drainage areas of >125 ha)			x	
6. Headwater source and discharge area			x	
Potential Natural Areas and Corridors				
1. Earth Science ANSI (MNR)	x (ORM)			x
2. All other woodlands (< 3ha)				x
3. Unevaluated Cartographic Wetland				x
4. Valley and Stream Corridors (Drainage areas of >125 ha)			x	
5. Sensitive groundwater recharge areas			x	
6. Open spaces of Parkway Belt West Plan Area			x	
7. Potential ESAs			x	
Regionally Significant Life Science ANSI	x (ORM)		x	
Floodplains (PPS)		x		
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Fish Habitat (PPS)	x (ORM)	x		
Sand Barrens (ORM)	x (ORM)			
Savannahs (ORM)	x (ORM)			
Tallgrass Prairie (ORM)	x (ORM)			
Kettle Lakes (ORM)	x (ORM)			
Permanent and Intermittent Streams (ORM)	x (ORM)			
Seepage Areas and Springs (ORM)	x (ORM)			
NEP Parks and Open Space System Zones		x		
Conservation Area		x		
Provincial Park, Nature Reserve		x		

Region of Peel Official Plan, 1998.

Figure 4: Regional Municipality of Peel



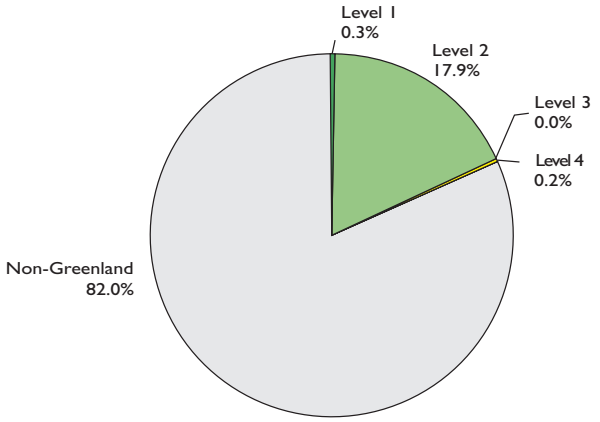
City of Toronto

With an area of 63,489 ha, the City of Toronto is the smallest in area of all the regions considered. With about 82% of the land urbanized, it also has the least amount of Greenlands. Aside from a few parks, the only remnant natural areas are the deeply incised, wooded ravines and valleys associated with the Rouge, Don, and Humber rivers and their tributaries (Figure 5). Wide floodplains along the valley floors, combined with steep forested slopes, inhibit the use of these areas for future development.

There are only a small number of provincially significant wetlands in Toronto, mostly in the Rouge watershed.

The City of Toronto's new Official Plan (City of Toronto 2002) protects valleylands and a wide range of other natural heritage features (City of Toronto and Toronto and Region Conservation Authority 2001), including wetlands, fish habitat, woodlands, beaches and bluffs, as well as significant landforms (Table 4).

There are only a small number of provincially significant wetlands in the City, mostly in the Rouge River watershed. The protection given to valleylands contributes most of the greenland space – 17.9% of the municipality. A few isolated woodlots and small, unevaluated wetlands covering less than 0.2% of the area are unprotected (Level 4) Greenlands.



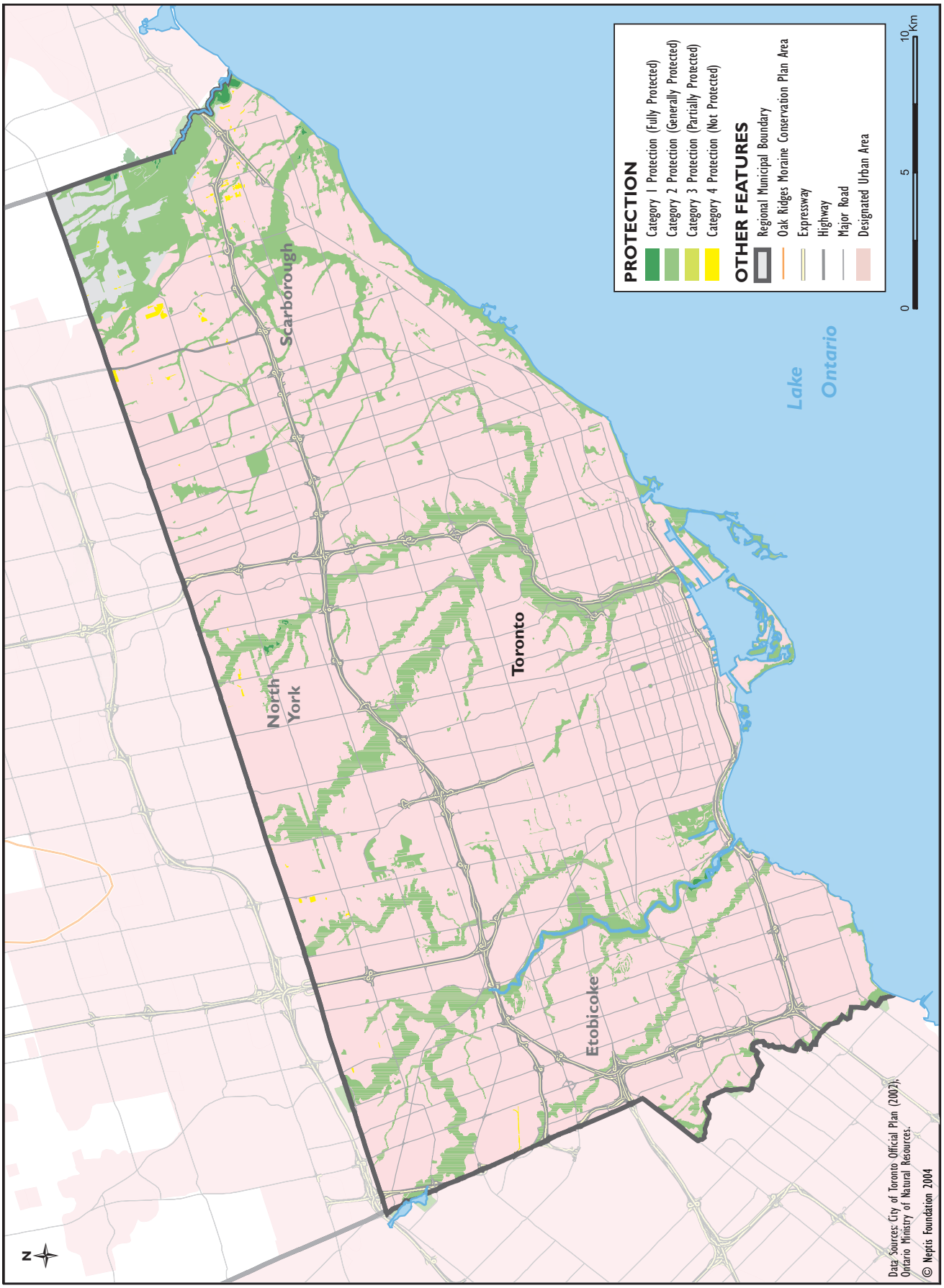
City of Toronto

Table 4: Levels of Greenlands Protection for the City of Toronto

Level of Protection	**1**	**2**	**3**	**4**
PROTECTION	**FULLY PROTECTED**	**GENERALLY PROTECTED**	**PARTIALLY PROTECTED**	**NOT PROTECTED**
Significant portions of the habitat of endangered and threatened species (MNR) (PPS) (not mapped)	x			
Significant Wildlife Habitat (PPS)			x	
Floodplain				
Significant Valleylands (PPS)			x	
Provincially Significant Life Science ANSI (PPS)		x		
Regionally Significant Life Science ANSI (MNR)			x	
Earth Science ANSI (MNR)		x		
Environmentally Significant Areas (TRCA)		x		
Provincially Significant Wetland (MNR) (PPS)	x			
Locally Significant Wetland (MNR)			x	
Unevaluated Cartographic Wetland				x
Other Woodlands		x		x
Fish Habitat		x		
Conservation Area		x		
Natural Heritage System (features not included in the PPS)				
1. Significant landforms and physical features		x		
2. Riparian zone		x		
3. Meadows		x		
4. Beaches and Bluffs		x		
5. Vegetation communities and species of concern		x		
6. Woodlands		x		

The City of Toronto Official Plan, 2002.

Figure 5: City of Toronto



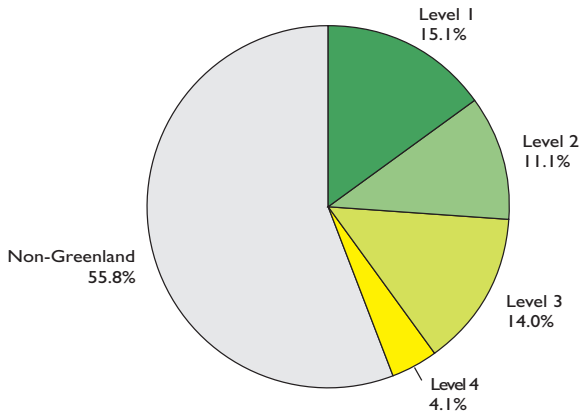
Regional Municipality of York

The Oak Ridges Moraine runs east-west through the centre of York Region. Virtually all the land south of the Moraine is urbanized.

The last frontier for development in York Region essentially exists north of the Oak Ridges Moraine, which runs east-west through the centre of the region. Virtually all the land south of the Moraine is urbanized (Town of Markham, City of Vaughan, and Town of Richmond Hill). To the west, the wide, deep valleys of the Humber River act as major constraints in northern Vaughan, while the heavily rural Township of King has maintained several large blocks of forest and significant wetland (Figure 6). To the east, in north Markham, there is a narrow (3 to 4 km wide) band of farmland remaining south of the Oak Ridges Moraine, much of which is already owned by development interests.

North of the Moraine, through the Towns of East Gwillimbury and Georgina, there are large areas of unserviced rural land, although historically, residential development has been concentrated in the Lake Simcoe communities of Keswick and Sutton. Further inland there are a number of large swamp wetlands associated with the major creek systems that drain northward to Lake Simcoe, including the Holland River, Black River, and Pefferlaw Brook. All of these are provincially significant wetlands that preclude any form of development. Those few sections of the south shore of Lake Simcoe that are not already developed are constrained by clay soils with high (perched) water table conditions and large patches of second-growth woodland.

In its Official Plan, York Region (1999) identifies a Greenlands System (Gartner Lee Limited 1994) that recognizes and protects ecologically significant/sensitive areas such as ESAs, ANSIs, wetlands, and large forested areas (Table 5).



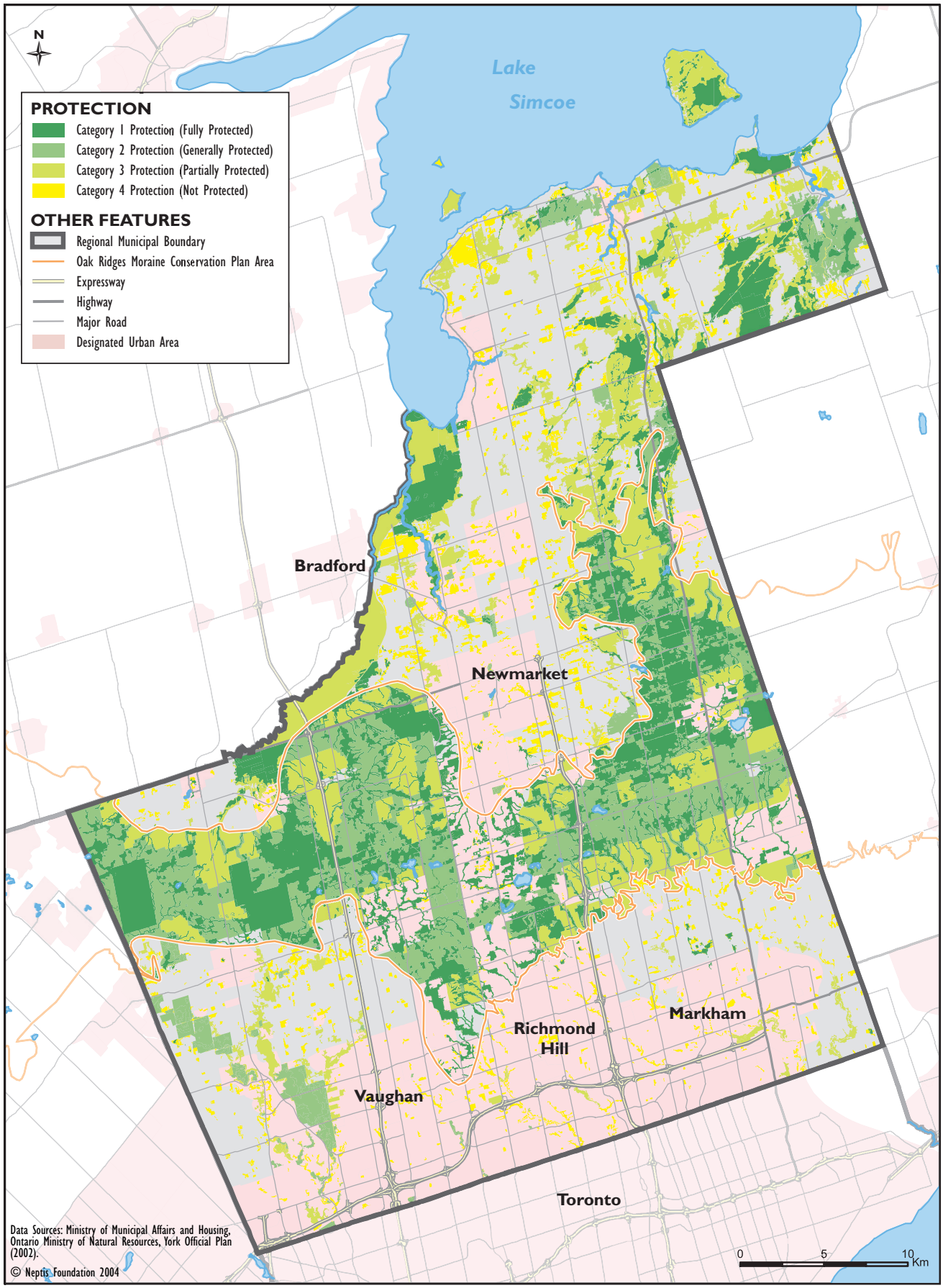
Regional Municipality of York

Table 5: Levels of Greenlands Protection for the Region of York

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Significant portions of habitat of endangered and threatened species (MNR)	x			
Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI)	x (ORM)		x	
Regionally Significant Life Science (ANSI) (MNR)	x (ORM)		x	
Earth Science ANSI (MNR)	x (ORM)			x
Environmentally Sensitive Areas (TRCA, LSRCA)	x (ORM)		x	
Provincially Significant Wetland (MNR)	x			
Locally Significant Wetland (MNR)	x (ORM)		x	
Unevaluated Cartographic Wetland	x (ORM)			x
Fish Habitat (PPS)	x (ORM)	x		
Other Woodlands				x
Natural Core or Linkage Area (ORM)		x		
Countryside Area (ORM)			x	
Significant Woodlands	x (ORM)	x		
Significant Valleylands (PPS)	x (ORM)		x	
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Sand Barrens (ORMCP)	x (ORM)			
Savannahs (ORMCP)	x (ORM)			
Tallgrass Prairie (ORMCP)	x (ORM)			
Kettle Lakes (ORMCP)	x (ORM)			
Permanent and Intermittent Streams (ORMCP)	x (ORM)			
Seepage Areas and Springs (ORMCP)	x (ORM)			
Hydrogeological Environmentally Sensitive Areas (LSRCA)			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		

Region of York Official Plan, 1999.

Figure 6: Regional Municipality of York



Regional Municipality of Durham

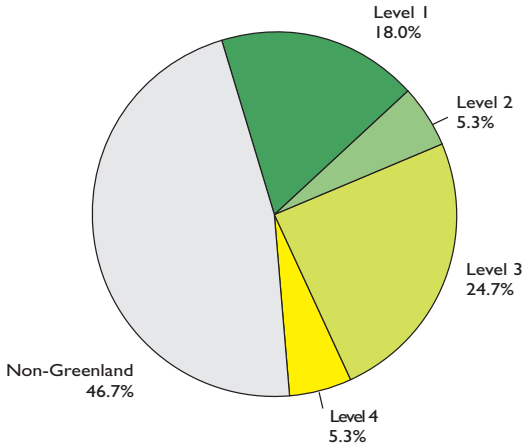
Durham Region has an area of 258,134 ha. The environmental setting is very similar to that of the Region of York (see page 47). The lands immediately north of Lake Ontario are heavily urbanized (the Towns of Ajax and Whitby, the Cities of Pickering and Oshawa, and the Municipality of Clarington). The few undeveloped shoreline areas are occupied by provincially significant coastal marshes (e.g., Frenchman's Bay, Lynde Shores, Oshawa Second Marsh) that are fully protected (Level 1) within the Durham Official Plan (Figure 7).

Durham Region's Official Plan identifies a Major Open Space System (MOSS) that includes Open Space Linkages and Waterfront Links, and a Permanent Agricultural Reserve in north Pickering (Table 6). These partially protected (Level 3) areas occupy much of the undeveloped land between Pickering and Whitby and Oshawa and Bowmanville (Figure 7).

Durham Region's Official Plan identifies a Major Open Space System (MOSS) that includes Open Space Linkages and Waterfront Links, and a Permanent Agricultural Reserve in north Pickering.

Although the section of the Oak Ridges Moraine that passes through Durham is somewhat narrower than in York, this landform occupies much of the central portion of the Region. Much of the Moraine is heavily forested, with Level 1 protection given to these woodlands (Figure 7).

Between the south edge of the moraine and the present urban limits of Ajax, Whitby, and Oshawa lies the Lake Iroquois Shoreline. This is a ridge of sands and glacial lake deposits (silts and clays) that marks the shoreline of Lake Ontario (glacial Lake Iroquois) left behind after the last glaciers melted 10,000 to 12,000 years ago. It performs an important groundwater recharge/discharge function, providing baseflow to the many Level 3 creeks and rivers (Level 3 ESAs and valleylands) that flow south to Lake Ontario (Duffins, Harmony, Oshawa, Lynde, Wilmot, and Ganaraska), and supports a number of Level 1 wetlands and Level 2 woodlands (Figure 7). Much of the agricultural land immediately north and south of the Moraine has little forest cover and these small, remaining woodlands are generally not protected (Level 4) under the Regional Official Plan (Region of Durham 1993).



