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# Past, Present And Possible: Toward An Integrated Approach For Natural Heritage Conservation

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**PAST, PRESENT AND POSSIBLE:  
TOWARD AN INTEGRATED APPROACH FOR NATURAL HERITAGE  
CONSERVATION**

by

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in partial fulfillment of the requirements for the degree of

Master of Planning  
in Urban Development

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Master of Planning  
in  
Urban Development  
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**ABSTRACT**

The Greenway Initiative, proposed by Ontario Nature, endeavours to reconnect the province's fragmented natural landscapes through a system of cores and corridors. Non-governmental organizations like Ontario Nature are leading the effort to conserve the province's natural heritage through public-private incentive-based tools including conservation easements and stewardship agreements. The rationale to incent conservation through public-private partnerships is to overcome the politically- and financially- unfavourable consequences that limit the effectiveness of regulatory approaches to achieve conservation objectives at the local scale. However, public-private incentive-based conservation tools also generate trade-offs that maintain the need for traditional regulatory approaches. This paper argues that in addition to established public instruments, incentive-based conservation tools to promote stewardship on private land are necessary to achieve broader conservation objectives. With a combination of public, private and third sector approaches, an integrated set of strategies is recommended, in which planning choices and trade-offs are made clear.

Key words: Planning, Natural Heritage, Public-Private Partnerships, Conservation

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Sincerely,  
Lily

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## 1.0 Introduction

A confluence of factors has contributed to a renewed interest in greenways as a land use planning tool. The integration of ecosystem principles in land use planning, for instance, encourages planners to conceptualize contemporary land use issues from multiple scales and perspectives, acknowledging their complex and systematic character. Moreover, there is a growing awareness that natural heritage – the abiotic and biotic features of a landscape – provide the underlying infrastructure that sustains social and ecological systems. Both factors have refreshed the approach employed to protect and conserve ‘green spaces’. As such, this approach to manage land use more sustainably is challenging common opinions of green spaces as simply undeveloped land. In response, the current paradigm of sustainable development in land use planning has motivated a regional planning strategy to reduce the negative ecological impacts associated with urbanization such as landscape fragmentation, habitat destruction and biodiversity loss.

In Ontario this regional planning strategy consists of complementary policies to manage the growth of human settlements and those that protect ecologically significant natural landscapes from encroaching development. Central to this regional planning approach is the use of a greenbelt as an environmental planning tool. This tool to manage growth in Ontario represents a policy shift in land use planning that recognizes the importance of conserving the ecological functions and features that make up the province’s natural heritage. Arguably, this regional approach is only the first step to conserving natural heritage throughout the province and necessitates re-scaling the focus of natural heritage conservation.

Given that landscapes, and the ecosystems they support, are intrinsically dynamic, there is a need to advance natural heritage conservation planning by establishing linkages between existing protected zones and other fragmented natural landscapes caused by decades of unrestricted urban development (Waltner-Toews, Kay and Lister, 2008). Ontario Nature, an environmental non-

governmental organization (ENGO) dedicated to conservation, proposes to scale-up the vision for natural heritage conservation through its Greenway Initiative. The Greenway Initiative endeavours to reconnect the province's fragmented natural heritage landscapes through a system of cores and corridors. This use of a greenway as an environmental planning tool contains three strategies:

- preserving significant natural landscapes by land acquisition;
- promoting stewardship on privately owned land to create a network of natural landscapes;
- influencing land use policies to ensure that scientifically-assessed significant natural landscapes are identified and preserved.

Of interest here is the second strategy and the need to motivate private landowners to conserve and steward natural heritage on their properties. Accordingly, the focus of this paper is assessing the role of incentives for private stewardship to achieve broader conservation objectives in contemporary planning practice.

### **1.1 The need for incentive-based conservation tools**

The tradition of land use development is based on a separation between 'culture' and 'nature'. The culture/nature duality is arguably itself a cultural construct and a 'contemporary expression' of reductionist thinking in western civilization (Plumwood, 2006). Within this expression, the agency and autonomy of natural systems has been overlooked or altogether denied (Plumwood, 2006). The result is a cultural system that views natural systems as passive entities. Nature has consequently been treated as an externality to everyday activities and transactions, including development practices, particularly in a market-structured society. Conventional land use developments are reflective of this separation by way of short-term economic growth strategies that undervalue natural processes, or entirely exclude them in their economic calculus (Tucker, 2010). Plumwood (2006) argues that the primary challenge to bridge the conceptual divide between nature and culture is to value nature for the goods and services that are integral to the survival of all living systems.

Growing awareness of the connection between culture and nature as well as the application of ecological principles to a variety of policy areas, including land use management, are beginning to transform how humans view their relationship to the natural environment. The relationship between anthropocentric activities and climate change, for instance, inspired the sustainable development movement. Principles of sustainable development have subsequently been integrated in land use policies and plans including Ontario's Growth Plan for the Greater Golden Horseshoe, 2006. Despite the integration of ecological principles in legislation and policies governing land use, the 'institutional challenge' to promote land use practices that internalize the value of natural heritage is that the benefit of doing so is inherently a public good (Goldman et al., 2007). Public goods have two basic characteristics "1) they are non-rival (everyone can benefit from the good without diminishing others' enjoyment...2) they are non-excludable" (Goldman et al., 2007: 334).

Given the public interest of natural heritage preservation, the government, whether federal, provincial or municipal, has traditionally maintained responsibility for achieving conservation objectives. In fact, Hilts (1993) maintains that Canadians rely on the government to maintain the public tradition of conservation, which has historically been facilitated through a relatively robust land use planning system. However recreating a network of linked landscapes that conserve natural heritage requires participation and support from a variety of stakeholders and proprietors given that land in Ontario is publically and privately owned. In Southern Ontario for instance, less than five percent of the ecologically significant Carolinian Canada landscape is publically-owned (Carolinian Canada[b], n.d.).

The forested region in Southern Ontario known as Carolinian Canada is often cited as an example of how urbanization has been consequential to the loss of natural heritage. The reason for this is that Carolinian Canada once covered the area "running south from an imaginary line between Toronto in the east to Grand Bend on the shores of Lake Huron in the west" (Kylie, 2012). This area is "the northernmost edge of the deciduous forest region in eastern North America, and is named after the



Figure 1, Carolinian Canada, depicted in green, is the northernmost edge of the deciduous forest region in eastern North America.

Carolina states” in the US (Carolinian Canada, n.d.). However the pattern of urban and agricultural development throughout Southern Ontario – Canada’s largest urbanized area constituting 25 percent of the country’s population – has reduced the Carolinian forest cover by 90 percent (Carolinian Canada, n.d.; Kylie, 2012). The residual forest areas are “too fragmented and small to be suitable habitat for many native [plant

and] animal populations” and therefore contains species of flora and fauna that are regionally

endangered, threatened or of special concern (Kylie, 2012). As such, the Carolinian Canada forest zone is considered Ontario’s “most threatened ecological region” (Carolinian Canada, n.d.).

Carolinian Canada is valued for its natural heritage features and functions, particularly the diversity of the species that it supports. Data from the Canadian Wildlife Federation notes that the Carolinian forest “hosts 70 species of deciduous trees and some 2,200 species of grasses, ferns, sedges and other herbaceous plants. It’s also home to more than 40 per cent of Canada’s nationally at-risk species, including the five-lined skink, the Kentucky coffee tree, the spotted turtle and the Acadian flycatcher” (Kylie, 2012). Despite being Canada’s smallest vegetation zone, Carolinian Canada supports more species of flora and fauna “than any other ecosystem in” the country (Carolinian Canada, n.d.).



Figure 2, Biodiversity in Carolinian Canada.

Incentives to encourage natural heritage protection and stewardship on private land are therefore increasingly being used as a tool to achieve broader conservation objectives. The argument is that without intervention from third sector organizations like Ontario Nature through public- private partnerships and incentive-based tools there is no rationale for private landowners to adopt behaviours or practices that utilize their own resources for the benefit of the public. However financial incentives, the preferred public-private conservation tool, to conserve natural heritage also incur several trade-offs in their application.