Regional Municipality of Durham

That portion of Durham Region lying north of the Oak Ridges Moraine (Town of Uxbridge and Townships of Brock and Scugog) is traversed by a series of wide, Level 3 creek valleys (e.g., Uxbridge Brook, Pefferlaw Brook, and Nonquon River) that drain north to Lake Simcoe. These north-south trending lowlands contain provincially significant swamp forest wetlands (Level 1 protection), within which development is prohibited. The land use in north and northeast Durham is predominantly rural, within which most of the smaller woodlands are not given any policy protection (Level 4). Another rural area is the Duffins-Rouge Agricultural Preserve and the Seaton lands, both in the Town of Pickering (see page 82 for a description of the development pressures facing these areas).

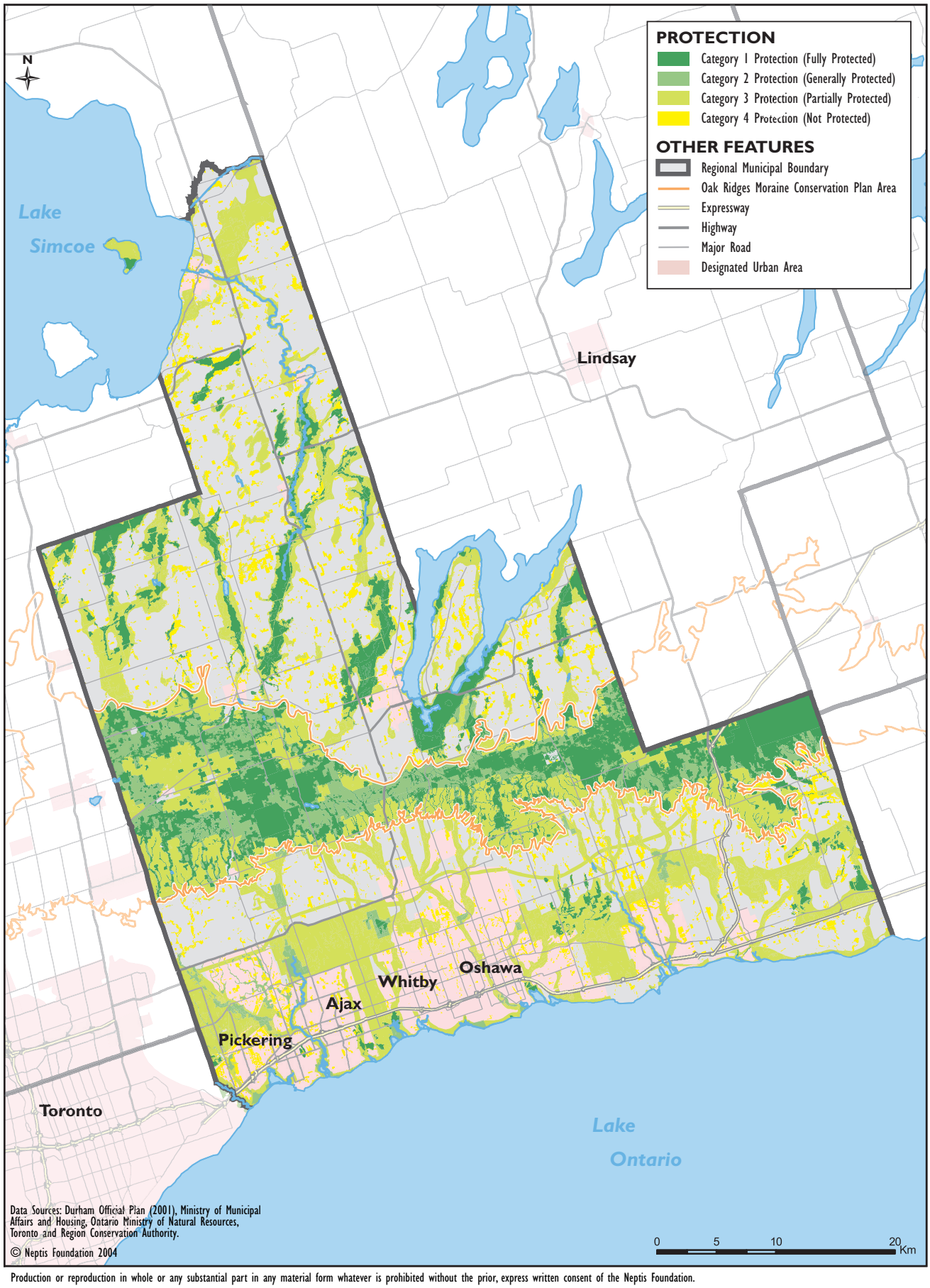
Due to the relatively large portion of the Region within the Oak Ridges Moraine, it has a relatively large portion of Level 1 protected lands – almost 18.0%. The Regional Major Open Space System also contributes a relatively large portion of the land with Level 3 protection – 24.7%.

Table 6: Levels of Greenlands Protection for the Region of Durham

Level of Protection	**1**	**2**	**3**	**4**
PROTECTION	**FULLY PROTECTED**	**GENERALLY PROTECTED**	**PARTIALLY PROTECTED**	**NOT PROTECTED**
Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Valleylands (as defined by Conservation Authorities, municipalities)		x		
Environmentally Sensitive Areas				
1. Provincially Significant Life Science ANSI (PPS)	x (ORM)		x	
2. Regionally Significant Life Science ANSI (MNR)	x (ORM)		x	
3. Earth Science ANSI (MNR)	x (ORM)			
4. Provincially Significant Wetland (MNR) (PPS)	x (ORM)		x	
5. Locally Significant Wetland (MNR)	x (ORM)	x		
6. Unevaluated Cartographic Wetland	x (ORM)			x
Environmentally Sensitive Areas (CLOCA, KRCA, LSRCA, TRCA)			x	
Fish Habitat	x (ORM)	x		
Other Woodlands (<4 ha)				x
Significant Woodlands (PPS)	x (ORM)		x	
Significant Valleylands (PPS)	x (ORM)		x	
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Sand Barrens (ORMCP)	x (ORM)			
Savannahs (ORMCP)	x (ORM)			
Tallgrass Prairie (ORMCP)	x (ORM)			
Kettle Lakes (ORMCP)	x (ORM)			
Permanent and Intermittent Streams (ORMCP)	x (ORM)			
Seepage Areas and Springs (ORMCP)	x (ORM)			
Major Open Space Systems				
1. Major Open Space a) Open Space Linkages			x x	
2. Waterfronts a) Waterfront Links			x x	
Permanent Agricultural Reserve			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		

Region of Durham Official Plan, 1993.

Figure 7: Regional Municipality of Durham



Regional Municipality of Niagara

Niagara Region is the most southerly municipality in the Central Ontario Zone, extending along the south shore of Lake Ontario from the City of Hamilton east to the Niagara River and New York State. Urban development is concentrated along the shore of Lake Ontario (Grimsby, Beamsville, Vineland, and St. Catharines), the Welland Canal (Thorold, Welland, and Port Colborne), and the Niagara River (Niagara-on-the-Lake, Niagara Falls, and Fort Erie).

Given its fertile soils and favourable climatic conditions, agriculture is an extremely important land use in Niagara, particularly the growing of tender fruits such as peaches, apples, cherries, and grapes along the brow of the Escarpment.

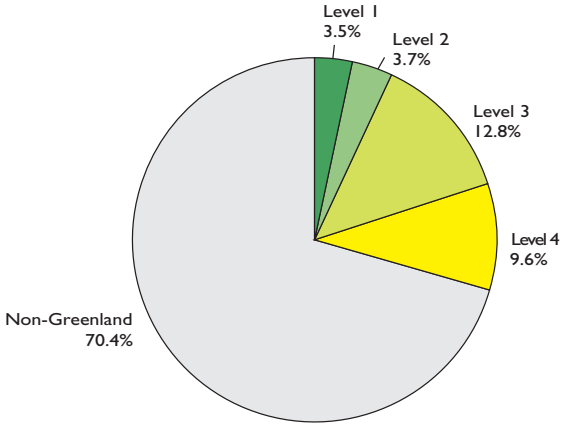
Given its fertile soils and favourable climatic conditions, agriculture is an extremely important land use in Niagara, particularly the growing of tender fruits such as peaches, apples, cherries, and grapes along the brow of the Escarpment.

The Niagara Escarpment is the most prominent landform feature in Niagara, as well as the most environmentally significant area (Figure 8). Although the rich woodlands along the face of the Escarpment are still largely intact, there are fewer Escarpment Natural Area woodlands (Level 2 protection) on the top of the landform than elsewhere (e.g., City of Hamilton and Region of Halton). The geological formations that make up the Escarpment have given rise to several very large quarry operations.

The Regional Official Plan (Regional Municipality of Niagara 2000) defines "Environmentally Sensitive Areas" very broadly (Table 7) and maps them even more generally (Figure 8) as a network of green ribbons that represent the Niagara Escarpment and several major creek and river corridors (e.g., 20 Mile Creek, Welland River, and Welland Canal Corridors). The provincially significant Wainfleet Bog, situated just west of Port Colborne, is the largest Level 1 feature in the municipality, but is also subject to commercial peat extraction operations (which, as an agricultural use, is a permitted activity).

Short Hills Provincial Park, which lies just south of St. Catharines, is also a significant Life Science ANSI, and receives Level 2 protection. The Haldimand Clay Plain, which occupies the western portion of Niagara Region, supports several Level 1 and 2 wetlands.

The Official Plan of the Region of Niagara lacks any specific policy provision to protect woodlands, and as a result these features are classified as having Level 4 protection (Table 7).



Regional Municipality of Niagara

Table 7: Levels of Greenlands Protection for the Region of Niagara

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Environmentally Sensitive Areas				
1. Significant Woodlands (PPS)			x	
2. Significant Wildlife Habitat (PPS)			x	
Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Provincially Significant Wetland (MNR) (PPS)	x			
Locally Significant Wetland (MNR)		x (NEP)	x	
Unevaluated Cartographic Wetland				x
Fish Habitat (PPS) (not mapped)		x		
Other Woodlands				x
Conservation Area		x		
Provincial Park, Nature Reserve		x		
Significant Wildlife Habitat			x	
NEP Escarpment Natural Areas				
1. Significant Valleylands		x (NEP)		
2. Provincially Significant Life Science ANSI (PPS)		x (NEP)		
3. Earth Science ANSI (MNR)		x (NEP)		
NEP Protection Areas				
1. Regionally Significant Life Science ANSI (MNR)			x (NEP)	
2. Woodlands			x (NEP)	

Region of Niagara Official Plan, 2000.

Figure 8: Regional Municipality of Niagara

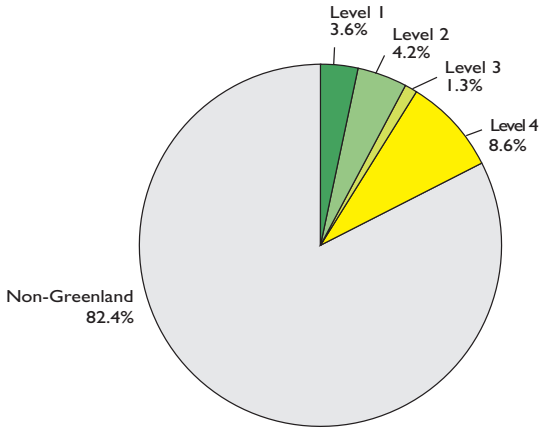
Regional Municipality of Waterloo

Waterloo Region has an area of 138,420 ha, and the highest percentage of cleared land in the study area – 82.4%. It is a predominantly rural municipality, with agriculture the principal land use. From an agricultural perspective, high-quality Class 1 and 2 soils cover much of the Region. The central and southeast portions are occupied by the large urban centres of Kitchener-Waterloo and Cambridge, respectively. The Region is roughly bisected from northwest to southeast by the Grand River (Figure 9).

Waterloo Region has the highest percentage of cleared land in the study area – 82.4%. It is a predominantly rural municipality, with agriculture the principal land use.

In its Official Plan, the Regional Municipality of Waterloo (1998) has identified a system of Environmentally Sensitive Policy Area (ESPAs) that include the following: PSWs, ANSIs, Environmentally Significant Areas as identified by the Grand River Conservation Authority, significant woodlands, significant valleylands, and significant wildlife habitat (Table 8). These are all environmental constraint areas. Wetlands are generally associated with the major tributaries of the Grand River and are concentrated in the southeast and west-central portions of the Region (Figure 9). Given the agricultural nature of the area, much of the native forest cover has been removed; however, Waterloo farmers tend to practise good forest management and have maintained rear lot forest blocks throughout. However, most of these woodlands are given no protection (Level 4) within the Region's Official Plan. This is particularly true in the Townships of Woolwich, Wilmot, and North Dumfries, situated to the west and north of the urban centre of Kitchener-Waterloo.

The Region has only 3.5% of its land base protected at Level 1 – mostly provincially significant wetlands associated with the Grand River and several of its major tributaries.



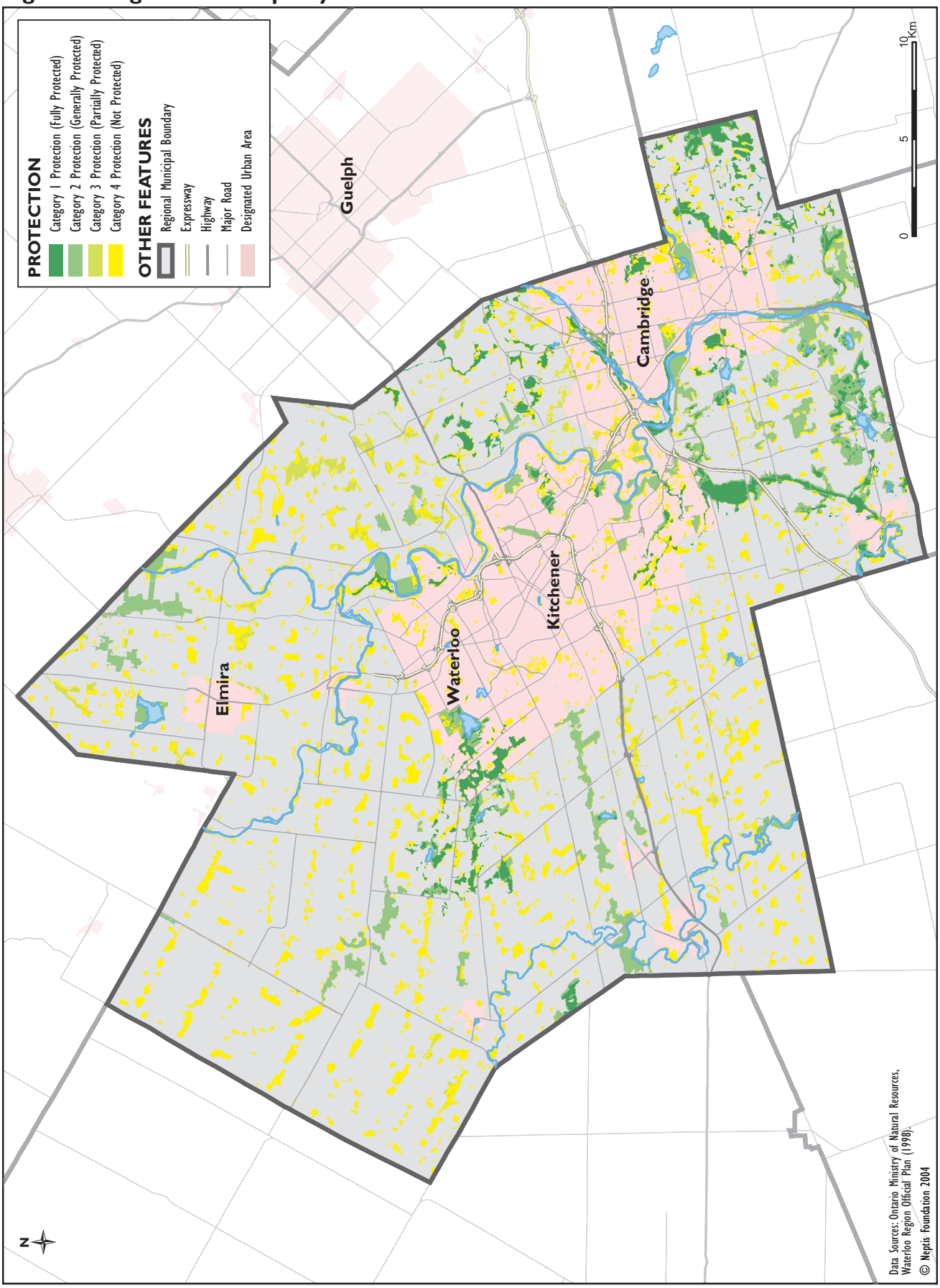
Regional Municipality of Waterloo

Table 8: Levels of Greenlands Protection for the Region of Waterloo

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Environmentally Sensitive Policy Areas				
1. Provincially Significant Life Science ANSI (PPS)		x		
2. Regionally Significant Life Science ANSI (MNR)		x		
3. Provincially Significant Earth Science ANSI (MNR)		x		
4. Regionally Significant Earth Science ANSI (MNR)	x	x		
5. Significant Woodlands (PPS)		x		
6. Significant Wildlife Habitat (PPS)		x		
7. Significant Valleylands (PPS)		x		
8. Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
9. Provincially Significant Wetland (MNR) (PPS)	x			
Fish Habitat (PPS)		x		
Floodplains		x		
Locally Significant Wetland (MNR)			x	
Unevaluated Cartographic Wetland				x
Regional Forests		x		
Other Woodlands				x
Conservation Area		x		
Provincial Park, Nature Reserve		x		

Region of Waterloo Official Plan, 1998.

Figure 9: Regional Municipality of Waterloo



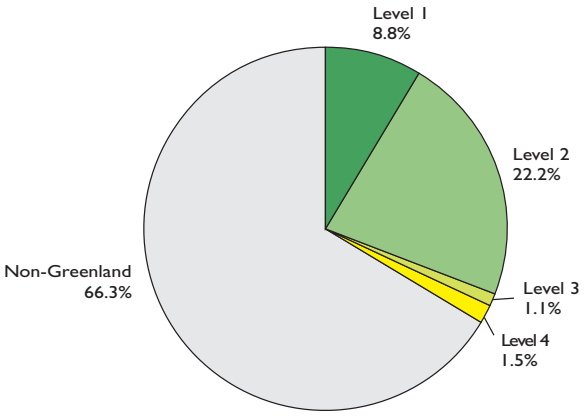
County of Wellington

Like Waterloo, the County of Wellington is a predominantly rural municipality, with agriculture the principal land use. From an agricultural perspective, much of Wellington is covered by Class 1 and 2 soils, which are highly productive. The area is underlain by several extensive and high yielding aquifers. This combination of rich agricultural land and high-quality groundwater resources has contributed to a long history of rural occupation, with only limited and very localized development pressure being exerted outside of Guelph and the Highway 6/401 corridors.

Among the upper-tier municipalities, Wellington County has one of the longest-standing and most proactive approaches to Greenlands identification and protection anywhere in Ontario.

The City of Guelph is the largest urban area, with Fergus, Elora, and Erin acting as smaller settlement areas. Several major river systems pass through Wellington, all tributaries of the Grand River. These include the Speed and Eramosa Rivers, as well as Hanlon Creek and Blue Springs Creek. These river valleys are identified in the County of Wellington (1998) Official Plan as core Greenland areas and act as significant environmental constraints (Table 9).

The Grand River Conservation Authority has identified a number of Environmentally Sensitive Areas (ESAs) in Wellington. The County also contains several large provincially significant wetlands and many woodlots greater than 10 ha in size, which are given Level 1 and Level 2 protection, respectively, under the County's Official Plan (Figure 10). Only 2.6% of the County is occupied by Greenlands features that have either partial (Level 3) or no (Level 4) protection. Among the upper-tier municipalities, Wellington County has one of the longest-standing and most proactive approaches to Greenlands identification and protection anywhere in Ontario.



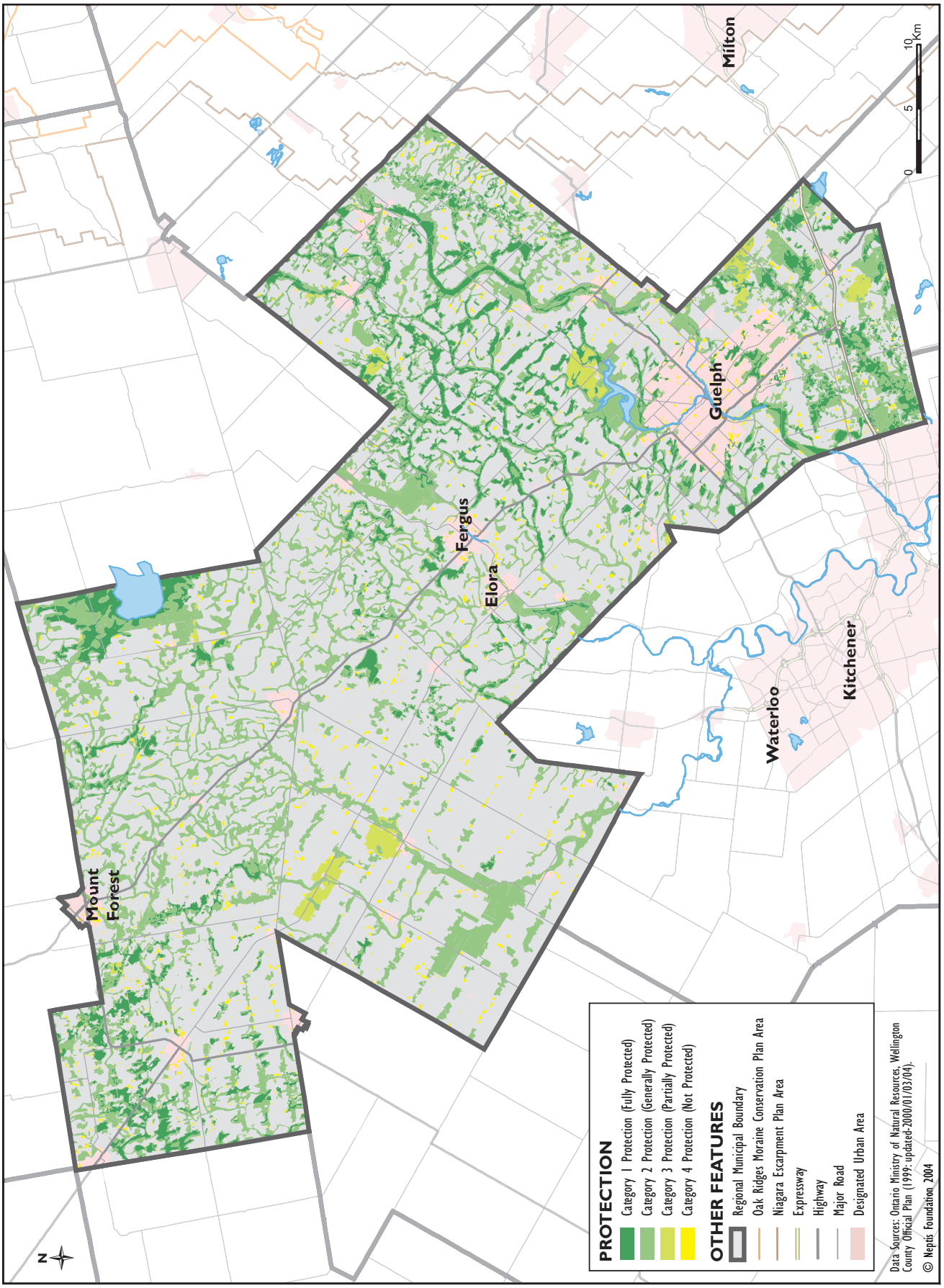
County of Wellington

Table 9: Levels of Greenlands Protection for the County of Wellington

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Core Greenlands				
1. Provincially Significant Wetland (MNR) (PPS)	x			
2. Locally Significant Wetland (MNR)		x		
3. Significant portions of the habitat of endangered or threatened species	x			
4. Floodways and hazardous lands (10 m from waterways)		x		
Greenlands B				
1. Environmentally Sensitive Areas (GRCA)		x		
2. Streams and Valleylands		x		
3. Provincially Significant Life Science ANSI (MNR)		x		
4. Regionally Significant Life Science ANSI (MNR)		x		
5. Earth Science ANSI (MNR)			x	
6. Significant Woodlands (PPS) (> 10 ha)		x		
Fish Habitat (PPS)		x		
Unevaluated Cartographic Wetland				x
Other Woodlands (< 10 ha)				x
Conservation Area		x		
Provincial Park, Nature Reserve		x		

County of Wellington Official Plan, 1998.

Figure 10: County of Wellington

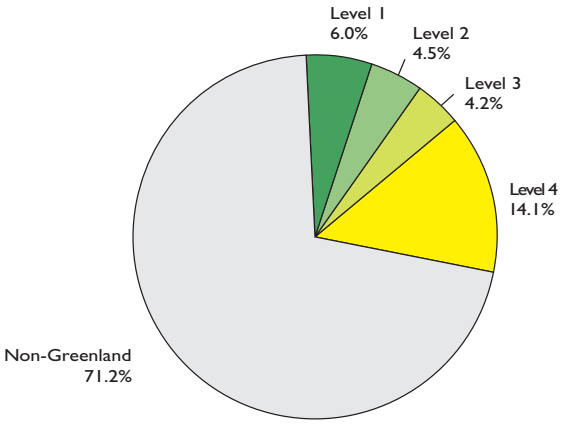


County of Dufferin

Dufferin County has an area of 149,667 ha. It is almost entirely a rural municipality, with urban development concentrated in the Town of Orangeville to the south and to a lesser extent in the Village of Shelburne in the centre of the County. With the exception of low-lying wet areas, much of the County (more than 71%) has long been cleared and cultivated. At present the County of Dufferin has no upper-tier Official Plan. As a result, land use designations, zoning, and environmental protection policies are established at the local municipal level and vary somewhat among the eight local municipalities that make up Dufferin County (Table 10).

Dufferin County is almost entirely a rural municipality, with urban development concentrated in Orangeville and Shelburne. With the exception of low-lying wet areas, much of the County has long been cleared and cultivated.

The most prominent environmental feature in Dufferin is the Niagara Escarpment, which cuts northward through the municipality and occupies much of its eastern half. The extensive woodlands within Escarpment Natural Areas have Level 2 protection (Figure 11). Several large provincially significant wetland complexes are situated in the central and northwestern parts of the County, and part of Luther Marsh, an extensive wetland of high environmental significance, extends into the extreme western portion. These wetlands have Level 1 protection. Greenlands that lack any policy protection in Dufferin are Earth Science ANSIs, woodlands less than 30 ha in size, and unevaluated wetlands (Figure 11), which accounts for the fact that almost half of the Greenland areas within Dufferin have no (Level 4) policy protection.



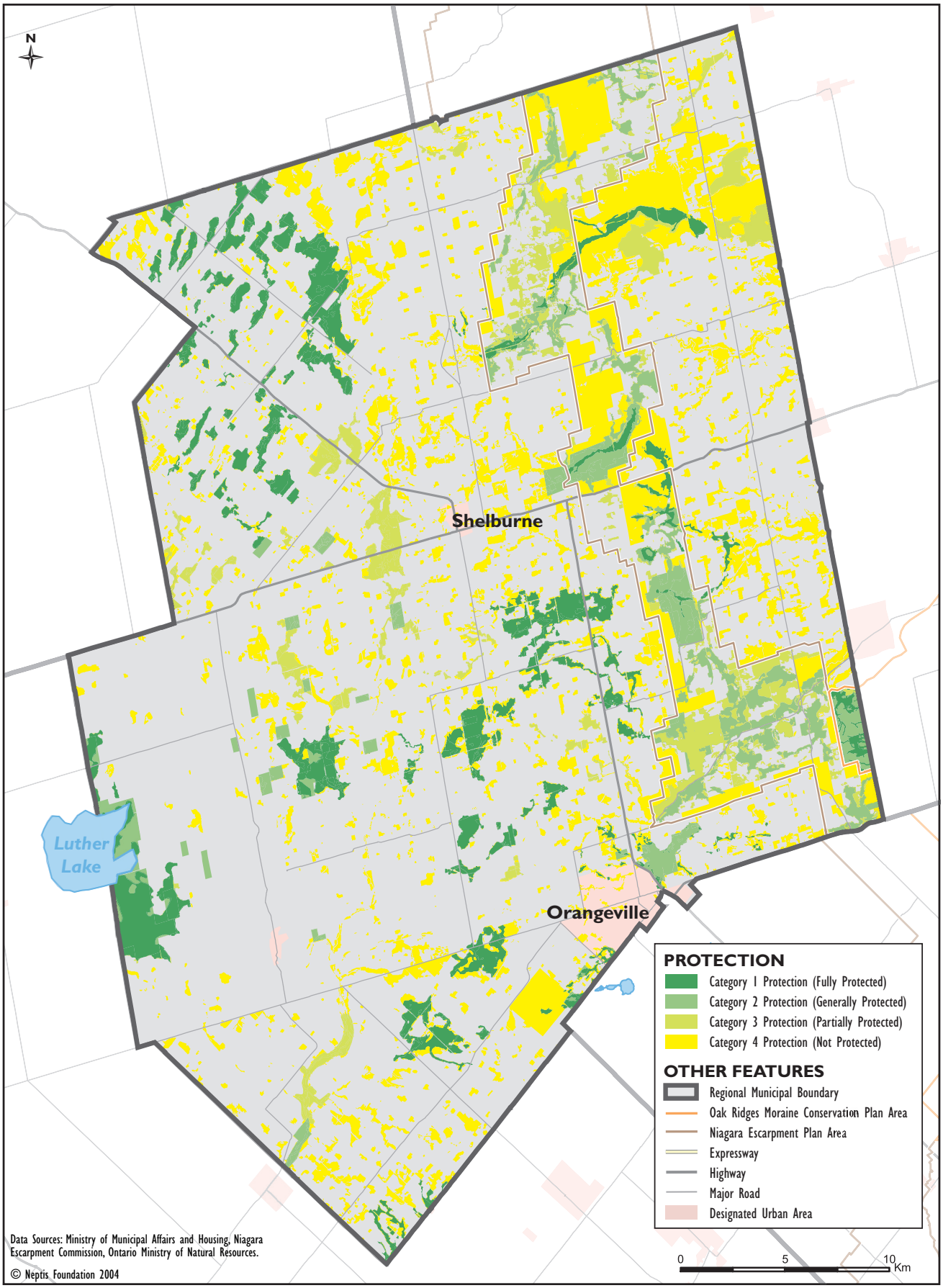
County of Dufferin

Table 10: Levels of Greenlands Protection for the County of Dufferin

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Provincially Significant Wetland (MNR) (PPS)	x			
Significant Woodlands (PPS)	x (ORM)		x	
Environmentally Sensitive / Significant Areas	x (ORM)		x	
Provincially Significant Life Science ANSI (PPS)	x (ORM)	x		
Niagara Escarpment Plan (NEP) Natural Areas		x		
Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Locally Significant Wetland (MNR)	x (ORM)		x	
County Forests		x		
NEP Escarpment Protection Areas			x	
Earth Science ANSI (MNR)	x (ORM)			x
Other Woodlands				x
Unevaluated Cartographic Wetland				x
Regionally Significant Life Science ANSI (MNR)	x (ORM)		x	
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Fish Habitat (PPS)		x		
Sand Barrens (ORMCP)	x (ORM)			
Savannahs (ORMCP)	x (ORM)			
Tallgrass Prairie (ORMCP)	x (ORM)			
Kettle Lakes (ORMCP)	x (ORM)			
Permanent and Intermittent Streams (ORMCP)	x (ORM)			
Seepage Areas and Springs (ORMCP)	x (ORM)			
Conservation Area		x		
Provincial Park, Nature Reserve		x		

Note: The County of Dufferin does not have an Official Plan.

Figure 11: County of Dufferin



Data Sources: Ministry of Municipal Affairs and Housing, Niagara Escarpment Commission, Ontario Ministry of Natural Resources.

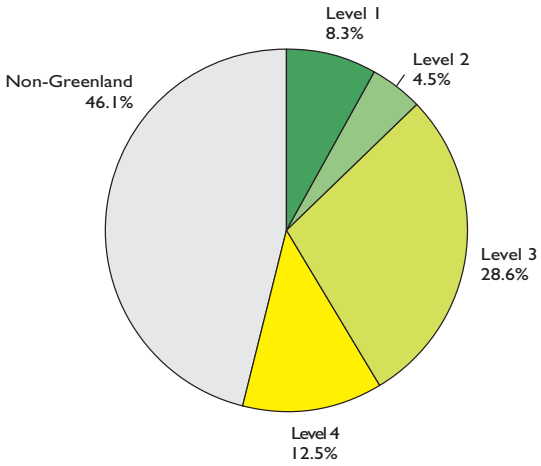
County of Simcoe

Simcoe County is one of the largest upper-tier municipalities in the central Ontario zone (491,157 ha) and also ranks among the most ecologically significant and diverse regions of the Province. Like the City of Kawartha Lakes (see page 68) and the County of Peterborough (see page 71), the northern portion of Simcoe contains extensive tracts of undisturbed forest, a considerable amount of which is still Crown Land. However, several of the larger tracts have been identified as County Greenlands (Gartner Lee Limited 1996) and therefore receive Level 3 protection (Table 11, Figure 12).

Simcoe County ranks among the most ecologically significant and diverse regions of the Province. The primary areas of environmental constraint in south Simcoe are associated with the Oak Ridges Moraine.

Northeast Simcoe (Townships of Matchedash, Severn, and Ramara) also contain numerous unevaluated wetlands that have no policy protection (Level 4). There are three large Provincial Parks (Level 2) in this area. Much of the development pressure in north Simcoe County is being exerted along the shoreline of Georgian Bay (particularly in the Towns of Collingwood and Wasaga Beach).

North of the City of Barrie, in the central portion of Simcoe County (Townships of Springwater and Oro-Medonte), there are vast tracts of woodland, many of which are County Greenlands and County Forests (Level 3). Two of the most dominant natural heritage features in this part of the County are the extensive, provincially significant Minesing Swamp (Figure 12), which forms part of the Nottawasaga River drainage basin, and the Oro Moraine (see page 88), a well-wooded area of rolling terrain located between the Cities of Barrie and Orillia that marks the drainage divide between Lake Simcoe and Georgian Bay.



County of Simcoe

The primary areas of environmental constraint in south Simcoe are associated with the Oak Ridges Moraine, which occupies its southwest corner (Figure 12), the shore of Lake Simcoe (Cook's Bay and Kempenfelt Bay), the densely forested lands on and surrounding Canadian Forces Base Borden due west of Barrie (Township of Essa), and six major northward flowing creek valleys: Lovers Creek (Town of Innisfil), Innisfil Creek (Innisfil and New Tecumseth), the main branch of the Nottawasaga River (Townships of Adjala-Tosorontio and Essa), Shelton Creek (Adjala-Tosorontio), Bailey Creek (New Tecumseth), and the Pine River (Adjala-Tosorontio). The Pine River and Innisfil, Bailey, and Shelton Creeks are all major headwater tributaries of the Nottawasaga River, which eventually drains to Georgian Bay. These creek valleys contain provincially significant wetlands, adjacent woodlands and important coldwater fish habitat.

Outside the communities of Barrie, Bradford, Alliston, and to a lesser extent Beeton, Alcona, and Cookstown, the predominant land use in south Simcoe is agricultural. The forest cover over much of this farmland, however, is sparse and fragmented, with the majority of the woodlots less than 10 ha in size and not protected (Level 4). However, many of the larger,

intact forest blocks remaining in south Simcoe are part of the County's Greenlands System (Gartner Lee Limited 1996), which forms an integral part of the County of Simcoe (2000) Official Plan.