## **1.2 What is natural heritage?**

This paper hinges on the concept of natural heritage as the focus of landscape conservation given that ‘heritage’ is generally understood as a legacy to ‘inherit, maintain and bequeath’. The Provincial Policy Statement (PPS), the policy vision for land use in Ontario, refers to natural heritage as “a system made up of *natural heritage features and areas*, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include lands that have been restored and areas with the potential to be restored to a natural state” (Ministry of Municipal Affairs and Housing, 2005: 33).

The emphasis in this definition is the relationship between the landscape and the ability of natural features, both biotic and abiotic to function as a system. Natural heritage is a broad concept that is inclusive of other conceptual frameworks that advocate for the preservation of natural features such as biological diversity (biodiversity), green infrastructure and natural capital. This description also reflects the integration of spatial and temporal scales in land use management, such as the intergenerational equity principles of sustainability. The provincial definition however refers to ‘significant’ natural features where significant implies that certain features are prioritized over others due to the character of the functions they perform and are identified by science-based provincial evaluation procedures.

### **1.3 Objectives**

This paper examines the potential application of incentive-based conservation tools to achieve a province-wide greenway, as envisioned by Ontario Nature. It is argued that, in addition to established public instruments, incentive-based conservation tools to promote stewardship on private land are also necessary to achieve broader conservation objectives. With a combination of public, private and third sector approaches, an integrated set of strategies is recommended, in which planning choices and trade-offs are made clear.

The paper begins with an overview of greenways as an environmental planning tool in Section 2. The regulatory framework for land use planning as it relates to natural heritage follows in Section 3. Section 4 presents an analysis of the prevailing incentive-based conservation tools. Subsequently, a discussion synthesizing the findings of the previous three sections is presented in Section 5, before the conclusion in Section 6.

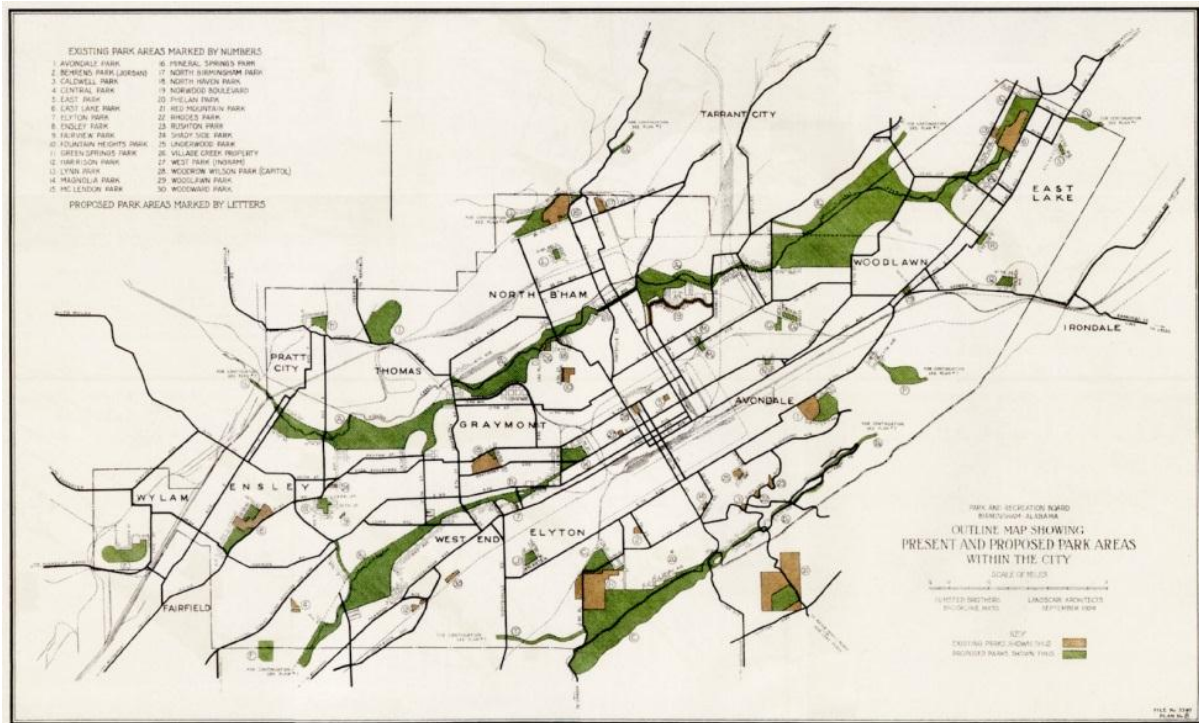
## **2.0 Greenways – the past, present and possible**

There is a renewed interest in greenways as a planning tool in a contemporary land use practice. They are being planned in response to a variety of social and environmental issues. This section attempts to locate Ontario Nature's Greenway Initiative within the evolving 'greenway movement'. The objective is to provide a refreshed understanding of the need and relevance for greenway planning initiatives within the context of competing land uses.

### **2.1 Form follows function: a brief history of greenway planning and design**

Hellmund and Smith maintain that almost all greenway interventions are initiated "because people perceive a problem in the landscape" (2006: 10). These problems are often associated with the development patterns of urban areas that contribute to the loss of cultural and natural heritage, the fragmentation and isolation of landscapes, and the disruption of ecological functions and systems. A review of academic literature from the fields of landscape architecture and urban planning confirm that greenways emerged as a planning tool to balance the land use pressures of urban development in the late 19<sup>th</sup> century (Fabos, 1995; Taylor et al., 1995; Hellmund and Smith, 2006; Fung and Conway, 2007; Waldheim, 2010). They were originally designed to preserve the cultural heritage of an increasingly urban population, but have since evolved to include environmental and ecological considerations. Regardless of the rationale for intervention, greenways continue to be used as a tool to mitigate the negative impacts associated with urban development (Searns, 1995).

Linear green spaces were first used by the American landscape architect Frederick Law Olmsted during the 1860s as a means to provide urban residents with connections to city parks (Fabos, 1995; Hellmund and Smith, 2006; Searns, 1995). He designed tree-lined pathways, which he referred to as parkways, to link parks and neighbourhoods to each other "as a conscious attempt to reintroduce nature into the city" (Searns, 1995: 67). The intention was to "reconcile the seemingly contradictory impulses of the industrial metropolis with the social and cultural conditions of agrarian settlement"



**Figure 3, Frederick Law Olmsted's use of greenways for regional connectivity in Birmingham, Alabama.**

(Waldheim, 2010). The logic behind the intention was that urban greenways and parks would mediate the negative effects of urban lifestyles that were perceived as a threat to the agrarian ethic (Miller, 1976; Lubove, 1990). As such, Olmsted used his designs for urban greenways and parks as a medium to preserve the “traditional American values, formulated ... by agrarian republicans” that revered nature (Miller, 1976: 186). Although Olmsted believed that urban greenways and parks were necessary for the social and moral welfare of urban populations, he justified the need for them through utilitarian and economic arguments such as the increased value of adjacent properties (Lubove, 1990). In this sense, Olmsted’s parkways “established an early and strong precedent for the idea of using greenways to accommodate multiple uses” and benefits to urban populations (Hellmund and Smith, 2006: 26).