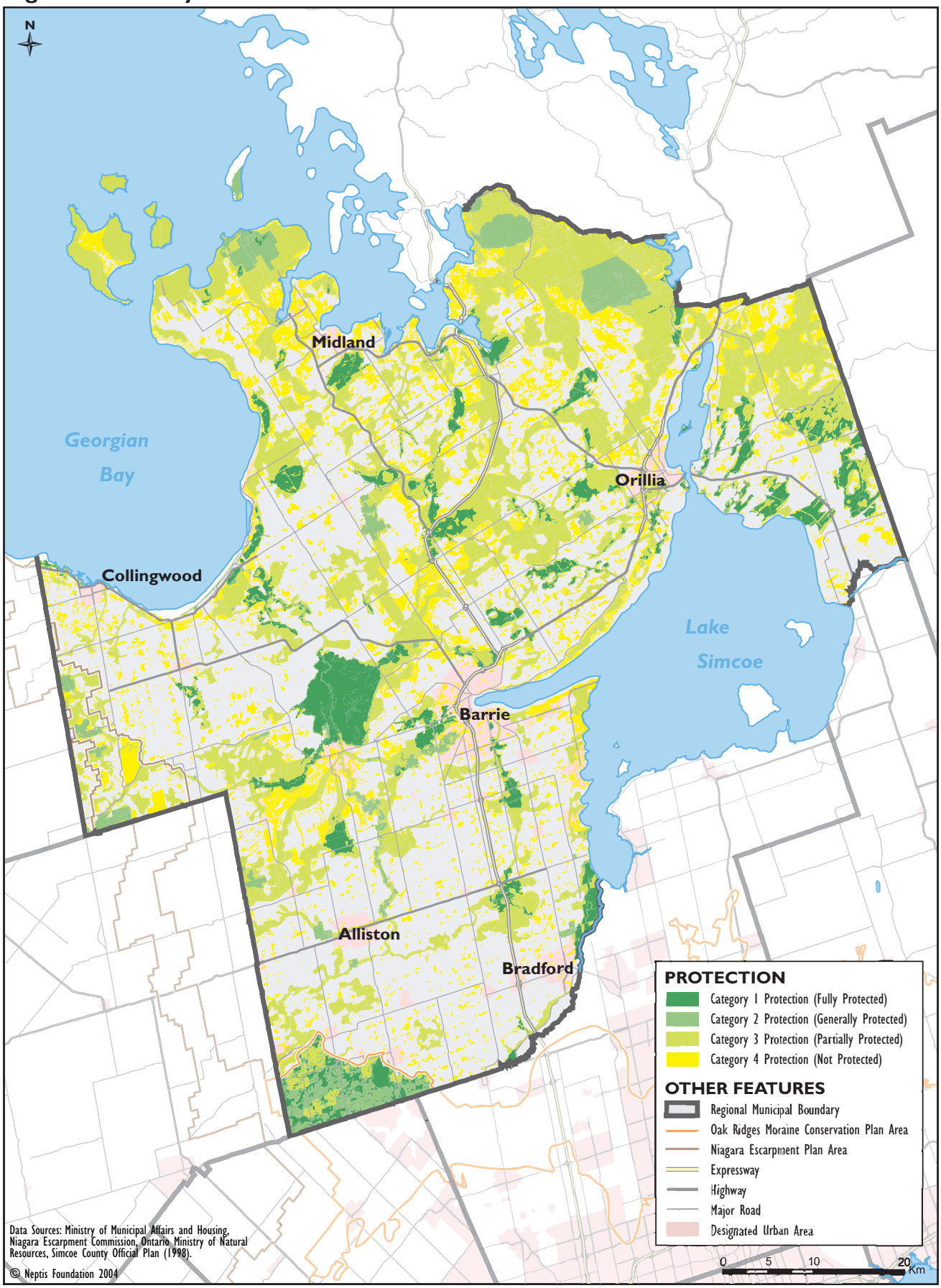
Several large developments have been proposed for the southern municipalities of Simcoe (specifically the Towns of Innisfil and Bradford-West Gwillimbury).

Table 11: Levels of Greenlands Protection for the County of Simcoe

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Provincially Significant Wetland (MNR) (PPS)	x			
Locally Significant Wetland (MNR) (PPS)	x (ORM)		x	
Significant Woodlands (PPS)	x (ORM)		x	
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Significant Valleylands (PPS)	x (ORM)		x	
Areas of Natural and Scientific Interest (PPS)			x	
Environmentally Significant Areas (LSRCA)			x	
Niagara Escarpment Natural Areas		x		
Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Unevaluated Cartographic Wetland	x (ORM)			x
Other Woodlands				x
Fish Habitat (PPS)	x (ORM)		x	
Niagara Escarpment Parks and Open Space Systems		x		
Provincially Significant Life Science ANSI (MNR)	x (ORM)		x	
Regionally Significant Life Science ANSI (MNR)	x (ORM)		x	
Earth Science ANSI (MNR)	x (ORM)			x
Environmentally Significant Areas (LSRCA)	x (ORM)		x	
Natural Core and Linkage Areas (ORM)		x		
Countryside Area (ORM)			x	
Sand Barrens (ORM)	x (ORM)			
Savannahs (ORM)	x (ORM)			
Tallgrass Prairie (ORM)	x (ORM)			
Kettle Lakes (ORM)	x (ORM)			
Permanent and Intermittent Streams (ORM)	x (ORM)			
Seepage Areas and Springs (ORM)	x (ORM)			
Hydrogeological Environmentally Sensitive Areas (LSRCA)			x	
Crown Land			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		

The County of Simcoe Official Plan, 2000.

Figure 12: County of Simcoe



City of Kawartha Lakes

The City of Kawartha Lakes (formerly the County of Victoria) is one of the most rural municipalities in the study area, occupying an area of 333,379 ha. Like the City of Hamilton, Kawartha Lakes was recently restructured as a result of the amalgamation of 18 local townships into a single-tier municipality. The City is currently in the process of developing a new Official Plan, but in the meantime reference is made to the old County of Victoria (1999) Official Plan with respect to natural heritage policies.

The City of Kawartha Lakes covers a wide spectrum of environments, from the largely undeveloped Shield woodlands of its most northerly regions, through the Trent-Severn lakes and the many rivers and creeks that flow into them, to the agricultural areas that characterize much of its southern portion.

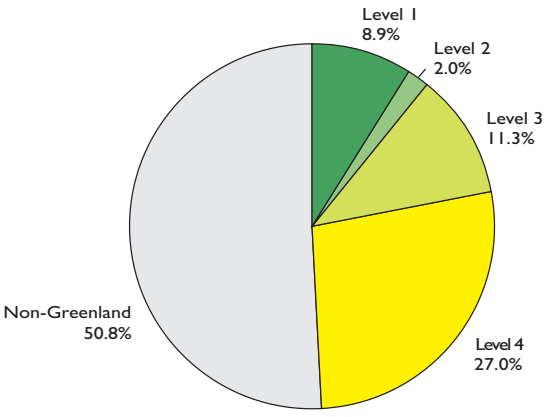
Kawartha Lakes is bisected by the Trent-Severn waterway, a series of connected lakes linked by a series of lift locks, which forms an important boating route between Lake Ontario and Lake Simcoe/Georgian Bay (Figure 13). These lakes are very important from a recreational perspective and their shorelines are dotted with a mix of cottages, year-round residences, and marina facilities. Aside from one small town (Lindsay) and the villages of Fenelon Falls, Omemee, and Bobcaygeon, the City of Kawartha Lakes has very little in the way of urban settlement.

The City of Kawartha Lakes covers a wide spectrum of environments, from the largely undeveloped Shield woodlands of its most northerly regions, most of which are unprotected (Level 4), through the Trent-Severn lakes and the many rivers and creeks that flow into them, to the agricultural areas that characterize much of its southern portion.

The Oak Ridges Moraine occupies the most extreme southern end of the municipality. This area is characterized by dense woodlands and provincially significant wetlands (Level 1 protection) and as a result offers very little in the way of future development opportunities. Several ANSIs (Level 2 protection) and large provincially significant wetlands (Level 1) trend northwards from the Moraine and Lake Scugog into the Trent-Severn lakes (Figure 13).

The municipality also contains the Cameron Ranch, a significant tract of land situated on the Carden Plain that is subject to special protection provisions (see page 88), as well as sizable areas of Crown Land (Level 3 protection).

The City of Kawartha Lakes is one of a number of central Ontario municipalities that has policies regarding the protection of Significant Woodlands, but does not identify where these features occur (Table 12). As a result, most of the City's woodlands have no (Level 4) true policy protection, unless they are associated with other Greenlands (ESAs, ANSIs, or wetlands). Most of the municipality north of the Trent-Severn lakes is well wooded, but is subject to little development pressure aside from individual cottage lot applications.



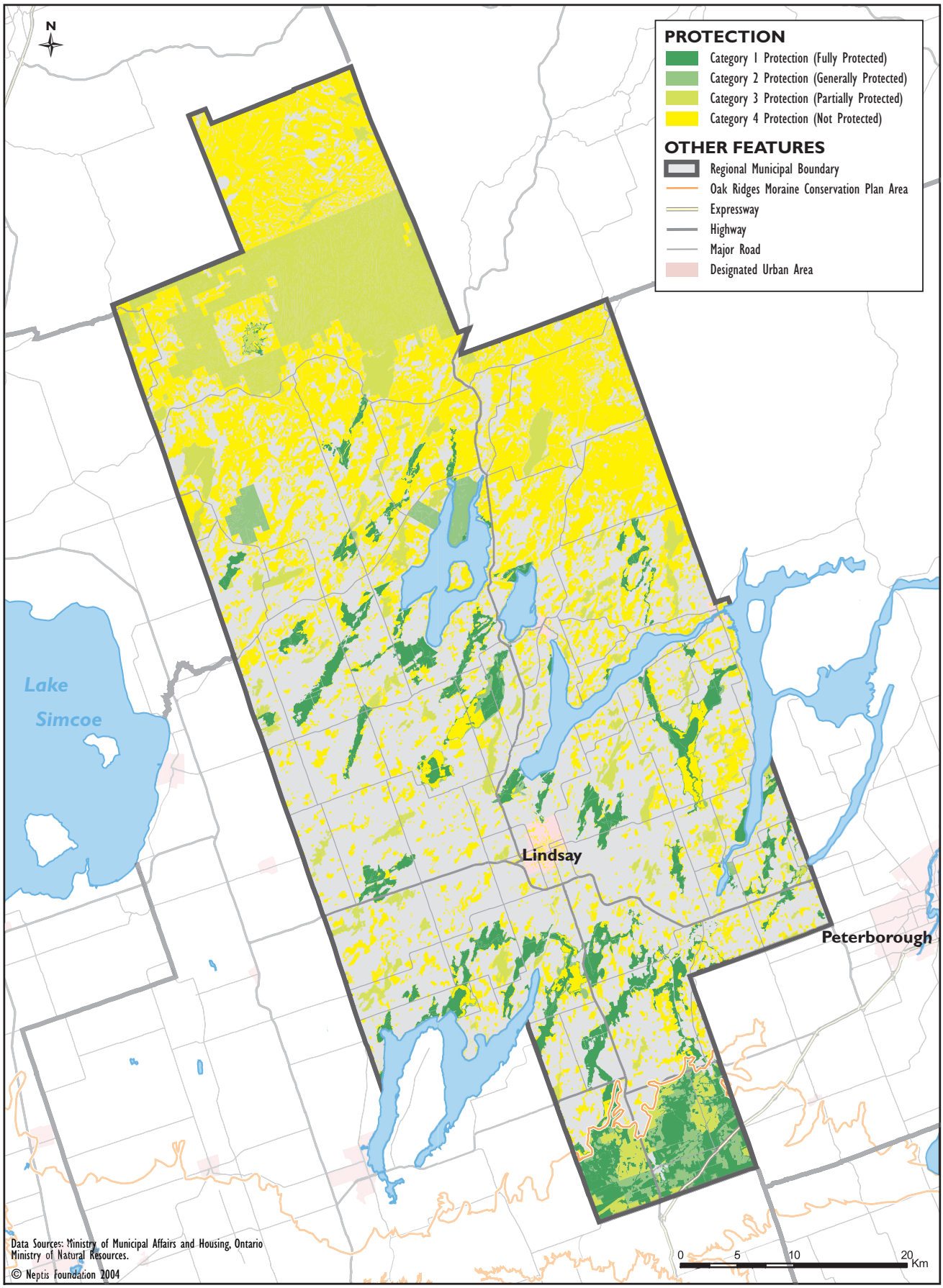
City of Kawartha Lakes

Table 12: Levels of Greenlands Protection for the City of Kawartha Lakes

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Environmentally Sensitive Areas				
1. Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
2. Provincially Significant Life Science ANSI (PPS)	x (ORM)	x		
3. Regionally Significant Life Science ANSI (MNR)	x (ORM)	x		
4. Provincially Significant Wetland (MNR) (PPS)	x			
5. Locally Significant Wetland (MNR)	x (ORM)		x	
6. Significant Wildlife Habitat (PPS)	x (ORM)		x	
7. Significant Woodlands (PPS)	x (ORM)		x	
Environmental Protection				
1. Significant Valleylands (PPS)	x (ORM)	x		
2. Floodplains		x		
3. Earth Science ANSI (MNR)	x (ORM)		x	
Unevaluated Cartographic Wetland				x
Other Woodlands	x (ORM)			x
Sand Barrens (ORMCP)	x (ORM)			
Savannahs (ORMCP)	x (ORM)			
Tallgrass Prairie (ORMCP)	x (ORM)			
Kettle Lakes (ORMCP)	x (ORM)			
Permanent and Intermittent Streams (ORMCP)	x (ORM)			
Crown Land			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		

The County of Victoria Official Plan, 1999.

Figure 13: City of Kawartha Lakes



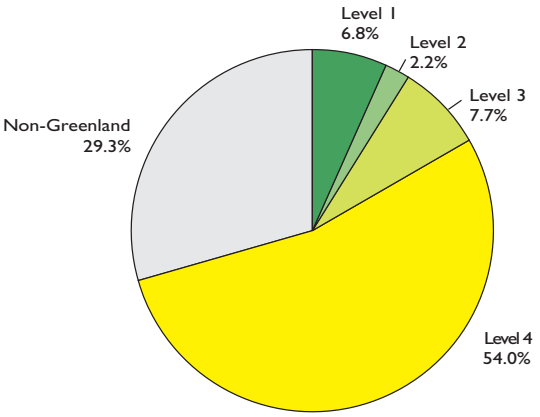
County of Peterborough

The County of Peterborough occupies 421,490 ha in the northeast corner of the study area. It is a largely rural municipality, with only one large urban centre – the City of Peterborough. The villages of Lakefield and Fraserville have been identified in the County of Peterborough Official Plan (1994) as "growth nodes" to which future development will also be directed. Few areas outside these designated settlement areas are experiencing any development pressure at present and consequently few of the County's Greenlands areas are under threat. Indeed, Greenland areas subject to policy (Table 13) are not even mapped in the current County Official Plan (1994).

Few of the designated settlement areas in the County of Peterborough are experiencing any development pressure at present and consequently few of the County's Greenlands areas are under threat.

The northern half of the County of Peterborough is situated on the Canadian Shield. Most of the land is wooded (Crown land), dotted with many small wetlands, the vast majority of which are unevaluated (Level 4 protection).

South of the Shield, a number of provincially significant wetlands (Level 1) are associated with the creeks that drain into Rice Lake and Sturgeon Lake, as well as ESAs identified by the Otonabee Region Conservation Authority. The Oak Ridges Moraine extends into the extreme southwest corner of the County (Figure 14).



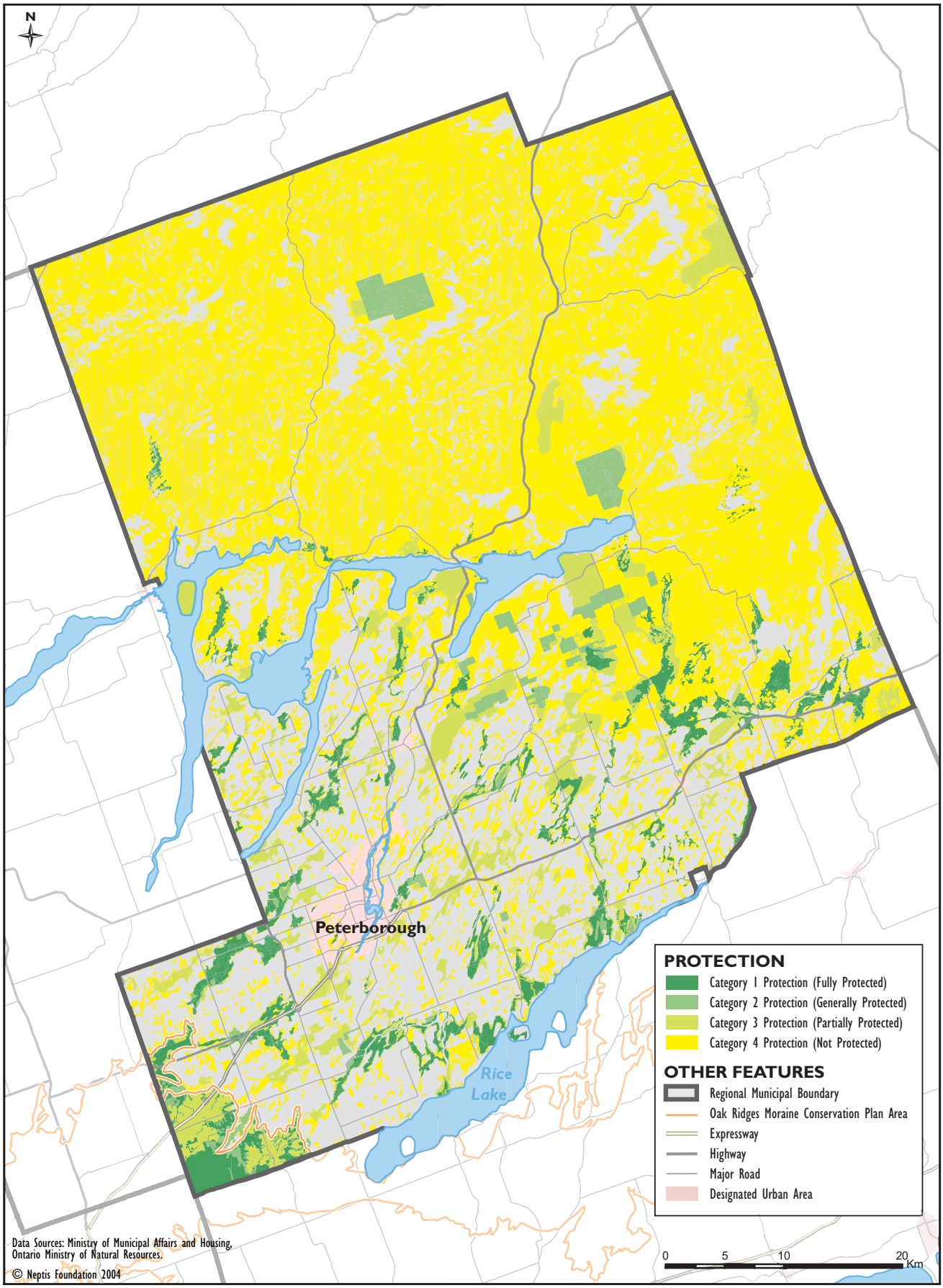
County of Peterborough

Table 13: Levels of Greenlands Protection for the County of Peterborough

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Floodplains		x		
Provincially Significant ANSI (PPS)	x (ORM)	x		
Earth Science ANSI (MNR)	x (ORM)			x
Environmentally Sensitive Areas (ORCA)		x (ORM)	x	
Provincially Significant Wetland (MNR) (PPS)	x (South of Shield)	x (on Shield)		
Locally Significant Wetland (MNR)	x (ORM)		x	
Unevaluated Cartographic Wetland				x
Other Woodlands				x
Significant Woodlands (PPS)	x (ORM)		x	
Natural Core and Linkage Area (ORM)		x		
Countryside Area (ORM)			x	
Significant Valleylands (PPS)	x (ORM)	x		
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Fish Habitat (PPS)	x (ORM)	x		
Sand Barrens (ORM)	x (ORM)			
Savannahs (ORM)	x (ORM)			
Tallgrass Prairie (ORM)	x (ORM)			
Kettle Lakes (ORM)	x (ORM)			
Permanent and Intermittent Streams (ORM)	x (ORM)			
Seepage Areas and Springs (ORM)	x (ORM)			
Crown Land			x	
Conservation Area		x		
Provincial Park, Nature Reserve		x		

The County of Peterborough Official Plan, 1994.