An expansion of the concept that developed independently emerged through the work of Ebenezer Howard and his Garden City plan. Howard’s Garden City aimed to synthesize the benefits of town and country life through the integration of land uses. His plan included “belts of rural land to limit urban sprawl and to tie the city and country together” (Hellmund and Smith, 2006: 26). Olmsted and



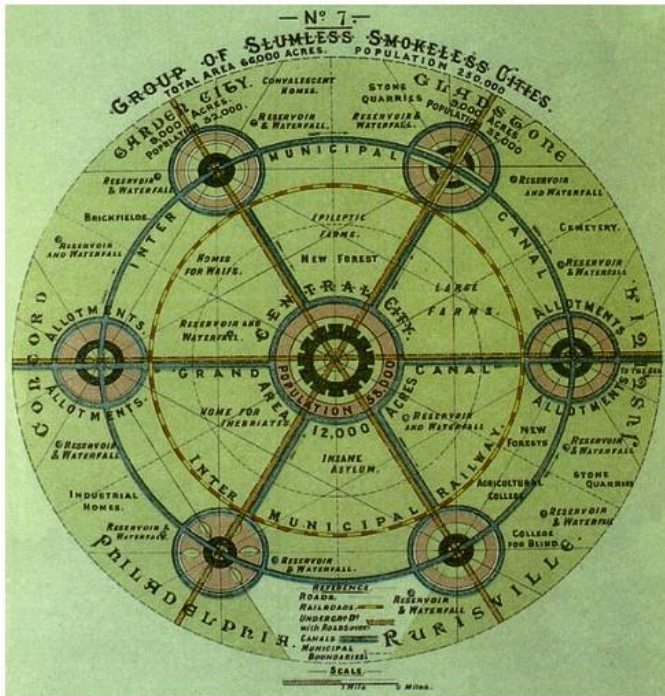


Figure 4, Ebenezer Howard's Garden City Plan.

Howard both employed greenways as a planning tool to preserve cultural values that were being displaced by the rapid pace of urbanization during the industrial revolution. Accordingly, Howard's use of greenbelts was also multifunctional in their design as they preserved agricultural land near urban areas while containing urban expansion into the countryside (Carter-Whitney, 2010). Searns (1995) refers to these early examples of parkways and

greenbelts as the first generation (pre-1700s to 1960s) of the greenway concept.

The second generation (1960s to 1985) of greenways primarily functioned as recreational trails in urban settings providing residents with connections to rivers, parks, and other public spaces insulated from automobiles (Searns, 1995: 66). Many of these greenway corridors are examples of the adaptive re-use of abandoned infrastructure such as railway lines (Searns, 1995). These recreational amenities continue to provide urban residents with opportunities to experience natural ecosystems in built-up areas.

The third generation of greenways (1985 to present) have evolved to integrate additional functions in their design, influenced by other fields of study. For instance, understanding the impact of fragmented and isolated landscapes has contributed to the integration of systems-based and ecological principles in greenway planning, building on the original urban design concept. Hellmund and Smith, for example, note that the work of Robert MacArthur and Edward Wilson pertaining to island biogeography resulted in the application of greenways as movement corridors for flora and fauna. Greenways as



**Figure 5, The West Toronto Rail Path (left) and the High Line in New York are contemporary examples of recreational greenways.**

corridors “make intuitive sense. If the landscape [is] being increasingly fragmented, then saving or reinstating connections for” different species would, in theory, address concerns pertaining to extinction or extirpation associated with isolated habitats (Hellmund and Smith 2006: 31).

There is however a cautionary note to this premise. Empirical studies have demonstrated that the benefits of corridors as linkages between fragmented, ‘core’ landscapes depend on the species and quality of the landscapes being protected, as “connectivity is both species- and landscape-specific” (Noss, 2006: 71). The reason for this is that creating linkages between isolated landscape patches benefits some species over others. In some instances, one species may benefit from enhanced connectivity between isolated habitats at the expense of another species (Noss, 2006). The quality of the patches being connected should also be considered. For example, establishing a corridor between a landscape patch valued for the presence of desirable native species of vegetation to a landscape patch that has been degraded by frequent use and the occurrence of undesirable ‘invasive’ species will contribute to the degradation of the first patch (Noss, 2006; King, 2012). As a conservation biologist, Noss even maintains that the objective of reconnecting fragmented landscapes should be strategic and not “encourage the dispersal of all species” (2006: 86). As such, designing greenways as corridors to facilitate the movement of flora and fauna, between core natural areas, requires a collaborative approach involving biologists, ecologists and land use planners.

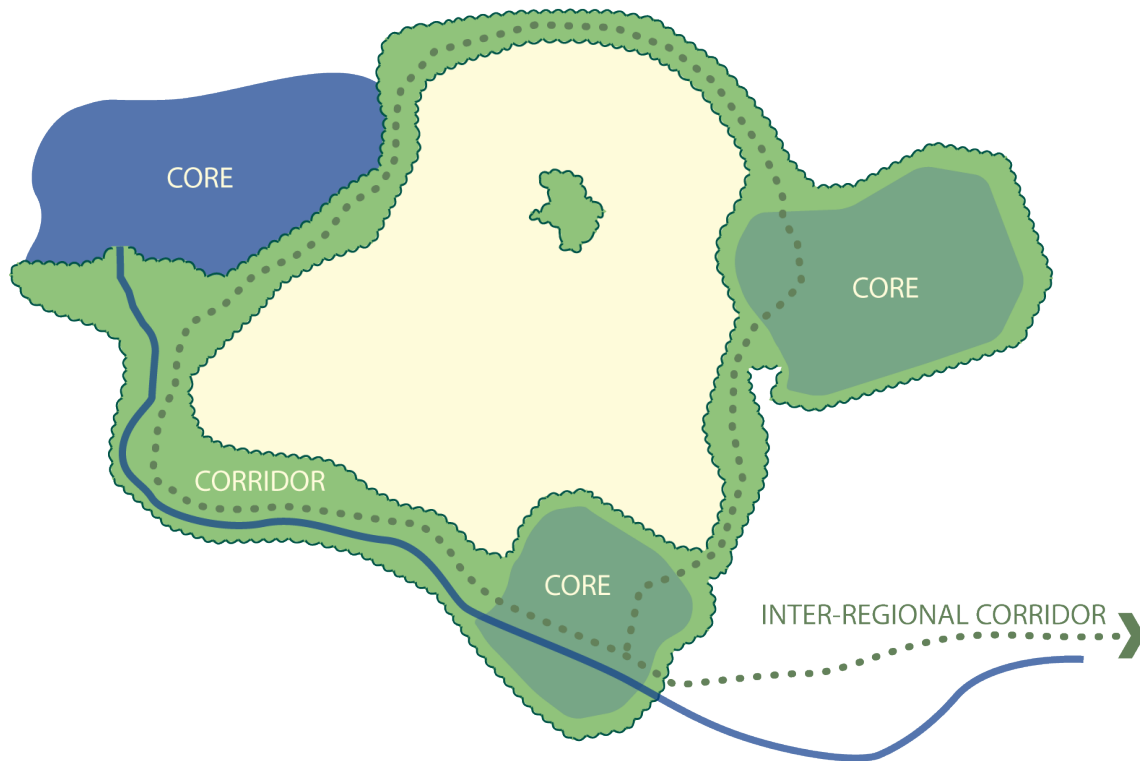


Figure 6, A greenway system of cores and corridors.