Figure 14: County of Peterborough



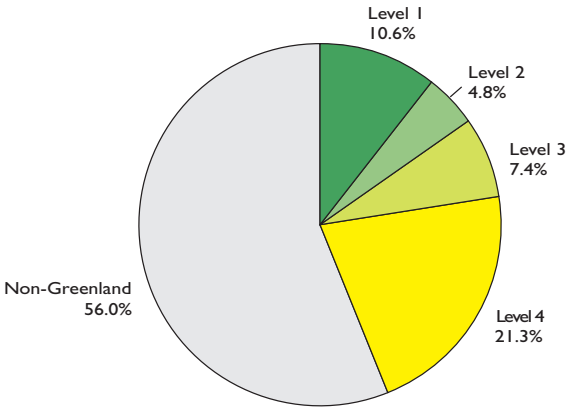
County of Northumberland

The County of Northumberland (area 221,145 ha) is the most easterly municipality in the Neptis study area, extending along the north shore of Lake Ontario as far east as Trenton and the Bay of Quinte. Most of the larger urban communities are situated between Highway 401 and Lake Ontario (e.g., Town of Port Hope, Town of Cobourg, Brighton, and Trenton). Future urban growth is expected to be concentrated in these centres, and very little development is expected to occur in the interior areas.

The County of Northumberland is one of only two upper-tier municipalities in the study area that lacks an Official Plan.

From an environmental perspective, the central portion of Northumberland is dominated by the Oak Ridges Moraine (Figure 15). The provincially owned Ganaraska Forest is an extensive area of native and plantation forest tracts (Level 1) that marks the eastern terminus of the Moraine. South of the Moraine the dominant Greenlands features are the unprotected (Level 4) woodlands of the glacial Lake Iroquois shoreline. East of Cobourg, some of the larger woodlots, particularly those near the Lake Ontario shoreline, have been identified by the Ganaraska Region Conservation Authority as ESAs, which receive Level 3 protection. Sandbanks Provincial Park, a peninsula that extends out into Lake Ontario, is one of very few areas in Northumberland with Level 2 protection (Table 14).

The County of Northumberland is one of only two upper-tier municipalities in the study area (the County of Dufferin is the other) that lacks an Official Plan at present.



County of Northumberland

Table 14: Level of Protection for the County of Northumberland

Level of Protection	1	2	3	4
PROTECTION	FULLY PROTECTED	GENERALLY PROTECTED	PARTIALLY PROTECTED	NOT PROTECTED
Significant portions of the habitat of endangered and threatened species (MNR) (PPS)	x			
Provinciallly Significant Wetland (MNR) (PPS)	x			
Provincially Significant Life Science ANSI (PPS)	x (ORM)		x	
Regionally Significant Life Science ANSI (MNR)	x (ORM)		x	
Earth Science ANSI (MNR)	x (ORM)			x
Environmentally Sensitive Areas			x	
Natural Core and Linkage Areas (ORM)		x		
Countryside Areas (ORM)			x	
Locally Significant Wetland (MNR)	x (ORM)		x	
Unevaluated Cartographic Wetland				x
Other Woodlands				x
Significant Woodlands (PPS)	x (ORM)		x	
Significant Valleylands (PPS)	x (ORM)		x	
Significant Wildlife Habitat (PPS)	x (ORM)		x	
Fish Habitat (PPS)	x (ORM)		x	
Sand Barrens (ORM)	x (ORM)			
Savannahs (ORM)	x (ORM)			
Tallgrass Prairie (ORM)	x (ORM)			
Kettle Lakes (ORM)	x (ORM)			
Permanent and Intermittent Streams (ORM)	x (ORM)			
Conservation Areas		x		
County Forests		x		
Provincial Park, Nature Reserves		x		

Note: The County of Northumberland does not have an Official Plan.

Figure 15: County of Northumberland

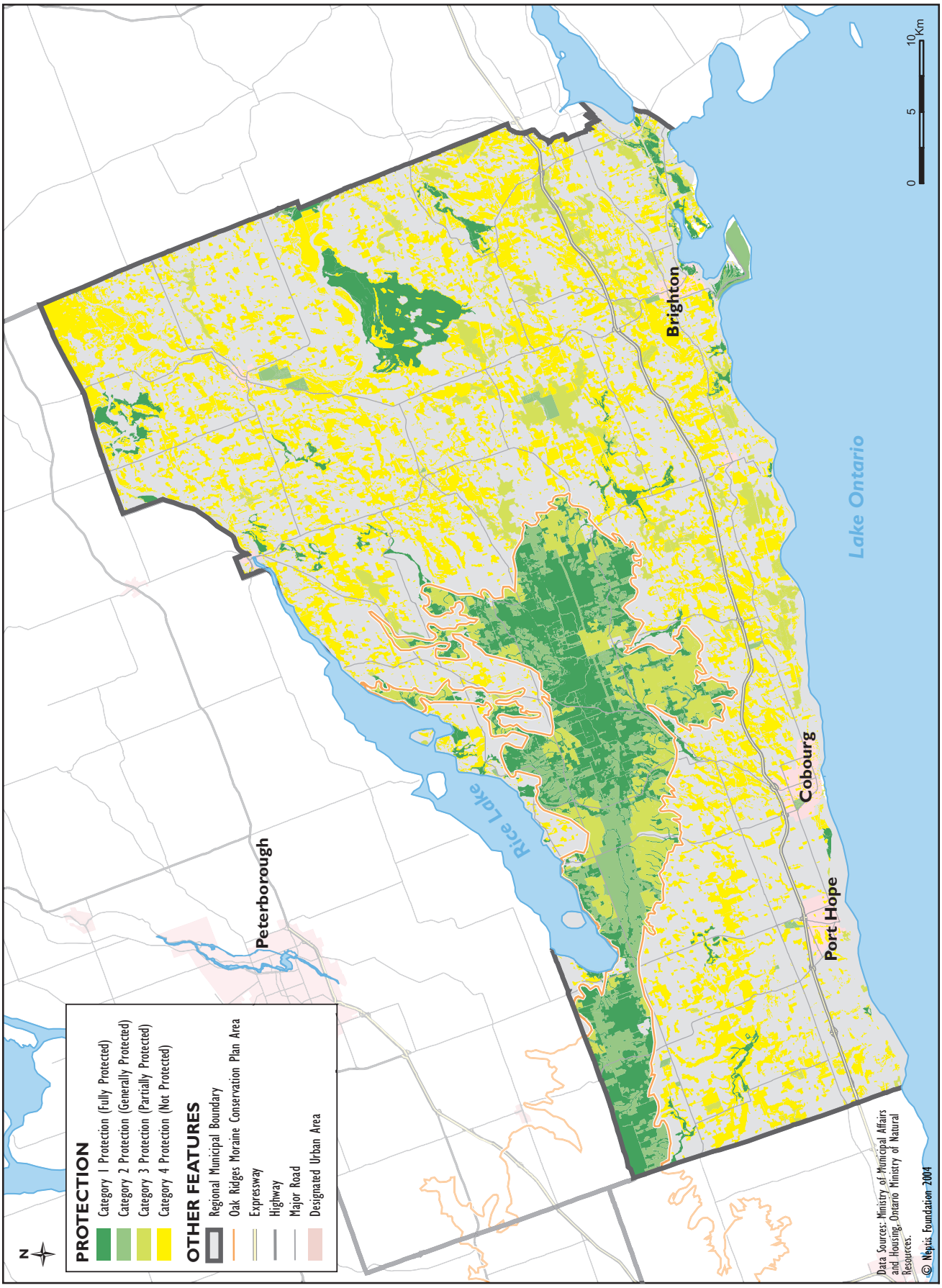


Table 15 summarizes the area of Greenlands in each municipality, according to level of protection, as well as the amount of each that is occupied by urban or agricultural land. Table 16 expresses the same information in terms of the percentage of land occupied by each level, by municipality.

Table 15: Area of Greenlands (in ha) by Level of Protection

Upper-tier Municipality	AREA OF MUNICIPALITY	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	NON-GREENLAND
County of Dufferin	149,667.0	8,957.8	6,767.2	6,282.6	21,094.3	106,565.2
Regional Municipality of Durham	258,134.1	46,413.3	13,796.6	63,812.7	13,595.3	120,516.2
Regional Municipality of Halton	97,287.2	3,985.8	12,660.6	7,740.7	13,193.3	59,706.8
City of Hamilton*	112,780.9	7,375.5	15,397.7	5,457.2	2,315.5	82,235.0
City of Kawartha Lakes*	33,3379.3	29,626.4	6,768.5	37,795.1	89,858.6	169,330.7
Regional Municipality of Niagara	188,416.7	6,547.9	6,924.7	24,029.1	18,178.1	132,736.9
County of Northumberland	221,145.1	23,417.2	10,555.9	16,320.3	47,013.4	123,838.4
Regional Municipality of Peel	125,407.8	8,741.6	16,971.2	9,583.6	4,940.5	85,170.9
County of Peterborough	421,490.0	28,715.6	9,442.5	32,436.4	227,442.9	123,452.5
County of Simcoe	491,157.6	40,666.1	22,317.9	140,428.8	61,393.1	226,351.6
City of Toronto*	63,489.1	159.0	11,341.2	0.0	97.0	52,050.9
Regional Municipality of Waterloo	138,420.3	4,927.1	5,783.3	1,855.9	11,842.4	114,011.6
County of Wellington	269,707.3	23,767.4	59,800.4	3,050.1	4,169.0	178,920.3
Regional Municipality of York	177,509.2	26,806.3	19,634.9	24,769.9	7,322.9	98,975.1
Total	3,047,991.4	260,107.0	218,162.7	373,562.4	522,456.3	1,673,862.5

*Single-tier municipality

Table 16: Area of Greenlands (%) by Level of Protection

Upper-tier Municipality	% LEVEL 1	% LEVEL 2	% LEVEL 3	% LEVEL 4	% NON-GREENLAND
County of Dufferin	6.0	4.5	4.2	14.1	71.2
Regional Municipality of Durham	18.0	5.3	24.7	5.3	46.7
Regional Municipality of Halton	4.1	13.0	8.0	13.6	61.4
City of Hamilton*	6.5	13.7	4.8	2.1	72.9
City of Kawartha Lakes*	8.9	2.0	11.3	27.0	50.8
Regional Municipality of Niagara	3.5	3.7	12.8	9.6	70.4
County of Northumberland	10.6	4.8	7.4	21.3	56.0
Regional Municipality of Peel	7.0	13.5	7.6	3.9	67.9
County of Peterborough	6.8	2.2	7.7	54.0	29.3
County of Simcoe	8.3	4.5	28.6	12.5	46.1
City of Toronto*	0.3	17.9	0.0	0.2	82.0
Regional Municipality of Waterloo	3.6	4.2	1.3	8.6	82.4
County of Wellington	8.8	22.2	1.1	1.5	66.3
Regional Municipality of York	15.1	11.1	14.0	4.1	55.8
Total	8.5	7.2	12.3	17.1	54.9

*Single-tier municipality

Case Studies

The following four case studies have been included to illustrate some of the ways in which Greenlands protection plays out in practice and the controversies that may arise when the preservation of Greenlands is at stake.

Trafalgar Moraine

The Trafalgar Moraine is a landform a few kilometres wide and about 25 kilometres long that extends southwest to northeast across the northern part of the Town of Oakville in Halton Region. Although it sounds similar, it does not perform one of the most critical ecological functions – groundwater recharge – as the Oak Ridges Moraine. The Trafalgar Moraine is largely composed of silty, clay-rich sediment, underlain by shale bedrock, both of which impede the infiltration of water. A few areas, however, act as ponds for surface water, allowing some groundwater recharge, despite the nearly impermeable soils. These features are the only distinguishing ones of this topographically very subtle geological feature.

Although it sounds similar, the Trafalgar Moraine does not perform the same ecological function – groundwater recharge – as the Oak Ridges Moraine.

Until recently, the Trafalgar Moraine was not widely known outside the geological community, and it was not considered to be in need of any special designation or protection. The valley of Sixteen Mile Creek, which crosses the moraine, is protected under the Region of Halton's Official Plan (Level 2), as are some woodlots, but the moraine itself is not. Moraines are quite a common feature in southern Ontario, and until quite recently this one aroused no particular interest.

The Trafalgar Moraine entered the public eye in 1998 after the Town of Oakville proposed an Official Plan Amendment (OPA 198) to designate land north of Dundas Street for future urbanization – about one-quarter of which was on the Trafalgar Moraine. A background report prepared as part of the plan amendment process, titled *North Oakville Natural Heritage Inventory and Analysis*, mentioned the moraine. A local group called Oakvillegreen Conservation Association Inc. picked up on this and began lobbying the town and province to protect the moraine from urban development on the grounds of its environmental sensitivity. Other environmental groups soon joined this effort.

As a result of pressure from these groups, Mike Colle, Liberal MPP for Eglinton-Lawrence and opposition critic for the Greater Toronto Area, introduced the *Trafalgar Moraine Protection Act* in the provincial legislature. The act called for a moratorium on development on the moraine until a plan to identify and protect its sensitive features was in place – much like the Act that had been passed to protect the high-profile Oak Ridges Moraine. In the meantime, land developers submitted plans for the area and publicly supported the OPA, while Oakvillegreen launched an appeal to the Ontario Municipal Board opposing it.

A group of local residents opposed to the urban expansion lobbied the town and the province to protect the Trafalgar moraine from urban development on the grounds of its environmental sensitivity.

The *Trafalgar Moraine Protection Act* was defeated after second reading in the legislature in June 2003. Soon afterwards, the stakeholders reached a compromise with government officials and the land development inter-

ests, allowing the OPA to be passed on condition that a good portion of the land involved would be protected as public parkland. The Regional Municipality of Halton also considered designating a particularly good example – yet to be determined – of the moraine's topography as an Environmentally Sensitive Area.

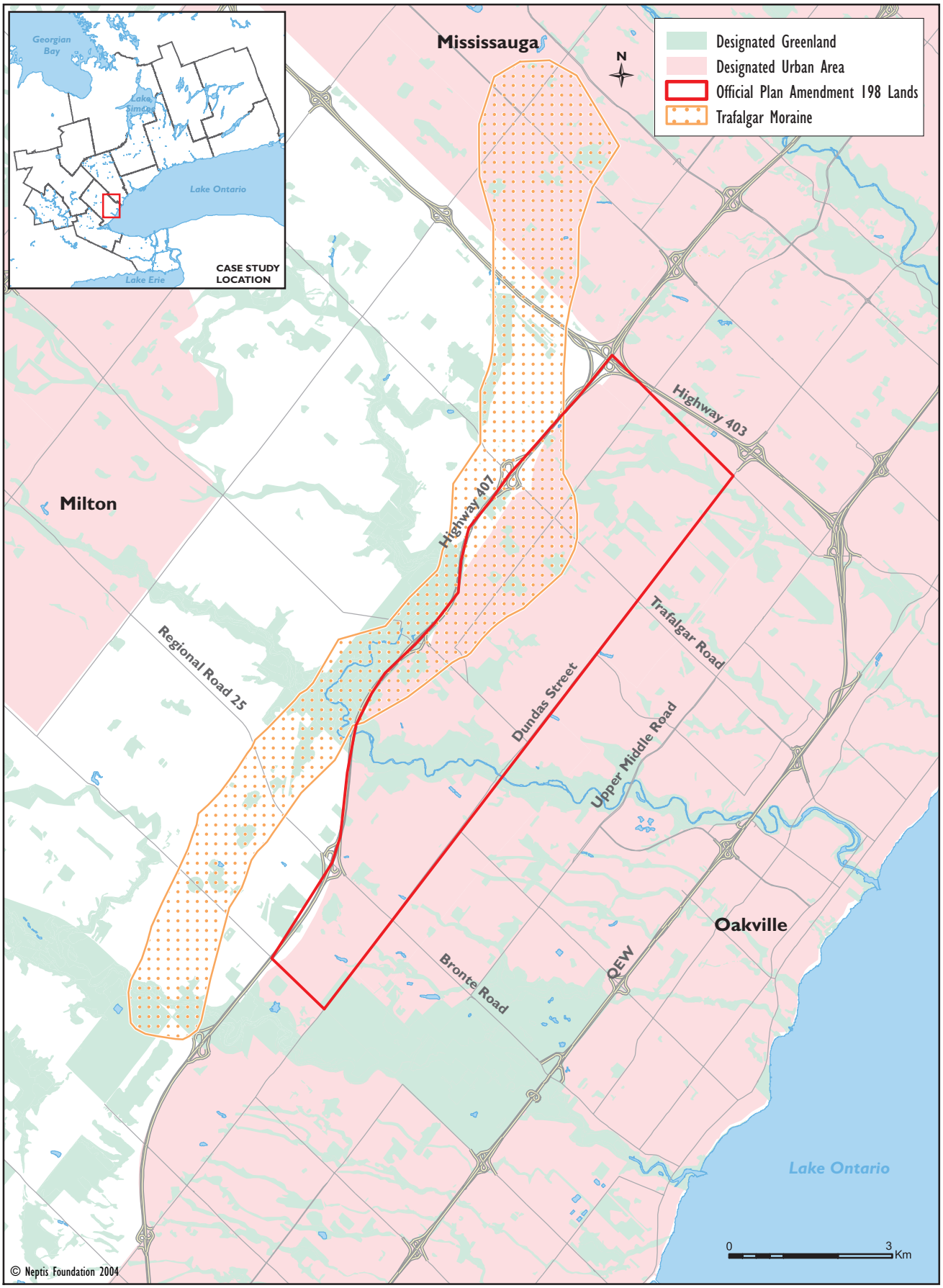
The case of the Trafalgar Moraine reveals many of the forces at work in the politics of Greenland protection in the south-central region of Ontario. Considering the moraine's questionable ecological significance, it seems possible that those advocating its protection were motivated at least as much by a wish simply to protect the area from urbanization as to protect the moraine's ecological integrity. But under current policy – or rather absence of policy – an ecological argument is the best, perhaps the only, way in which local residents can fight urban sprawl.