The conceptualization of natural heritage as ‘green’ infrastructure has also contributed to the evolution of greenway form and function. Green infrastructure is generally understood as the goods and services that result from naturally occurring processes in ecosystems. This conceptualization adopts a utilitarian perspective that values natural heritage for the benefits provided by particular processes (Hellmund and Smith, 2006). Benedict and McMahon similarly describe green infrastructure as “green space...that is planned and managed for its natural resource values and for the associated benefits it confers to human populations” (2006: 3). For instance, vegetated landscapes are valued for the storm water management and water filtration functions they provide, particularly in urban settings, where they have the potential to reduce the demand on municipal ‘gray’ infrastructure. As permeable surfaces, vegetated landscapes allow water to percolate through the landscape as opposed to non-permeable surfaces like paved roads that direct water to sewers, which can be overwhelmed during storm events. Conceptualizing natural heritage as green infrastructure can therefore be viewed as a contemporary design response to landscape issues. An important implication of conceptualizing natural heritage in this

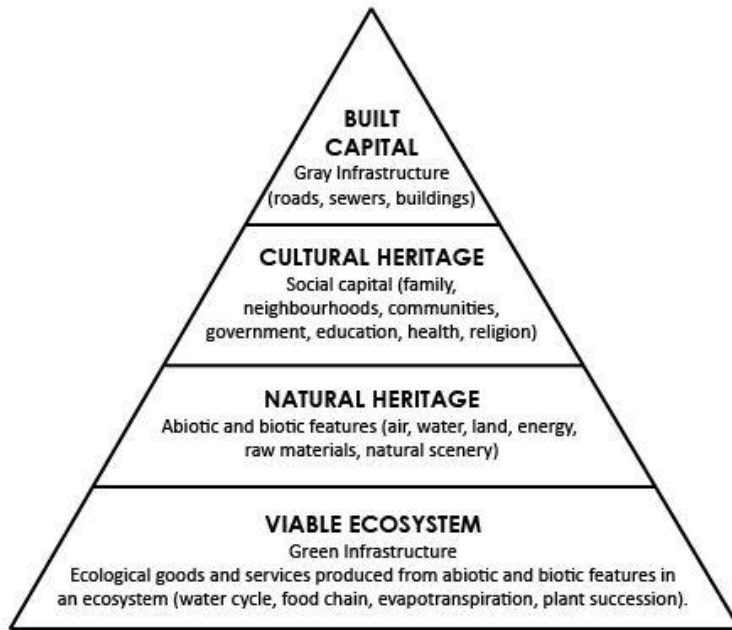


Figure 7, Green Infrastructure as the base of natural and social systems.

way is that ecosystem functions “should be considered as carefully as gray infrastructure, such as roads and utility lines” (Hellmund and Smith, 2006: 34). Qualifying ecosystem functions as infrastructure reflects their relatively recent acceptance as the foundation of all other structures, including social and economic systems.

However, fragmented and isolated landscapes caused by urbanization, also disrupt ecosystem functions and impair their green infrastructure capabilities. As a result, there has been a corresponding progression in greenway design “from planning individual greenways to networks of greenways” to provide the connectivity ecosystems require to maintain their natural functions and processes (Hellmund and Smith, 2006: 34).

The application of ecosystem principles in greenway planning has led to the design of greenways as a network of natural landscapes. Hellmund and Smith explain that undeveloped landscapes are “naturally filled with connections and interactions” (2006: 4). Accordingly, sustaining ecosystem functions in landscapes that are increasingly fragmented by urban or agricultural development depends on the structure of the remaining undeveloped landscapes and their ‘functional connectivity’ as referred to by Noss (2006: 71). The argument is that while it makes sense to conserve natural landscapes, the quantity of land protected is not sufficient to ensure conservation objectives. The structure of the residual undeveloped landscapes and their relationship to ecological processes merits equal consideration in greenway design (Hellmund and Smith, 2006). This argument also suggests that

greenway interventions should be analyzed from different scales as ecological processes are dynamic and change over time and space (Noss, 2006).

Greenways, in present-day planning practice can be understood as a tool to mitigate or renew the loss of natural landscapes caused by development. The need and relevance of greenway interventions is to designate space amongst competing land uses to provide “the physical conditions necessary for ecosystems and species populations to survive in a human-dominated landscape” (Hellmund and Smith, 2006: 34). Accordingly, greenways have evolved to incorporate multi-function objectives to retain cultural heritage and local history, contain urban sprawl, provide urban residents with opportunities for recreation, and more recently to protect natural heritage and sustain ecological functions (Fung and Conway, 2007; Searns, 1995; Taylor et al., 1995). These functions can be organized within one of three principle categories with overlapping qualities described by Fabos (1995) – ecological greenways, recreational greenways and historical heritage and cultural greenways. The physical structure and form of greenways has incidentally changed from the linear pathways first modeled by Olmsted and Howard based on human-scale connections to more recent examples designed with ecological and watershed principles. Changes in greenway form have therefore paralleled changes in greenway function.

## **2.2 Greenways, what are they?**

This brief history alludes to some of the defining characteristics of greenways, although an exact definition is problematic due to the variety of greenway forms and functions (Searns, 1995). There is also some discord within the literature as to whether greenways and greenbelts are transposable concepts. Searns, for instance, maintains that they are not as “greenbelts [function to] primarily buffer and separate” whereas greenways invite movement along them (1995: 68). Fung and Conway (2007) however maintain that the terms greenway and greenbelt are often used interchangeably in landscape and planning literature. Taylor et al. (1995) suggest that the evolving form and function correspond to

the distinction “from greenbelt to greenways”. Despite this, greenways are geographically defined and legible landscapes, recognized on the basis of “official designation... or popular identification, as distinct areas” with identifiable qualities (Hellmund and Smith, 2006: 1). As such, greenways can function as a corridor, or a networks of corridors “designed and managed for multiple purposes...with an overall aim of sustaining the integrity of the landscape, including both its natural (biophysical) and social components” (Hellmund and Smith, 2006: 4). Greenways are also characterized as corridors for movement “for people, for animals, for seeds, and often, for water” (Searns, 1995: 66). These corridors may in turn be used as spaces in and of themselves, such as habitat in the case of corridors connecting fragmented undeveloped landscapes (Noss, 2006). Moreover, greenway form continues to progress from “individual greenways to networks of greenways ... called ecological networks” (Hellmund and Smith, 2006: 32). This is where Ontario Nature’s Greenway Initiative fits in.



Figure 8, Examples of greenway form and function.

### **2.3 A greenway for Ontario**

The Greenway Initiative proposed by Ontario Nature continues to build upon contemporary examples of greenways, but also marks a departure from them as well. The focus of Ontario Nature's Greenway Initiative is to restore and enhance the province's natural heritage by linking "key natural areas or 'cores' with "natural passageways or 'corridors'" (n.d.).

The Greenway Initiative is an ecologically-based approach that is also a departure from current examples of greenway interventions due to the scale of the proposed greenway's form. Ontario Nature's vision for a greenway aims to restore an ecological network of existing natural or planned greenways by means of corridors, throughout the province, not just in rural areas adjacent to urban developments. Another feature that distinguishes this Greenway Initiative from contemporary examples is that the primary function is to protect and restore natural heritage. As such, greenways designed to conserve ecosystem functions can be conceptualized as a system of cores connected by corridors.

Ontario Nature has three strategies to implement this proposed vision – preserving significant landscapes by land acquisition, promoting stewardship on privately owned land and influencing land use policies. The second strategy is the focus of this paper which examines the incentive-based tools land use planners can employ to promote the conservation and stewardship of natural heritage on privately owned land.

### **2.4 Moving toward the possible**

The literature review of the development of greenways as a planning tool provides direction for further investigation with respect to the research focus outlined above, pointing out opportunities and challenges. Hellmund and Smith note, for instance, that "by their very nature, landscapes are dynamic" implying differences at temporal and spatial scales. This has important implications for cultural systems when greenways are implemented to achieve cultural and natural heritage objectives.



This is particularly true of greenways designed to function as natural heritage conservation areas as they are more often than not designated in rural areas. It is therefore necessary to understand the interface between ecological, social and economic systems, and pose the question “greenways for whom?” Fabos (1995) and Taylor et al. (1995) hint at the complexity of greenway design from a land use and legal perspective, particularly in the North American context. Both papers suggest that greenway design should consider “implementation and management strategies” that reflect the structural system based on market principles. The following section examines the policy context for natural heritage conservation – the basis of Ontario Nature’s Greenway Initiative.



Figure 9, Ontario Nature's Greenway Initiative.