Under current policy – or rather absence of policy – an ecological argument is the best, perhaps the only, way in which local residents can fight urban sprawl.

Other reasons for protecting the land – the lack of a demonstrated need to urbanize more rural land, the right of residents to protect local Greenlands, or the value of preserving large open spaces within an urbanized area – have no clear policy behind them. They also gain no significant media or political attention.

It is also important to note how much attention can be generated when Greenlands under threat are adjacent to a large, and in this case very articulate, urban population. So high profile did this issue become that a bill to protect the Trafalgar Moraine reached second reading in the provincial legislature – a remarkable situation considering the moraine's relative lack of ecological significance. In the meantime, arguably more significant natural features such as the Oro Moraine (see page 85), situated much farther from population centres and therefore from media scrutiny, attract only limited local attention.

Trafalgar Moraine



Pickering – Richmond Hill Land Exchange

In November 2001, about six months after the Ontario government introduced the *Oak Ridges Moraine Protection Act, 2001*, which established a six-month moratorium on development on the Moraine, the Province announced its intention to exchange privately owned lands on the Oak Ridges Moraine in Richmond Hill and Uxbridge, which had been slated for development, for publicly owned lands in north Pickering known as Seaton, thereby bringing this land preserve into the public eye.

In 2001, the Province announced its intention to exchange lands on the Oak Ridges Moraine in Richmond Hill and Uxbridge that had been slated for development, for the Seaton lands.

The Seaton lands have been under public ownership since the early 1970s, having been assembled by the Province to provide land for a planned community beside the new Pickering airport. But the airport was never built and the land remained undeveloped. Since then, most of the land has been farmed by tenants, who leased it from the government.

Several ambitious plans have been put forward to develop the area – the first in 1975 and the most recent in 1995 – but nothing has come of them. One important feature of the original 1975 plan was the designation of the northeast portion, covering about 3,230 ha, as land for urban development (now generally labelled the Seaton lands) and the southwest portion as an agricultural preserve of almost 2,000 ha (known as the Duffins-Rouge Agricultural Preserve). This split designation remains in the current Durham Region Official Plan and in provincial policy. In the late 1990s, the Ontario government began to sell land in the agricultural preserve back to the resident farmers, with easements on lots larger than 2 ha that required them to be kept in agricultural use.

The lands consist of a mix of farmland and woodland with a few small hamlets, much like the rest of that part of Durham Region. Some natural features, such as the old fields, streams, and wetlands, have a degree of protection, but apart from the agricultural preserve, the area has no special greenland designation.

The Seaton lands are unique in the fact that they represent a sizable parcel of land close to Canada's largest city that has remained more or less unchanged for thirty years. The lands were always intended for development, but by an accident of history, they were bypassed in the rapid urbanization of the surrounding areas.

Late in 2001, after passing the *Oak Ridges Moraine Protection Act*, the Province resolved to compensate developers whose land on the Moraine was now undevelopable, with suitable land elsewhere. Attention naturally turned to the Seaton lands, because they represented a large assembly of provincially owned, developable land. The Province engaged former Toronto mayor David Crombie to recommend how this "land swap" would be carried out, and established a review panel to ensure that the exchange was fair to all concerned. This group, known as the North Pickering Land Exchange Review Panel, recommended restrictions on development of the area.

Meanwhile, starting in 2002, the City of Pickering had prepared a growth management study for the entire area, which recommended that some development be allowed within the agricultural preserve. The City found itself in conflict with the Province, as well as with the Region of Durham, whose Official Plan calls for urbanization only in the northeast portion. The Province responded in April 2003 with a Minister's Zoning Order,

temporarily freezing the agricultural preserve, and an order under the rarely used *Planning and Development Act* that established a provincially controlled development planning area covering both the Seaton lands and the agricultural lands. Under this order, a provincial plan will be prepared for the whole area.

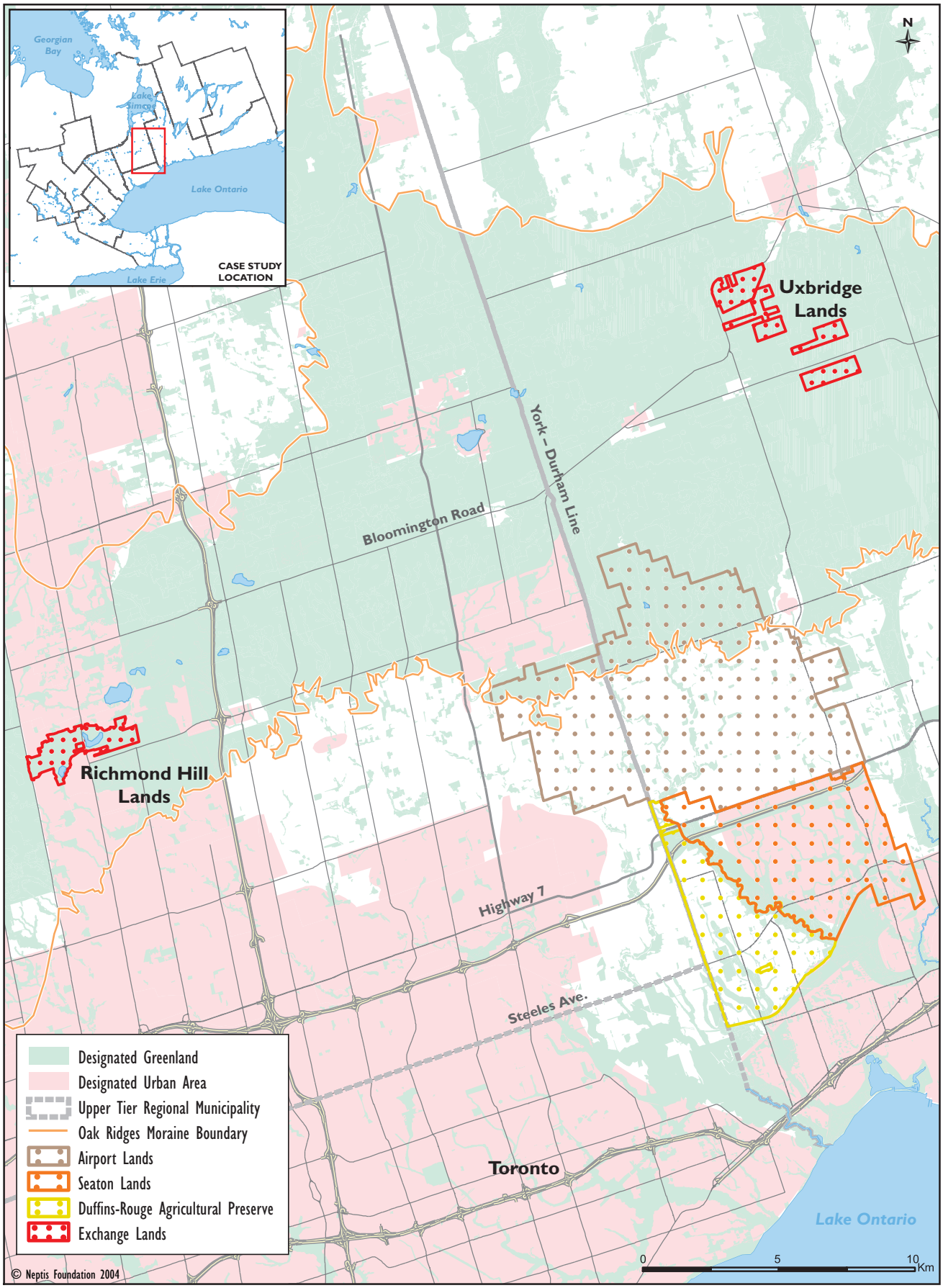
The affair remains unresolved. The new Ontario government has not opened up the land exchange negotiations to public scrutiny, so it is not yet known what lands will be offered or to what extent the existing natural features in the urbanized area will be protected. The status of the agricultural preserve also remains uncertain, its fate hinging on which of the three governments involved will exercise final authority.

The Seaton land exchange illustrates the fact that provincial ownership is no guarantee of protection.

The lands in question are in some ways quite ordinary. But the fact that they have remained more or less unchanged for more than 30 years makes them unique relative to the surrounding urbanized areas and therefore valuable. They afford an exceptional opportunity for both agricultural preservation, environmental protection, and well-planned, publicly regulated urbanization. At the same time, their location on the current urban edge makes the lands attractive to private developers, so pressures to develop them will undoubtedly be strong in the years to come.

The Seaton land exchange shows that public ownership is no guarantee of protection, and that conflicts can arise over greenlands protection that pit one level of government against another. It also illustrates the absence of a broad vision for greenlands and of a clear distinction between urban and non-urban space in South-Central Ontario.

Pickering – Richmond Hill Land Exchange



The Oro Moraine

The Oro Moraine, like most other moraines, is a formation of sand and gravel deposited by glacial action during the last ice age. It is fairly large, about 26 km long, covering approximately 17,000 ha, running northwest of Lake Simcoe between Barrie and Orillia. About 60% of the moraine is forested, with the remaining 40% used for mixed farming, aggregate extraction, rural housing, and recreation – especially skiing, for which the hilly terrain is well suited. The land is almost all privately owned, with about 275 separate landowners.

The Oro Moraine serves several important ecological functions. It acts as an important groundwater recharge for its immediate area, filtering and controlling flow into the nearby Minesing Swamp (a provincially significant wetland), among other places. Because of its varied terrain and substantial forested areas, it also provides habitat for many plants and animals that are becoming increasingly rare elsewhere in central Ontario.

The Oro Moraine acts as an important groundwater recharge for its immediate area. However, the integrity of the moraine as a natural area is threatened by rural estate development and the expansion of recreational facilities such as ski hills and golf courses.

Large sections of the Oro Moraine have remained in a fairly natural state, as until now this part of Simcoe County has seen relatively little urban or industrial development. However, the integrity of the moraine as a special natural area is becoming threatened by sand and gravel extraction, rural estate development, and the expansion of recreational facilities such as ski hills and golf courses, all of which are becoming increasingly common.

The Couchiching Conservancy led the drive to protect the Oro Moraine. The Conservancy identified it as an area in need of attention in 1994, and in 2001 undertook an inventory of natural habitats and land uses by contacting all the private landowners on the moraine. At the same time, the Township of Oro-Medonte, the local municipality in which the moraine is located, took some steps of its own. It assembled a working group of residents, landowners, and politicians to determine what land use policies should be put in place to control development over the next 20 years.

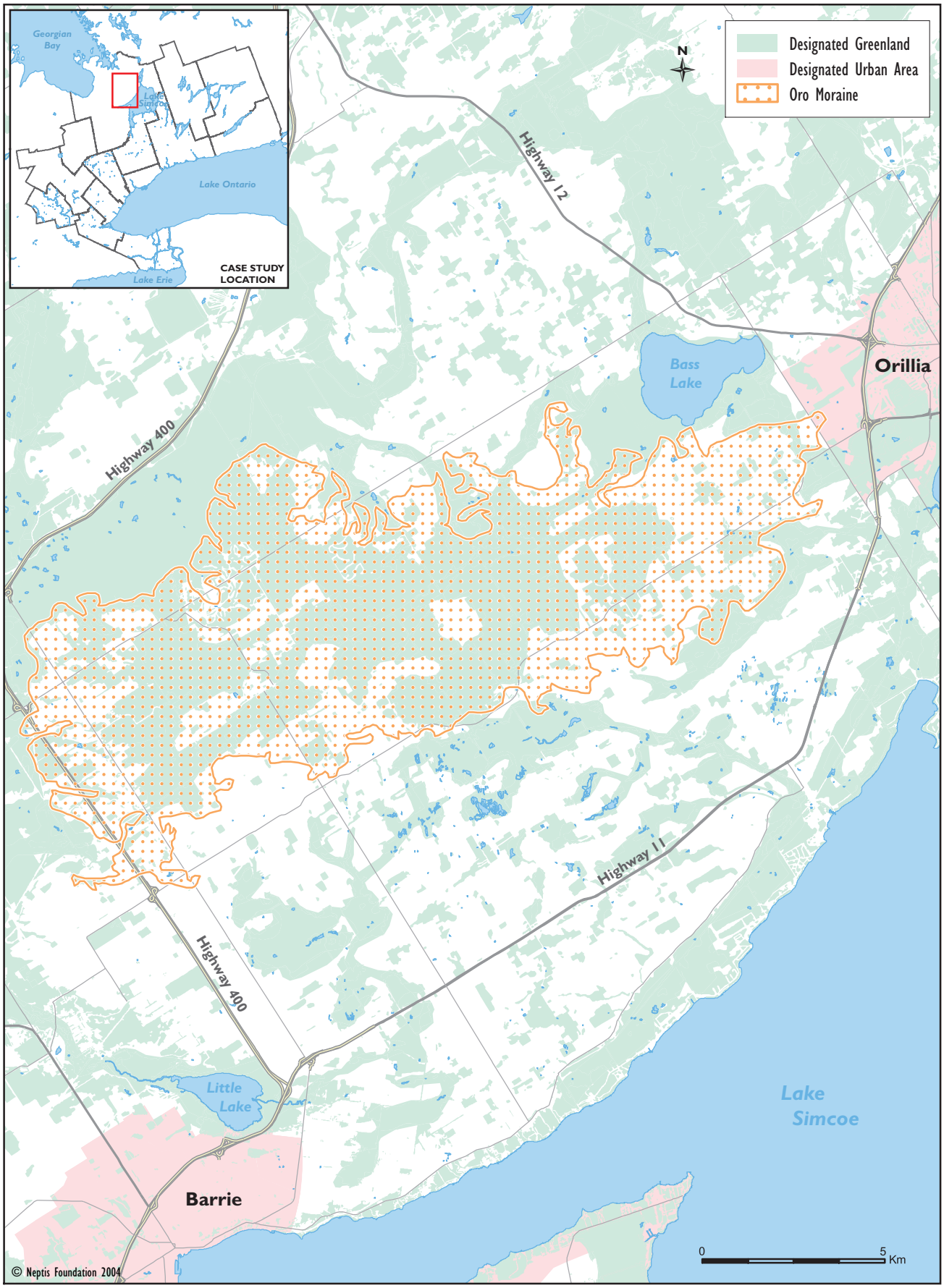
While this was under way, the water bottling company Gold Mountain Springs, which was already extracting groundwater from an aquifer beneath the moraine, proposed a new bottling plant on agricultural land within the moraine. The Township opposed the proposal, but its authority to prohibit construction of the plant was not at first clear. Provincial laws require local municipalities to protect certain environmental features, but do not give moraines any special status. However, in early 2002 the Ontario Municipal Board declared that the municipality did have the authority to control its land use to this extent, and construction of the bottling plant was stopped.

The protection of the Oro Moraine is one of the few cases in the region where a local municipality, spurred by a specific threat to a greenlands area, has taken the initiative in securing protection.

The municipality then amended its Official Plan to include a special land-use plan for the moraine. This amendment, which has not yet been passed, is expected to designate about 50% of the moraine as a natural area on which development will be tightly restricted. Apart from the aggregate industry, which of course wants to ensure the future viability of its operations, the plan appears to have received fairly widespread support.

The protection of the Oro Moraine, while still a work in progress, is one of the few cases in the region where a local municipality, spurred by a specific threat to a Greenlands area, has taken the initiative in securing protection. It also illustrates the lack of a region-wide vision for Greenlands.

Oro Moraine



The Cameron Ranch

The Cameron Ranch was, until recently, a privately owned 1,100 ha ranch on the Carden Plain east of Dalrymple Lake, in the City of Kawartha Lakes, about 40 km northwest of Lindsay. The owners put the ranch up for sale in 2001. A group of non-government nature and conservancy organizations purchased it with funds raised from various private and public sources. The ranch is now owned by the Nature Conservancy of Canada, and is the largest privately protected natural area in central Ontario.

The Cameron Ranch is of special interest because it is an alvar, a unique landform distinguished by a thin layer of soil resting on limestone bedrock where some unusual plant and animal species flourish.

The land is of special interest because it is an alvar, a unique landform distinguished by a thin layer of soil resting on limestone bedrock. Since their thin soils hold little water, alvars are prone to flooding during spring runoff and to drought in summer. This produces a unique, albeit rather harsh, natural habitat where some unusual plant and animal species flourish. Alvars thus serve a critical ecological function wherever they occur. Their uniqueness has also brought them international attention in recent years.

Because of their thin soils, alvars in the Great Lakes region have seldom been used for growing crops. The Cameron Ranch, for example, was being used for cattle ranching. This same feature, however, makes them an ideal source of limestone, since very little overburden needs to be removed to gain access to the rock, so they are under increasing threat of disturbance by quarrying operations.