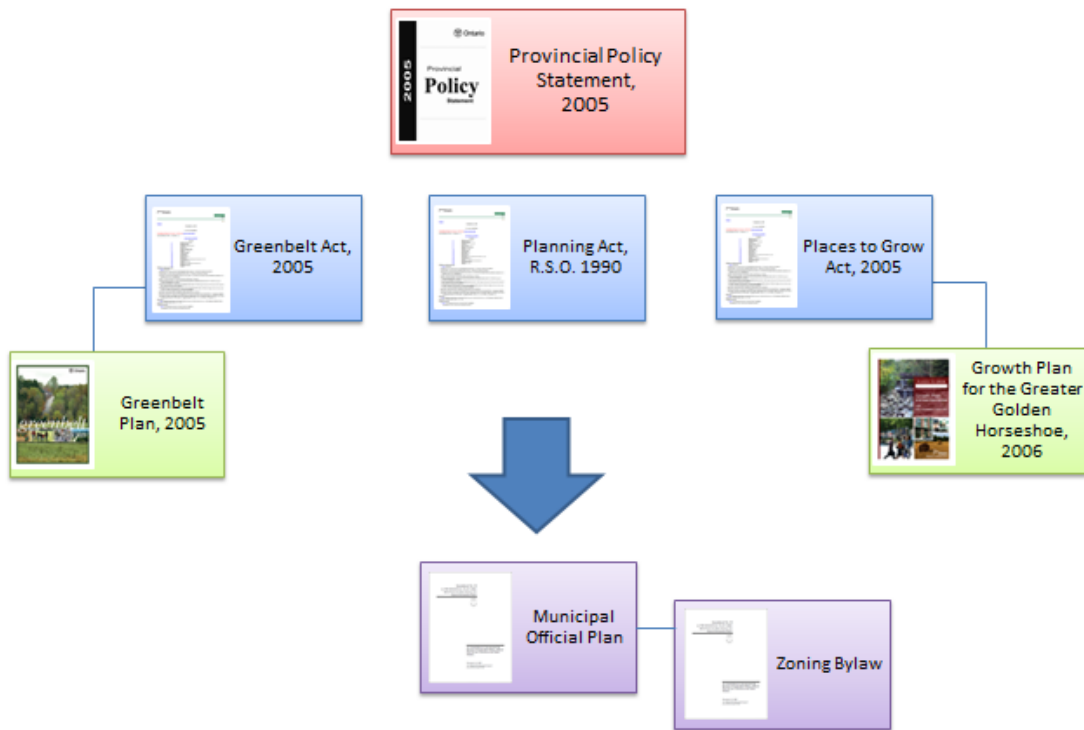
### **3.0 Policy Context of Natural Heritage Protection**

The purpose of the Greenway Initiative, proposed by Ontario Nature (n.d.), is to preserve and enhance the province's natural heritage system by establishing a network of protected "key natural areas or 'cores'" and natural passageways or 'corridors'". Implementing the proposed greenway necessitates the use of land. This section provides an overview of the regulatory framework that governs land use in Ontario, particularly as it relates to the protection of natural heritage. It contends that the land use policy and regulatory framework is a necessary component of natural heritage conservation strategies, but insufficient to achieve them.

#### **3.1 Regulatory framework of land use planning**

Land use planning in Ontario is provincially-led through a combination of policies, statutes and plans. The unprecedented rate and scale of population growth and urbanization throughout the twentieth century necessitated a coordinated, government-led approach to regulate land use (Doumani and Foran, 2010). Prior to the public regulation of land use, market needs and individual efforts to maximize private benefits directed land development without consideration for public goods (Doumani and Foran, 2010). The objective of the regulatory framework that emerged was to manage the externalities associated with land use planning and development by restricting how landowners "use their properties" (Doumani and Foran, 2010: 1). In this sense, the need for incentives to encourage private landowners to participate in the creation of a province-wide greenway is a fundamental land use issue that aims to achieve public benefits by negotiating the terms by which property owners use their land.

The provincially-led land use planning system is articulated primarily through the Provincial Policy Statement (PPS) and the Planning Act. The PPS establishes the policy basis for regulating the use and development of land in relation to "matters of provincial interest" (MMAH, 2005: 1). The "matters of provincial interest", which refer to the management of resources that affect the collective wellbeing of all Ontarians, are outlined in s. 2 of the Planning Act.



**Figure 10, Regulatory framework of land use planning.**

The policies of the PPS acknowledge the interrelatedness of land use planning decisions and incorporate principles of economic, social and environmental sustainability. Accordingly, the PPS states that “Ontario’s long-term prosperity, environmental health, and social well-being depend on protecting natural heritage, water, agricultural, mineral and cultural heritage and archaeological resources for their economic, environmental and social benefits” (MMAH, 2005: 15). The land use vision pertaining to natural heritage is outlined in Policy 2.1, Natural Heritage in the PPS.

The objectives of the Greenway Initiative proposed by Ontario Nature relate directly to the vision for natural heritage in Policy 2.1, which emphasizes the importance of restoring and enhancing ecological functions and biodiversity through the protection of a linked natural heritage system:

The diversity and connectivity of natural features in an area, and the long-term *ecological function* and biodiversity of *natural heritage systems*, should be maintained, restored or, where possible, improved, recognizing linkages between and among *natural*

*heritage features and areas, surface water features and ground water features* (MMAH, 2005: 15).

The natural heritage vision captured in Policy 2.1, however, is reconciled by the need to consider the short-term and long-term land uses that may at times be in direct conflict with each other (Doumani and Foran, 2010). In fact, a criticism of the land use planning system, despite the application of an ecosystem approach to policies, statutes and plans, is that short-term considerations that prioritize growth often result in trade-offs that favour economic development over environmental quality (Pond, 2009; Smith, 2009; Tucker, 2010).

The Planning Act provides the legislative structure that enables the policy vision established by the PPS and allocates the responsibility of land use management between the province and its municipalities (Doumani and Foran, 2011). The Planning Act also requires municipal plans and land use decisions to “be consistent with” the policies in the PPS, although the notion of consistency is often debated given the way it is arbitrarily determined. Even so, the need for consistency between local land use decisions and provincial policy embodies the idea that land use considerations “may outweigh the immediate interest of the parties” involved so that public benefits are protected against private interests (Doumani and Foran, 2010: 31). Together, the PPS and the Planning Act provide the overarching framework for administering land use in Ontario.

The management of land at the local level within this framework is implemented through a municipality’s official plan and zoning by-law. An official plan is a municipality’s vision for future development; although it cannot restrict land use in and of itself (Doumani and Foran, 2011). A zoning bylaw is a land use control instrument that identifies an area of land and restricts the land uses permitted within it (Doumani and Foran, 2011).

In a survey administered by Ontario Nature and published in a report co-authored with several other like-minded ENGOs, planning staff conveyed that official plans were “only the first step in achieving a fully functioning natural heritage system. Recognizing the importance of land-use practices

on private property, they expressed support for stewardship incentives, either through direct payments for good stewardship, or through programs that encouraged people to protect, restore or maintain wetlands on their property” (Ducks Unlimited Canada, 2012: 35).

Recent initiatives within the current land use planning regime have introduced significant legislative changes that are part of a regional planning strategy to reduce the negative economic and environmental effects associated with unregulated urban development. This regional planning strategy, known as Places to Grow, consists of complementary statutes and plans to manage the growth of human settlements through intensification and those that preserve ecologically significant landscapes.

The Places to Grow Initiative is enabled through the Places to Grow Act, 2006 and is complemented by the Greenbelt Act, 2005 and their respective plans. The Growth Plan for the Greater Golden Horseshoe, 2006 directs growth to existing urban areas through intensification. Its companion, the Greenbelt Plan, precludes future greenfield development by way of a boundary based on political, geological and ecological functions.

This regional planning strategy is indicative of a policy shift that recognizes the importance of systems-based planning to contain urban expansion. It also affirms the need to establish corridors to protect the ecological features and functions that contribute to the province’s natural heritage. As the latest application of greenway planning in Ontario, the subsequent section examines the Greenbelt Plan and its impact on land use and natural heritage preservation. The argument is that this approach to regional planning is primarily an urban containment strategy that necessitates additional policies and tools to support the protection of natural heritage resources.

### 3.2 The first step toward a provincial greenway



The Greenbelt Act received royal assent in February 2005. It is the enabling legislation that provides the provincial government with the statutory authority to establish a Greenbelt Area and the Greenbelt Plan. The Greenbelt Area refers to “a broad band of permanently protected land around the major municipalities” in the Greater Toronto and Hamilton Area (Fung and Conway, 2007: 103). It “extends approximately 325 km from the eastern end of

**Figure 11, Ontario's Greenbelt depicted as part of the Places to**

**Grow Initiative.** the [Oak Ridges Moraine], near the Rice Lake-Lake Iroquois Shoreline, to the Niagara River in the west, covering over 700,000 hectares of sensitive environmental and agricultural land” (Fung and Conway, 2007: 104). The Greenbelt Plan is an assembly of policies to guide the implementation of the Greenbelt Act’s objectives (Doumani and Foran, 2010; Fung and Conway, 2007). The primary objective of the Greenbelt legislation “is to protect farmland and open green space from urbanization while the province implements Places to Grow, its master plan for compact regional growth” (Pond, 2009: 413). However, as a multi-function planning tool it also protects countryside and open space areas, preserves agricultural land, protects the land base needed for ecological functions, and provides recreational and tourism activities (Doumani and Foran, 2010: 7).

The Greenbelt Plan is not Ontario’s first greenway planning effort and is preceded by the Niagara Escarpment Plan as well as the Oak Ridges Moraine Conservation Plan. In fact, the Greenbelt Area subsumes the Niagara Escarpment Plan and Oak Ridges Moraine Conservation Plan areas while adding 1 million acres of “previously unprotected watersheds” referred to as Protected Countryside

(Doumani and Foran, 2010: 7; Fung and Conway, 2007: 104; Pond, 2009: 413). A total of 1.8 million acres of land are protected through the Greenbelt legislation (Pond, 2009: 413).

Lands within the Protected Countryside are further organized based on four land use systems and are the subject of corresponding policies (Doumani and Foran, 2010; Fung and Conway, 2007). These land uses include an agricultural system, natural system, parkland, open space and trails, and settlement areas (Doumani and Foran, 2010: 10). These four policy areas are further subdivided to consider a range of over-lapping uses.

The strategy employed by the provincial government to push the Greenbelt Plan forward was to emphasize the ecological goods and services the protected land would provide to present and future generations of Ontarians (Pond, 2009). However the Greenbelt Act is recognized as an urban containment strategy and “is specific to land use planning as opposed to how individual protected, wilderness, or conservation areas are to be managed at the local scale” (Macaraig, 2011: 370). Comparable to the way that corridors linking fragmented undeveloped landscapes may benefit one species over another, Pond argues that the application of the provincial Greenbelt at a regional scale resulted in specific land use implications at the local scale that benefitted one population group over another. In this case, urban residents benefitted at the expense of rural landowners.

Pond writes from the perspective of a political scientist, examining the impact of the Greenbelt legislation on the area’s farming community. He notes that the majority of the land designated as Protected Countryside is privately-owned with farming as the prevailing land use (2009). A major consequence of the Greenbelt legislation is that property rights of landowners within the Greenbelt plan area have been expropriated without any form of compensation (Pond, 2009). A second major consequence is that the legislation demands the delivery of “environmental amenities [landowners] might not otherwise recognize as legitimate” due to the public good characteristics they exhibit (Pond, 2009: 414). In addition to the tension between private property rights and public goods is what Pond

refers to as “the increasing influence of an urban electorate...that demands more from the countryside than the provision of traditional food products” (2009: 414). A question of who benefits and who pays from natural heritage conservation on working landscapes emerges from this analysis. Pond however suggests that natural heritage conservation policies and programs should be designed “within the framework of the market economy, organized around the private ownership of land” as a departure point if they are to be successful (2009: 429).

In their study of the Greenbelt ‘as an environmental planning tool’ Fung and Conway, as planners, conclude that certain trade-offs occur with the application of multi-function planning tools with the result that they are insufficient to achieve all the planned objectives independently. As such, ‘supporting policies’ or tools become necessary (2007: 115). Fung and Conway also point out that the integrity of natural heritage inside and outside the Greenbelt is correspondingly affected by anthropocentric activities in these areas as well. This idea is further explained by Pulliam who writes “[b]ecause any given piece of the landscape is an open system, receiving and contributing matter, energy, organisms, and information...planners must consider individual sites in the context of broader landscape dynamics” (2002: 54). This is to say that the protection of natural heritage does not stop at the Greenbelt boundaries and would benefit from a larger scale vision for natural heritage conservation, like Ontario Nature’s Greenway Initiative.

The literature examining the implications of the Greenbelt legislation suggests that while the Greenbelt offers effective protection for natural heritage within the plan area, it is only a building block toward natural heritage protection throughout the province. Moreover, analysis at different scales (temporal and spatial) indicates that complementary measures to support provincial policies, and continue where they leave off, are needed.

Examining the effect of the Greenbelt at the local scale of intervention also reveals several questions for further consideration – should landowners be compensated for ecosystem services

provided by natural heritage on their land? Who should pay for them? Who benefits? Should the services provided by ecological functions be commodified? Can conservation be achieved through the public-private incentive-based tools?

### **3.3 From Government to Governance**

Another reason that the land use regulatory framework can be argued as insufficient is the move from government to governance in natural heritage conservation. While recent provincial policies and statutes demonstrate the integration of system-based planning principles, the provincial government has steadily been retreating from traditional interventions in natural heritage conservation, such as park planning and land acquisition, so that the responsibility is increasingly shared between the province, its agencies, ENGOs and citizen groups. The Greenbelt after all was implemented “with one stroke of the legislative pen” and expropriated the development rights of private landowners, not the land itself (Pond, 2009: 417).

In Ontario, conservation planning initiatives have become increasingly neoliberal, shifting the responsibility of these initiatives from the government to private interest groups, including ENGOs in the third sector. As summarized by Macaraig, neoliberalisation consists of “deregulation, the rollback of state interference in both environmental and social phenomena, where stakeholders become self-governing, and re-regulation, the deployment and facilitation of state policies which enable further privatisation of environmental and social phenomena” (2011: 358). This neoliberalisation has occurred in tandem to shifts in provincial politics and ideology that inevitably respond to economic conditions.

With the use of a long-term, historical perspective, the neoliberalisation of conservation and environmental planning in Ontario has been an ongoing process facilitated by the ‘policies of successive provincial governments over the past two decades’ (Macaraig, 2011: 363, MacDonald and Keil, 2012). In Ontario, the redistribution of government responsibilities to balance fiscal concerns has resulted in private interest groups and third sector organizations “providing services that were once done by the



state” (Macaraig, 2011: 358). In terms of natural heritage conservation these services include land acquisition, stewardship, and monitoring.

Accordingly there has been a transition from government to governance due to the “redistribution of state functions” (Reed and Bruyneel, 2010: 646). The distinction between government and governance is that government refers to “the formal, centralized and vertical exercise of power and authority, such as through regulation or market-based instruments” whereas governance denotes “where power and authority are horizontally decentralized and devolved to broader members of society” (Reed and Bruyneel, 2010: 647).

The shift from government to governance is dynamic and constantly moving to new states of equilibrium, as in any system. However the literature cautions that the transition from government to governance does not necessarily mean that the role of the state has been reduced, it has simply changed (Reed and Bruyneel, 2010; Macaraig, 2011). Moreover, the capacity of private interest groups or third sector organizations to carry out responsibilities previously administered by the state, has not necessarily increased and depends upon funding and other resources (Reed and Bruyneel, 2010; Macaraig, 2011).