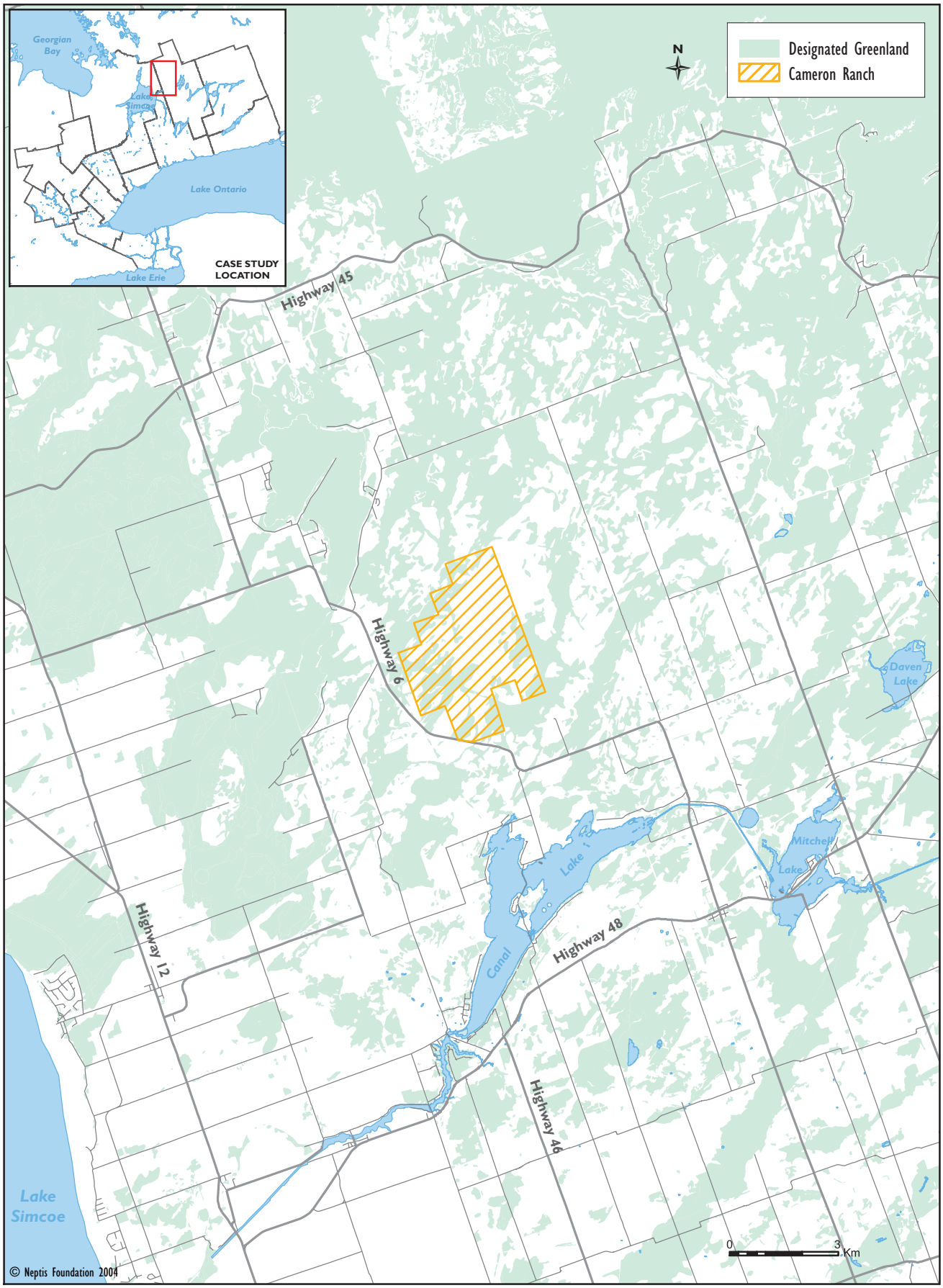
The protection of the Cameron Ranch is a result of private initiative and fundraising rather than government action. The provincial government, the traditional custodian of public resources in Ontario, played only a very minor role in protecting the land.

The Carden Plain was not, and in fact still is not, a natural feature with any special government designation. It does contain several woodlands and wetlands, which are fairly well protected by provincial policy, but since it is a habitat more than a feature, it has not been well served by current feature-based policies.

In the 1990s, the Nature Conservancy of Canada sponsored a three-year study of Great Lakes alvars and the plant and animal communities they support. This study confirmed that the Carden Plain is an excellent example of an alvar ecosystem, supporting some unusual species of shrubs and grasslands, as well as several rare and endangered species of birds. The study also drew attention to the Cameron Ranch as a large parcel of undisturbed land on the Carden Plain with a single owner. The Nature Conservancy then joined together with a number of other organizations, among them the Couchiching Conservancy, the Federation of Ontario Naturalists, and several local groups, to raise the funds needed to purchase the entire ranch. This was accomplished on April 30, 2003. Management of the land was then turned over to Ontario Parks.

The Cameron Ranch is now well protected, although what land uses will be permitted have yet to be settled to everyone's satisfaction. But this protection is a result of private initiative and fundraising rather than government action – although some of the funds raised for its purchase came from government sources. The provincial government, the traditional custodian of public resources in Ontario, played only a very minor role in bringing the land into protection, although it will now take on a more active management role.

Cameron Ranch



Conclusions

A number of conclusions arise out of this review of the status and distribution of Greenlands in south-central Ontario and their degree of policy protection. Although an attempt has been made to place the conclusions in a logical sequence, the order in which they are presented is not intended to reflect a hierarchy of importance.

The Official Plans reviewed as part of this study invariably recognize significant natural heritage features, and generally discourage development or site alteration from occurring within them. In most instances, however, they do not absolutely prohibit development.

A relatively small percentage of the Region's Greenlands are fully protected

One of the most significant conclusions to be drawn from this study is that, in our judgment, only 260,107.0 hectares or 19% of south-central Ontario's Greenlands should be considered fully protected under current municipal and provincial policy. As can be seen in Figure 16, the vast majority (81%) of the region's Greenlands have been deemed less than fully protected.

Figure 16: Composite Map

Georgian Bay

Lake Simcoe

Lake Ontario

Lake Erie

PROTECTION

- Category 1 Protection (Fully Protected)
- Category 2 Protection (Generally Protected)
- Category 3 Protection (Partially Protected)
- Category 4 Protection (Not Protected)

OTHER FEATURES

- Regional Municipal Boundary
- Oak Ridges Moraine Conservation Plan Area
- Niagara Escarpment Plan Area
- Designated Urban Area

N

0 50 Km

The Official Plans reviewed as part of this study invariably *recognize* significant natural heritage features, and generally *discourage* development or site alteration from occurring within them. In most instances, however, they do not *absolutely prohibit* development. Instead, consistent with the direction provided by the Provincial Policy Statements, development or site alteration within most significant natural heritage features or on nearby lands (that is, within a prescribed distance of the features) *may* be permitted, if it can be demonstrated that this can occur without resulting in any negative impacts on the feature and its functions. Because this policy framework has on many occasions permitted development within greenlands – largely because it is so difficult to conclusively demonstrate negative impacts, especially where development is proposed adjacent to but not actually within a feature – we have arrived at the above conclusion.

Very few areas in this part of the province have been set aside specifically to protect large swaths of agricultural land or to create broad, connected "Greenbelts" that support recreational activities.

Greenlands protection is primarily feature-based, not land-use based

The protection of Greenlands in south-central Ontario is largely based on preserving specific natural heritage *features*, usually because of their ecological significance, rather than on protecting or curtailing land uses within specified areas for social purposes or for reasons of good regional design.

The two most notable exceptions to this are the Niagara Escarpment and Oak Ridges Moraine plans, which place land use restrictions on relatively large blocks of land, rather than merely on the individual Greenlands features found within them. At the same time, however, their special designation as protected areas rests on their ecological significance more than on their purpose or function within the urban region, and it is primarily their features – often fragmented or irregularly shaped – that have the strongest protection. Away from the Moraine and the Escarpment, the most extensive protected areas include the Minesing Swamp of central Simcoe County and the large river valley wetlands associated with the drainage systems of the Lake Simcoe and Kawartha Lakes basins. Figure 16 also shows large areas of Greenlands in the more northerly reaches of the study area. Again, however, only certain features within those areas, such as provincially significant wetlands, have a high level of security.

Some large areas with unique soil or climatic conditions, such as Holland Marsh in southeast Simcoe County and the tender fruit lands of the Niagara Peninsula, are also given special recognition and are fully protected as significant agricultural lands in Official Plans. However, very few areas in this part of the province have been set aside specifically for agriculture or to create broad, connected "Greenbelts" that might also support recreational activities.

Official Plan policies typically require the preparation of an Environmental Impact Statement (EIS) in support of development or a change in land use that might adversely affect a Greenlands feature. This is the only form of protection available to certain features.

Even where significant natural features or areas are given some protection in the text of an Official Plan, they are often depicted on an "environmental overlay" to the land use schedule (this is true of Greenland features as well as broader areas). This means that the fundamental (i.e., underlying) land use designation, such as "Industrial" or "Residential," will usually take precedence over any environmental overlay. The County of Simcoe is an example of an upper-tier municipality that actually uses the term

"Greenland" as one of its Official Plan land use designations. However, with the exception of the Provincially Significant Wetlands within those areas, the Official Plan permits the following activities within County Greenlands (subject to the findings of an Environmental Impact Study): agriculture, resource extraction, institutional uses, highway commercial establishments, recreational facilities (including golf courses), residential lots created by consent, and residential subdivisions of up to a maximum of 20 lots.

Although the Oak Ridges Moraine Conservation Plan and Niagara Escarpment Plans provide comprehensive conservation planning to two highly significant landforms, there is no similar vision in place for south-central Ontario as a whole.

There is currently no overall provincial vision of a protected Greenlands system

To date, provincial policy in the area of land use planning has not resulted in an overarching vision of Greenlands protection for south-central Ontario. Protection is fragmented among many jurisdictions (upper- and lower-tier municipalities, conservation authorities, the province) and as a result similar Greenlands may be treated differently from one municipality to the next. As well, designations have been created at different times, when different ideas prevailed about Greenlands – some designations, such as ESAs, date back to the 1970s and 1980s. Although the Oak Ridges Moraine Conservation Plan and Niagara Escarpment Plans protect areas and features that cross several political jurisdictions, there is no standard set of criteria for the region as a whole.

Given the current state of Greenlands protection, Ontarians may place undue emphasis on the preservation of marginal, often degraded Greenlands in populated areas at the expense of high-functioning ecosystems in more remote areas.

The proposed *Greenbelt Protection Act* is expected to result in the identification of a Greenlands system across the Golden Horseshoe region of the province that may well go beyond what is deemed "fully protected" in this study. However, at the time of writing (summer 2004), this initiative is still in the early stages of "visioning" and public consultation and its outcome is not known.

"The Big Picture Project" is an attempt to identify a large, connected natural heritage system across southern and central Ontario made up of core and other significant natural areas, linked by a network of habitat corridors. "The Big Picture Project" has no formal status as a government-led project (despite participation by the Ministry of Natural Resources in partnership with non-government organizations such as the Nature Conservancy of Canada and the Federation of Ontario Naturalists) and does not represent the province's official position as to what a comprehensive Greenlands system for this area could look like.

The level of Greenlands protection is strongly influenced by the amount of development pressure

In rapidly urbanizing areas, environmental features of relatively marginal ecological importance are increasingly being protected in municipal Official Plans even when they are not covered under the Provincial Policy Statement. Because Greenlands features may be few and far between in such places, the prevailing attitude is often one of "protect anything that

is green," an attitude that rests on the assumption that the feature must be valuable from an ecological perspective simply because it is in short supply. This is not always the case, however. A small, already degraded woodlot in an urban area may have relatively little ecological value.

The lack of a Greenlands designation does not mean that a feature will ultimately be lost. Many natural heritage features that have little to no formal protection under policy, end up being retained as part of a development proposal.

Conversely, in more remote areas, highly significant features may be lost because of a combination of the lack of strong policy protection and lack of knowledge about the presence of the feature or its sensitivity. For example, a highly sensitive and rare fen wetland located on the Canadian Shield could be lost following an approved change in land use simply because no one knew it existed or because there was no policy in place to protect it. From a purely ecological perspective, the fen is far more "valuable" than the degraded urban woodlot, even though the land on which it occurs may have a relatively low value as a piece of real estate.

This is not to say that ecological significance is or should be the only criterion for protecting greenlands. But it is to say that, where it is a criterion, ecological significance is being distorted by a tendency to place undue emphasis on the preservation of marginal, often degraded Greenlands in populated areas at the expense of high-functioning ecosystems in more remote areas.

The effects of development pressure can also be seen in the treatment given to woodland protection in Official Plans. Generally speaking, the minimum size a woodland must be to achieve some level of recognition (and thus protection) increases as one moves from south to north in the study area. This pattern is apparent from an examination of Figure 16, whereby woodlands that lack policy protection (Level 4) become increasingly more evident in the area west of the Niagara Escarpment and north and west of the Oak Ridges Moraine. Not only are these unprotected woodlands larger, but there are more of them situated closer to one another, so that at the edge of the Shield, woodlands form a virtually unbroken band across the top of the study area. However, because these woodlands are in abundant supply and subject to relatively low development pressure, they are generally not given a very high degree of policy protection unless they are also recognized as a Provincially Significant Wetland or an ANSI.

* * *

This study has presented a detailed analysis of the current state of Greenlands protection in the region of south-central Ontario. Just as the presence of a protective designation does not imply that the feature will persist in perpetuity, the lack of a Greenlands designation does not mean that a feature will ultimately be lost. Many natural heritage features that have little to no formal protection under current policy may end up being retained as an outcome of the actions of government authorities or private developers. While the maps that accompany this report show the extent to which Greenlands are protected at present, it should not be assumed that those features with relatively weak or no formal protection whatsoever are destined to disappear from the landscape.

Acknowledgements

We would like to acknowledge the contribution of individuals who were of immeasurable help in the preparation of this paper. This project was truly a team effort and would not have succeeded without the significant contributions made by a number of our colleagues at Gartner Lee:

Dale Leadbeater, Senior Ecologist, who reviewed this paper and acted as a sounding board for many of the ideas expressed in it;

Jacquie Corley, Ecologist, who researched the environmental policy regime for the upper-tier municipalities within the study area;

Jill Attwood, Ecologist, who researched and prepared the Case Studies;

Rosalind Chaundy, Ecologist, who compiled the Greenlands definitions found in Appendix A.

In addition, we would like to thank:

Lee Parsons, a partner at Malone Given Parsons Limited, who provided invaluable information on the history of urban growth patterns in Central Ontario;

Marcy Burchfield of the Neptis Foundation, who provided much assistance in obtaining spatial data;

Byron Moldofsky and ***Jo Ashley*** of the University of Toronto Cartography Department, who provided technical advice on the maps and other graphic material;

Tony Coombes and ***Richard White*** of the Neptis Foundation, who offered advice, leadership, and guidance throughout the entire project.

Gartner Lee Limited and the ***Neptis Foundation*** also gratefully acknowledge the contributions of the Ontario Ministry of Natural Resources, the Niagara Escarpment Commission, and other public-sector agencies, for their permission to use their data for this report. In addition to data obtained from the Ontario Geospatial Data Exchange, several upper-tier municipalities also contributed specific data sets that have been used in the preparation of the various Greenlands maps.

Appendix A: Lower-tier Municipalities in the Study Area

Township of Adjala-Tosorontio (Simcoe)
Town of Ajax (Durham)
Township of Alnwick – Haldimand (Northumberland)
Township of Amaranth (Dufferin)
Township of Asphodel-Norwood (Peterborough)
Town of Aurora (York)
City of Barrie (Simcoe)
Town of Bradford West Gwillimbury (Simcoe)
City of Brampton (Peel)
Town of Brighton (Northumberland)
Township of Brock (Durham)
City of Burlington (Halton)
Town of Caledon (Peel)
City of Cambridge (Waterloo)
Town of Campbellford, Seymour, Percy, Hastings (Northumberland)
Township of Cavan-Millbrook-North Monaghan (Peterborough)
Township of Centre Wellington (Wellington)
Municipality of Clarington (Durham)
Township of Clearview (Simcoe)
Town of Cobourg (Northumberland)
Town of Collingwood (Simcoe)
Township of Cramahe (Northumberland)
Township of Douro-Dummer (Peterborough)
Township of East Garafraxa (Dufferin)
Town of East Gwillimbury (York)
Township of East Luther Grand Valley (Dufferin)
Town of Erin (Wellington)
Township of Essa (Simcoe)
Town of Fort Erie (Niagara)
Township of Galway, Cavendish and Harvey (Peterborough)
Town of Georgina (York)
Town of Grimsby (Niagara)
City of Guelph (Wellington)
Township of Guelph-Eramosa (Wellington)
Town of Halton Hills (Halton)
Township of Hamilton (Northumberland)
Township of Havelock-Belmont-Methuen (Peterborough)
Town of Innisfil (Simcoe)
Township of King (York)
City of Kitchener (Waterloo)
Town of Lincoln (Niagara)
Township of Mapleton (Wellington)
Town of Markham (York)
Township of Melancthon (Dufferin)
Town of Midland (Simcoe)
Town of Milton (Halton)
Town of Minto (Wellington)
City of Mississauga (Peel)
Town of Mono (Dufferin)

Township of Mulmur (Dufferin)
Town of New Tecumseth (Simcoe)
Town of Newmarket (York)
City of Niagara Falls (Niagara)
Town of Niagara-on-the-Lake (Niagara)
Township of North Dumfries (Waterloo)
Township of North Kawartha (Northumberland)
Town of Oakville (Halton)
Town of Orangeville (Dufferin)
City of Orillia (Simcoe)
Township of Oro-Medonte (Simcoe)
City of Oshawa (Durham)
Township of Otonabee-South Monaghan (Peterborough)
Town of Pelham (Niagara)
Town of Penetanguishene (Simcoe)
City of Peterborough (Peterborough)
City of Pickering (Durham)
City of Port Colborne (Northumberland)
Township of Port Hope and Hope (Northumberland)
Township of Puslinch (Wellington)
Township of Ramara (Simcoe)
Town of Richmond Hill (York)
Township of Scugog (Durham)
Township of Severn (Simcoe)
Town of Shelburne (Dufferin)
Township of Smith-Ennismore-Lakefield (Peterborough)
Township of Springwater (Simcoe)
City of St. Catharines (Niagara)
Township of Tay (Simcoe)
City of Thorold (Niagara)
Township of Tiny (Simcoe)
Township of Uxbridge (Durham)
City of Vaughan (York)
Township of Wainfleet (Niagara)
Town of Wasaga Beach (Simcoe)
City of Waterloo (Waterloo)
City of Welland (Niagara)
Township of Wellesley (Wellington)
Township of Wellington North (Wellington)
Township of West Lincoln (Niagara)
Town of Whitby (Durham)
Town of Whitchurch-Stouffville (York)
Township of Wilmot (Waterloo)
Township of Woolwich (Waterloo)