The significance of the transition from government to governance and government retrenchment from conservation initiatives strengthens the rationale for Ontario Nature to push forward with the Greenway Initiative for several reasons. The Greenway Initiative scales up the conservation of natural heritage protection throughout the province, building upon previous green space initiatives. However the strategic approach employed by Ontario Nature acknowledges the complexity of conservation practices at the local level and the need for collaboration between multiple stakeholders. Most of all the Greenway Initiative ensures that landscape conservation for natural heritage persists despite shocks to political and economic systems.

The limitations of the regulatory framework for land use management in combination with the shift from government to governance necessitate additional strategies to achieve natural heritage conservation objectives. ENGOs in the third sector are contributing to an integrated approach for natural heritage conservation that complements established policy instruments through the use of incentive-based conservation tools. This is particularly true where land is privately owned. The traditional approach would have been to expropriate the land, or limit landowner rights; however both are politically and economically unfavourable. The subsequent section examines the prevailing incentive-based tools that are employed to promote natural heritage conservation on privately owned land.

## **4.0 Incentive-Based Tools for Natural Heritage Conservation**

As examined in the previous section, the limitations of natural heritage conservation implemented through regulatory interventions have promoted interest in public-private incentive-based initiatives.

This section examines the prevailing public-private tools that incentivize conservation on privately owned land. While the intent here was to analyse the potential application of these tools as part of Ontario Nature's Greenway Initiative, it was found that many of the prevailing incentive-based tools are already being utilized. As such, this section evaluates how the tools are being used in practice.

### **4.1 Incentive-based tools**

Incentive-based tools to promote public-private partnerships in natural heritage conservation have been used in practice for decades, although their application in Ontario is relatively recent (Lorinc, 2002; Sandberg and Wekerle, 2010; Wright, 1993). The prevailing strategy to preserve natural heritage by private landowners and non-governmental organizations (NGOs) has been through a co-operative structure known as land trusts. "A land trust is a registered charitable non-profit organization that is dedicated to preserving and protecting natural and cultural" landscapes (Ontario Nature, n.d.). Land trusts often vary in their mission and scope. The Ontario Farmland Trust (n.d.) was established to promote "the conservation of working farmland" whereas Ontario Nature, functions as a land trust to safeguard natural habitats, although both aim to protect land, and common values from future development (Hilts, 1993).

In the case of a land trust, land preservation is facilitated between the trust and private landowners through tools such as conservation easements and title transfers that may offer some kind of incentive or compensation. The land preserved through these tools is managed by the land trust to protect it from future development. As such, land trusts offer an alternative, community-building strategy from regulatory approaches to achieve conservation objectives "while still respecting private property" (Hilts, 2003: 16). Caldwell and Hilts note that a defining characteristic of land trusts in Ontario,

compared to examples from the US, is the focus on “education, research, monitoring and policy development” (2005: 69A). The reason for this is that private property rights are not constitutionally entrenched in Canada as they are in the US so that “the same emphasis on acquiring land would be unrealistic and unnecessary” (Caldwell and Hilts, 2005: 69A). While land trusts operate independently from government institutions, as NGOs they still depend on government support in the form of enabling legislation, and funding to implement their respective goals. In this sense, land trusts are an innovative means to protect common values, such as natural heritage; however they are not a substitute for government policy (Caldwell and Hilts, 2005).

Although land trusts have operated for decades, usually through direct land acquisition, the 1990s marked a ‘dramatic shift’ in the land trust movement corresponding to a) regulatory changes pertaining to conservation easements, and tax credits for donated land, as well as b) the increase of publically funded programs to facilitate private stewardship initiatives (Ontario Nature, n.d.; Hilts and Mitchell, 1993; Merenlender et al., 2004). Conservation easements were not permitted “under British common law in Canada” (Hilts and Mitchell, 1993: 20). As legal agreements, they could only be devised through an enabling statute. Ontario was the first province to permit the use of conservation easements in this regard; however they were only available as a conservation tool to the Ontario Heritage Trust, particularly for the protection of historical buildings (Hilts and Mitchell, 1993). Subsequent amendments to the Ontario Heritage Act enabled NGO trusts to issue conservation easements and expanded the range of their use to protect cultural and natural heritage (Hilts and Mitchell, 1993: 20). Similarly, changes to the federal Income Tax Act facilitated the donation of private land for conservation purposes by providing landowners with a tax credit for the value of the donated land. Prior to these changes, landowners would have paid capital gain taxes on the donated land, effectually discouraging the practice (Hilts and Mitchell, 1993). These statutory changes in combination with an increase in public funds for conservation programs contributed to the expanded use of private-public conservation tools.

**Table 1, Natural Heritage Conservation Tools**

	<b>Conservation Tool</b>	<b>Description</b>	<b>Incentive</b>	<b>Examples</b>	<b>Additional Details</b>
<b>Public</b>	Parkland/Greenbelts	Landscape protection through regulation.	None – if privately owned land is included, land use rights are expropriated or restricted (without compensation); mandatory	Greenbelt	
	Land Trust	“A land trust is a registered charitable non-profit organization that is dedicated to preserving and protecting natural and cultural areas” (Ontario Nature)	Compensation through easements and title transfer; voluntary.	<ul style="list-style-type: none"> <li>Ontario Nature</li> <li>Ontario Farmland Trust</li> </ul>	Public-private partnership; land trusts mediate public funds for conservation
<b>Public-Private</b>	Conservation Easement (CE)	“A [CE] is a voluntary, legal agreement between a landowner and conservation organization that permanently limits uses of the land in order to protect its conservation values” (Nature Conservancy of Canada)	Tax breaks in the form of property taxes on a reduced portion of land owned; voluntary.		Can also be referred to as an Agreement, Covenant or Servitude
	Title Transfers	Title transfers refer to the acquisition of land through donation, bequest or purchase.	Tax break from capital gains; voluntary		
	Stewardship Agreements (SA)	A SA voluntary contract, often short-term, between a landowner and a land conservation organization or government body to employ land management practices that enhance the natural heritage features and functions of the landscape	Compensation for ecosystem services; voluntary	<ul style="list-style-type: none"> <li>Alternative Land Use Systems (ALUS)</li> <li>Safe Harbour Agreements</li> </ul>	
	Market-Based Instruments	Conservation tools to promote natural heritage protection through price signals in the marketplace	Compensation for ecosystem services; voluntary	<ul style="list-style-type: none"> <li>US Conservation Reserve Program</li> <li>Australia’s National Market-Based Instruments Pilot Program</li> </ul>	Voluntary; farmers with eligible land bid for conservation contracts; bids are assessed against a checklist for environmental benefits
<b>Private</b>	Performance-Based Instruments	Performance based rating system specifically for landscape design	Varies - voluntary	<ul style="list-style-type: none"> <li>Sustainable Sites</li> </ul>	New, interdisciplinary initiative from the US

Table 1 summarizes the tools frequently employed in natural heritage conservation initiatives. The table also provides a graphic representation of the prevailing tools that have been utilized in natural heritage conservation and demonstrates the shift from publicly-led interventions to public-private partnerships and the emergence of market-based initiatives. While there is a clear shift from publicly-led interventions to market-based initiatives, it is important to note that conservation mechanisms within all three areas of organization continue to be used. Conservation easements and stewardship agreements are currently the prevailing mechanisms and are examined in more detail below as they form a strategic component of Ontario Nature's Greenway Initiative.

## **4.2 Conservation easements**

Conservation easements are increasingly being used as a tool to promote natural heritage conservation on privately owned land. A conservation easement is a voluntary legal contract that transfers the development or subdivision rights of a private landowner to a land trust (Hilts and Mitchell, 1993; Rissman et al., 2006; Wright, 1993). The intention is to restrict land uses or preclude future development in perpetuity to preserve the land's natural or cultural values (Wright, 1993; Merenlender et al., 2004; Ontario Nature, n.d.). Accordingly, the conservation easement "is registered on title, remaining in force if the land is sold or transferred to a new owner" (Ontario Nature[b], n.d.). The terms and conditions of a conservation easement are based on the landscape's characteristics as well as the conservation and financial objectives of the landowner and land trust (Wright, 1993). As such, "a conservation easement has no specified content – it says what the parties agree to" (Merenlender et al., 2004: 67). For instance, a conservation easement can be specified to include the "entire property, or only those features cherished by the landowner - whether it is a pond, historical building or tract of woodland" (Ontario Nature[b], n.d.). The landowner continues to own the land identified in the conservation easement and can use it within the confines of the easement contract (Merenlender et al., 2004). The land trust takes on the responsibility of "monitoring and enforcing the easement specifications" (Merenlender et al.,

2004: 67). The flexible character of a conservation easement makes it appealing as a public-private conservation tool.