Appendix B: Definitions of Central Ontario Greenlands

Greenland Type	Definition
Provincially Significant Wetland (PSW)	For the purposes of the Provincial Policy Statement, a wetland is defined as "land that is seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of hydric plants or water tolerant plants." The four types of wetlands are swamps, marshes, bogs and fens. A *significant* wetland is one that is identified as *provincially significant* by the Ontario Ministry of Natural Resources. Specifically, a Provincially Significant Wetland (PSW) is any wetland that: 1) achieves a total score of 600 or more points, or 2) achieves a score of 200 or more points in either the Biological component or the Special Features component in the Ontario Wetland Evaluation System (OWES). A wetland is also considered a PSW if it has previously been evaluated under the first and second edition of the OWES as Class 1, 2, or 3 (out of 7 possible classes). On the Oak Ridges Moraine, significant wetlands are defined as any wetlands greater than 0.5 ha, regardless of whether or not they have been evaluated.
Locally Significant Wetland	A wetland that is evaluated under the Ontario Wetland Evaluation System, but is not considered provincially significant (i.e., scores lower than indicated above) may be designated as a *locally significant* wetland by a planning authority (i.e., municipality).
Unevaluated Wetland	A wetland that has not been evaluated using the Ontario Wetland Evaluation System.
Critical Portions of Habitat of Endangered and Threatened Species	An endangered species, as defined by the Ontario Ministry of Natural Resources, is any native species that, on the basis of the best available scientific evidence, is at risk of extinction or extirpation throughout all or a significant portion of its Ontario range if the limiting factors are not reversed. A threatened species is any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a significant portion of its Ontario range if the limiting factors are not reversed. The critical portion of the habitat of one of these species refers to the habitat that is necessary for the survival of populations of endangered and threatened species. This is determined on a case-by-case basis.
Fish Habitat	The spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Greenland Type	Definition
Significant Woodland	Woodlands are treed areas that provide environmental and economic benefits such as erosion prevention, water retention, provision of habitat, recreation, and the sustainable harvest of woodland products. Significance is based on meeting suggested standards for one or more of the following factors: woodland size, ecological functions (shape, proximity, linkages, diversity), is uncommon in the landscape (age, composition, cover type, quality, age structure), or economic and social values. Note that for woodlands within the Oak Ridges Moraine Conservation Plan area, precise definitions of Significant Woodlands have been developed by the OMNR (i.e., all woodlands greater than 0.5 ha in Natural Core and Natural Linkage Areas and all woodlands greater than 4.0 ha located in Countryside or Settlement Areas). Outside the Oak Ridges Moraine, responsibility for the identification of Significant Woodlands rests with the planning authority (i.e., municipality). Very few municipalities in Central Ontario have identified Significant Woodlands at a local or regional level.
Significant Valleylands	Valleylands are natural areas that occur in a valley or other landform depression that have water flowing through or standing for some period of the year. The identification of significant valleylands is the responsibility of the planning authority; in most municipalities/regions this has not occurred. Note that for valleylands within the Oak Ridges Moraine Planning Area more precise definitions have been developed. Outside the Oak Ridges Moraine, responsibility for the identification of Significant Valleylands rests with the planning authority (i.e., municipality).
Significant Wildlife Habitat	Wildlife habitat is identified as "areas where plants, animals, and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations." Specific wildlife habitats of significance may include areas where species concentrate at a vulnerable point in their annual cycle; and areas that are important to migratory and non-migratory species. It 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. Criteria for determining significance may be recommended by the Province, but municipal approaches that achieve the same objective may also be used. As is the case with Significant Woodlands and Significant Valleylands, a planning authority (i.e., municipality) is responsible for identifying Significant Wildlife Habitat, although to our knowledge this has not yet been done anywhere in South-Central Ontario.
Area of Natural and Scientific Interest (ANSI)	Areas of land and water containing natural landscapes or features that have been identified (by the Ministry of Natural Resources) as having life science or earth science values related to protection, scientific study, or education. ANSIs are either Life Science or Earth Science.
Provincially Significant ANSI	A provincially significant ANSI is one that is identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province.
Regionally Significant ANSI	A regionally significant ANSI is any ANSI that is not identified as provincially significant by the Ministry of Natural Resources.

Greenland Type	Definition
Environmentally Significant Area or Environmentally Sensitive Area (both referred to as ESA)	A natural area identified by a municipality or Conservation Authority as fulfilling certain criteria for ecological significance or sensitivity. ESAs, regardless of type, tend to be treated in much the same manner from a policy perspective. In some cases, municipal Official Plans will assign policy protection to ESAs.
Conservation Area	Areas in southern Ontario owned and managed by Conservation Authorities. These areas are open to the public and are maintained for recreation, natural heritage preservation, and water control purposes.
Escarpment Natural Area	Within the Niagara Escarpment Plan area, Escarpment Natural Area is the most protected of seven land use designations, each of which has its own objectives, criteria for designation, and permitted uses. The objectives of Escarpment Natural Area are to: maintain the most natural Escarpment features, stream valleys, wetlands, and related significant natural areas and associated cultural heritage features; to encourage compatible recreation, conservation, and educational activities; and to maintain and enhance the landscape quality of Escarpment features.
Provincial Park	Provincial Parks are areas of land and water managed for the benefit of present and future generations and dedicated to the people of Ontario and others who may use them for their healthful enjoyment and appreciation. The overall goal of the Provincial Park system is to provide a variety of outdoor recreation opportunities, and to protect provincially significant natural, cultural, and recreational environments.

Appendix C: Glossary of Acronyms

ANSI	Area of Natural and Scientific Interest
CA	Conservation Authority
DFO	Department of Fisheries and Oceans
EBR	Environmental Bill of Rights
EIS	Environmental Impact Study
ESA	Environmentally Significant Area; Environmentally Sensitive Area
ESPA	Environmentally Significant Policy Area
GIS	Geographic Information Systems
GTA	Greater Toronto Area
HADD	Harmful Alteration, Disruption and Destruction
HSF	Hydrologically Sensitive Feature
KNHF	Key Natural Heritage Feature
LIO	Land Information Ontario
LSW	Locally Significant Wetland
MMAH	Ministry of Municipal Affairs and Housing
MOSS	Major Open Space System
NEC	Niagara Escarpment Commission
NEP	Niagara Escarpment Plan
NHE	Natural Heritage Evaluation
NRVIS	Natural Resource Values Information System
OGDE	Ontario Geospatial Data Exchange
OMB	Ontario Municipal Board
OMNR	Ontario Ministry of Natural Resources
OP	Official Plan
OPA	Official Plan Amendment
ORM	Oak Ridges Moraine
ORMCA	Oak Ridges Moraine Conservation Act
ORMCP	Oak Ridges Moraine Conservation Plan
OWES	Ontario Wetland Evaluation System
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
UNESCO	United Nations Educational, Scientific and Cultural Organization
VPZ	Vegetation Protection Zone

References

Bakowsky, W,1996. Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario. Natural Heritage Information Centre, Ontario. Ministry of Natural Resources. Peterborough, Ontario. 21 pp.

Beier, P., and R.F. Noss, 1998. Do habitat corridors provide connectivity? Conservation Biology 12: 896-909.

Central Ontario Smart Growth Panel, 2003. Shape the Future – Central Ontario Smart Growth Panel. Final Report. April 2003. 97 pp.

Chapman L.J., and D.F. Putnam, 1984. The Physiography of Southern Ontario, Third Edition. Ontario Geological Survey Special Volume 2. 270 pp.

City of Toronto, 2002. Toronto Official Plan. Adopted by City Council November 2002.

City of Toronto and Toronto and Region Conservation Authority, 2001. City of Toronto Natural Heritage Study – Final Report. 104 pp + appendices and maps.

Coleman, J., and K. Cornelisse, 1995. A Guide to the Fish Habitat Protection Guidelines. Department of Fisheries and Oceans.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 2002. Species Listing, Terms and Risk Categories: www.cosewic.gc.ca

Committee on the Status of Species At Risk in Ontario (COSSARO), 1998. Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario. Ontario Ministry of Natural Resources.

County of Peterborough, 1994. County of Peterborough Official Plan.

County of Simcoe, 2000. The County of Simcoe Official Plan. Approved by MMAH on April 1, 1998. June 2000. 75 pp.

County of Victoria, 1999. Official Plan. Office Consolidation as Approved to May 1999.

County of Wellington, 1998. County of Wellington Official Plan.

Credit Valley Conservation, 1995a. Credit Watershed Natural Heritage Project, Terms of Reference, Background and Approach.

Department of Fisheries and Oceans Canada, 2002. Canada's *Fisheries Act*: The Habitat Protection and Pollution Prevention Provisions of the *Fisheries Act*. www.dfo-mpo.gc.ca/habitat

Ecologistics Limited, 1982. Environmentally Significant Areas Study. Prepared for the South Lake Simcoe Conservation Authority.

Environment Canada, Ontario Ministry of Natural Resources and Ontario Ministry of the Environment, 1998. A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern. Canada-Ontario Remedial Action Plan Steering Committee. 76 pp.

Fraser, D.M., 2003. Greenlands in Central Ontario: An Issues Paper. Prepared for The Neptis Foundation and the Central Ontario Smart Growth Panel.

Freemark, K., and B. Collins, 1992. Landscape ecology of birds breeding in temperate forest fragments. pp. 443-451. *In* J.M. Hagen and D.W. Johnston (eds.). Ecology and Conservation of Neotropical Migrant Landbirds. The Manomet Bird Observatory.

Gartner Lee Associates Limited, 1978. Environmental Sensitivity Mapping Project for the Central Lake Ontario Conservation Authority.

Gartner Lee Limited, 1994. A Greenlands System for York Region. Prepared for the Regional Municipality of York Planning Department.

Gartner Lee Limited, 1996. Development of a Natural Heritage System for the County of Simcoe. Prepared for the County of Simcoe. 62 pp.

Gartner Lee Limited, 2002. Rationale and Methodology for Determining Significant Woodlands in the Regional Municipality of Halton. Prepared for the Regional Municipality of Halton.

Geomatics International, 1978. Environmentally Sensitive Areas Study. Halton Region Conservation Authority.

Geomatics International, 1991. Environmentally Sensitive Areas Study. Addendum Report.

Geomatics International, 1993a. Environmentally Sensitive Area Study, Addendum Report – Phase 2. Regional Municipality of Halton, Planning Department. 352 pp.

Geomatics International, 1993b. Environmentally Sensitive Areas Study. Addendum Report – Phase 3.

Gould, J., 1989. Life Science Areas of Natural and Scientific Interest in Site District 7-3 Outside the Niagara Escarpment Planning Area: Review and Assessment of Significant Natural Areas. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Central Region, Richmond Hill.

Government of Ontario, 1990. Niagara Escarpment Planning and Development Act, R.R.O. 1990, Regulation 826, amended to O. Reg. 217/02

Government of Ontario, 1997. Provincial Policy Statement. Revised February 1, 1997.

Hanna, R., 1984a. Life Science Areas of Natural and Scientific Interest in Site District 6-6: A Review and Assessment of Significant Natural Areas in Site District 6-6. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Central Region, Richmond Hill.

Hanna, R., 1984b. Life Science Areas of Natural and Scientific Interest in Site District 6-8: A Review and Assessment of Significant Natural Areas in Site District 6-8. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Central Region, Richmond Hill.

Heagy, A. E. 1995. Hamilton-Wentworth Natural Areas Inventory Volume 1. Hamilton, Ontario. Hamilton Naturalists' Club.

Hunter and Associates, 1996. Hydrogeologic Evaluation of the Oak Ridges Moraine. Part of Background Report No. 3 for the Oak Ridges Moraine Planning Study.

IBI Group, 2002. Toronto-Related Region Futures Study: Interim Report – Implications of Business-As-Usual Development. Prepared for the Neptis Foundation in association with Dillon Consulting Limited. Toronto, Ontario.

Jalava, J.V., 2000. The Big Picture Project: developing a natural heritage vision for Carolinian Canada. Ontario Natural Heritage Information Centre Newsletter 6(1): 1-6.

Jones, M., 2001. Delineation of Proposed Oro Moraine Planning Boundaries. Memorandum from M. Jones (Azimuth Environmental Consulting) to A. Leigh, Township of Oro-Medonte. 6pp.

Kanter, R, 1990. Space For All: Options for A Greater Toronto Area Greenlands Strategy. 164 pp.

Lindsay, K.M., 1984a. Life Science Areas of Natural and Scientific Interest in Site District 6-7: A Review and Assessment of Significant Natural Areas in Site District 6-7. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Central Region, Richmond Hill. Ontario Ministry of Natural Resources. Richmond Hill, Ontario.

Lindsay, K.M., 1984b. Life Science Areas of Natural and Scientific Interest in Site District 6-13: A Review and Assessment of Significant Natural Areas in Site District 6-13. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Central Region, Richmond Hill. Ontario Ministry of Natural Resources. Richmond Hill, Ontario.

Macdonald, I.D., 1986. Life Science Areas of Natural and Scientific Interest in Site District 5-7, in Huronia District. Ontario Ministry of Natural Resources. Richmond Hill, Ontario.

McMurtry, M., J. Riley, P. Sorrill, and T. Sorrill, 2002. Summary of Methodology for Big Picture. Ontario Ministry of Natural Resources and Nature Conservancy of Canada. 11 pp.

Metropolitan Toronto and Region Conservation Authority, 1982. Environmentally Significant Areas Study.

Metropolitan Toronto and Region Conservation Authority, 1992. Valley and Stream Corridor Management Program.

Natural Heritage Information Centre, 1994. Natural Heritage Resources of Ontario: Amphibians, Birds, Butterflies, Freshwater Fishes, Mammals, Mollusks, Mosses, Vascular Plants, and Reptiles (Dragonflies in prep.) Compiled by M.J. Oldham and D.A. Sutherland.

Niagara Escarpment Commission, 1994. The Niagara Escarpment Plan. Office Consolidation, September 2003. Halton Hills, Ontario.

Noss, R.F., 1983. A regional landscape approach to maintain diversity. Bioscience 33: 700-706.

Noss, R. F., 1987. Protecting natural areas in fragmented landscapes. Natural Areas Journal 7: 2-13.

Oak Ridges Moraine Technical Working Committee, 1994. The Oak Ridges Moraine Area Strategy for the Greater Toronto Area. 106 pp.

Ontario Ministry of Municipal Affairs and Housing, 2002a. Oak Ridges Moraine Conservation Plan (ORMCP). O. Reg. 140/02. Made under the Oak Ridges Moraine Conservation Act. 73 pp.

Ontario Ministry of Municipal Affairs and Housing, 2002b. Five-Year Review of the Provincial Policy Statement: A Summary of Consultations. Toronto.

Ontario Ministry of Natural Resources, 1976. Ontario Provincial Parks Policy. Parks and Recreational Areas Branch.

Ontario Ministry of Natural Resources, 1987. Implementation Strategy: Areas of Natural and Scientific Interest. Parks and Recreational Areas Branch, Outdoor Recreation Group. 19 pp.

Ontario Ministry of Natural Resources, 1993. Ontario Wetland Evaluation System. Southern Manual, 3rd edition. NEST Technical Manual TM-002. Peterborough, ON. 177 pp.

Ontario Ministry of Natural Resources, 1994. Land Use Patterns on the Oak Ridges Moraine Area within the GTA: Background Study #1.

Ontario Ministry of Natural Resources, 1999. Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement. 127 pp.

Ontario Ministry of Natural Resources, 2000. Significant Wildlife Habitat Technical Guide. 151 pp. plus appendices.

Ontario Ministry of Natural Resources, 2004. Crown Land Use Policy Atlas. MNR website: www.mnr.gov.on.ca

Ouellet, P., 1991. An Assessment of the Effectiveness of Environmentally Sensitive Policy Areas in the Regional Municipality of Waterloo: 1978-1990. Master of Arts Thesis, University of Waterloo.

Parish Geomorphic, 2002. Trafalgar Moraine Delineation, Town of Oakville. Prepared for Town of Oakville. 21 pp.

Region of Hamilton-Wentworth, 1994. Towards a Regional Greenlands System: Discussion Paper. Planning & Development Department. 36 pp. + appendices.

Region of Peel, 2001. Official Plan. Office Consolidation. Planning Department. May 2001. 116 pp.

Regional Municipality of Durham. 1993. Official Plan. Office Consolidation.

Regional Municipality of Halton, 1995. Halton Region Official Plan.

Regional Municipality of Niagara, 2000. Regional Niagara Policy Plan. Office Consolidation. Publication No. 91. January, 2000.

Regional Municipality of Waterloo, 1998. Regional Official Policies Plan. Consolidation. December 1998.

Regional Municipality of York, 1999. York Region Official Plan. Office Consolidation (as of July 13, 1999). 91 pp. + maps.

Riley, J. and P. Mohr, 1994. The Natural Heritage of Southern Ontario's Settled Landscapes. Technical Report TR-001. Ontario Ministry of Natural Resources. Southern Region, Aurora. 78 pp.

Rowe, J.S., 1972. Forest Regions of Canada. Department of the Environment, Canadian Forestry Service, Publication No. 1300.

Simberloff, D., J.A. Farr, J. Cox, and D.W. Mehlman, 1992. Movement corridors: conservation bargains or poor investments? Conservation Biology 6:493-504.

Walton, M., 2002. Agriculture in the Central Ontario Zone: An Issues Paper. Prepared for the Neptis Foundation and the Central Ontario Smart Growth Panel.

Waterfront Regeneration Trust. 1996. Shoreline Management Strategy for the Lake Ontario Greenway.