In addition to flexibility, a landowner can benefit financially from land 'donated' through a conservation easement. For instance, the landowner may receive an income tax credit or be eligible for a reduction in property taxes for the land conferred in an easement. The tax credit is calculated "by comparing the appraised value of the land before and after the easement donation" whereas property taxes would be reduced based on the area of land conferred in the easement (Wright, 1993: 488). Essentially, the landowner retains proprietorship of the land and a reduction in taxes in exchange for relinquishing future development rights.

Few studies have attempted to assess the effectiveness of conservation easements as a tool to preserve natural heritage, although this is changing. On the one hand, there are some clear disadvantages associated with the tool. Writing from an environmental policy perspective Merelender et al. caution that assessing the effectiveness of conservation easements is difficult given the "variability of properties, organizations, and institutions involved" (2004: 66). The flexibility of the conservation easement tool, a characteristic which make it attractive to public-private conservation initiatives, is the same feature which complicates the ability to determine which ecological features and functions "are being protected or to compare the performance of one type of easement or institution to another" (Merelender, et al., 2004: 70). Rissman et al. (2006), add that information pertaining to ecological monitoring is not readily available. Conservation easements are also voluntary; landowners can simply choose not to participate in natural heritage conservation initiatives (Wright, 1993). Morris also characterizes the prevailing use of conservation easements as a "paradigmatic neoliberal environmental policy tool" that decentralizes and privatizes "conservation decision-making" (2008: 1215).

On the other hand, conservation easements do offer certain advantages – the flexibility combined with local knowledge means that land trusts may be able to "negotiate better terms, and

achieve conservation goals for less” (Merelender, et al., 2004: 70; Morris, 2008). Conservation easements also provide more long term protection from development than traditional zoning instruments or regulatory approaches (Merelender, et al., 2004; Wright, 1993).

A study conducted by Kiesecker et al. was the first to analyse the evolution of “easements as a conservation strategy in conjunction with advances in conservation science” (2007: 126). The study concluded that easements are being devised with identifiable natural heritage goals, however “it is too expensive and impractical to monitor all easements” to determine how well they achieve these goals (2007: 129). The result is that monitoring the effectiveness of the conservation tool, and by extension the easement program, is neglected.

Merelender et al conclude that “the use of land trusts to conserve resources by acquiring conservation easements has created a complex conservation situation that is poorly understood...We cannot expect conservation easements to protect all the natural resources associated with private land or to provide goods and services for all people” (2004: 73). Rissman et al., add that “most conservation easements involve trade-offs between biodiversity protection and development in an effort to secure some protection for private lands for a reasonable amount of investment” (2006: 717). Wright, a land use planner, maintains that “the best application of the tool requires the careful coordination of voluntary landscape conservation efforts with regulatory schemes and specific comprehensive plans objectives” (1993: 491). A variety of tools and strategies are therefore necessary to achieve broader conservation goals such as those included in Ontario Nature’s Greenway Initiative.

### **4.3 Stewardship agreements**

The term “stewardship” refers to the wide range of voluntary actions that Canadians take to care for the environment, ranging from conserving wild species and their habitats directly, to improving the quality of habitat by mitigating human impact” (Environment Canada, n.d.). Kabii and Horwitz offer the following definition of stewardship: a “partnership between landholders and other bodies, formed to



carry out set conservation objectives, where benefits of conservation extend beyond the landholder to the public” (2006: 16).

The application of stewardship agreements as a tool to encourage conservation on private land is relatively recent, although they have been used as a form of resource management for decades. A stewardship agreement is a voluntary contract, often short-term, between a landowner and a land conservation organization or government body to employ land management practices that enhance the natural heritage features and functions of a landscape. The purpose of a stewardship agreement is to preserve and restore ecological functions, habitat and biodiversity by encouraging private landowners to support these land uses in favour of other land uses through incentives such as supportive legislation or direct compensation. Goldman and Tallis offer the following description: “private landowners are paid to change or maintain some practice on their lands that is thought to improve the conservation value of that property” (2009: 65). Stewardship agreements offer more land use flexibility than a conservation easement as they are non-restrictive, allowing the proprietor to retain ownership and future development rights of the land.

In this sense the agreement is designed to encourage a change in behaviour as well as landscape performance. The incentives therefore also act as subsidies to decrease the cost of conservation initiatives or application of best management practices (Goldman and Tallis, 2009). These types of stewardship programs have been used throughout the US and Europe and are just beginning to take shape in Canada.

Goldman and Tallis maintain that conservation initiatives that demonstrate the connection between the future welfare of humans and natural heritage preservation “have the potential to engage a broader set of stakeholders, making conservation mainstream” (2009: 66). In their analysis of stewardship agreements, Goldman and Tallis found that they “do expand the breadth of landscapes upon which conservation efforts are employed, particularly on agricultural landscapes” (2009: 75). They

also found that as conservation projects become increasingly decentralized, partnerships and drawing on local knowledge also becomes correspondingly important. Goldman and Tallis however acknowledge that a critical question of stewardship agreements, the value of conservation, remains unanswered.

The literature pertaining to stewardship agreements based on the delivery of ecosystem services is interdisciplinary with a focus in the following areas of inquiry: determining the type of services provided by ecosystem functions at different scales (local, regional and global); valuing and quantifying ecosystem services in economic terms; studying how the ecosystem services concept has been applied in decision-making and broader conservation initiatives; and whether ecosystem services engage a wider range of stakeholders and participants. Understanding how stewardship agreements achieve conservation goals is therefore limited, but slowly beginning to change through the work of Rebecca Goldman and Heather Tallis (2009) and their colleagues at the Nature Conservancy (US) and the Woods Institute for the Environment at Stanford University. In the meantime however there is a definite oversight in terms of monitoring the effectiveness of incentive-based conservation tools to achieve conservation goals, particularly in the Canadian context.

Stewardship agreements vary in their scope and application, particularly between rural and urban areas. An emerging trend with the application of this conservation tool is to pay productivist landowners - farmers and ranchers- for the ecosystem functions produced on their land. Ecosystem functions refer to the ecological goods and services or green infrastructure that are valued by humans for the benefits they produce such as air and water purification (Goldman and Tallis, 2009). An example of a stewardship program currently being developed as a public-private conservation initiative that targets productivist landowners is presented in the subsequent section.

#### **4.4 Alternative Land Use Services – utilizing market signals to promote stewardship**

An example of a stewardship program currently being developed as a public-private conservation initiative is presented here. Alternative Land Use Services (ALUS) is an incentive-based conservation program that was initiated in the early 2000s by Keystone Agricultural Producers, the organization that represents the interests of Manitoba’s farming community. The program “recognizes the value of conserving and restoring Canada’s natural capital, while also respecting and rewarding the important role that rural landowners play in environmental management” (ALUS, n.d.). It synthesizes the dual pressures put on productivist landowners, as producers of agricultural commodities, and as environmental stewards, with an innovative approach that satisfies both demands. Accordingly, the program was established on the premise that “farmers have always acted as land stewards, and have provided ecological goods and services (EG&S) to Canadians – even though this often comes at a cost to the individual” (ALUS, n.d.). As such, the voluntary program incentivizes land management practices that produce environmental benefits by offering farmers “a fair price” for restoring or protecting valued ecosystem features and functions (ALUS, n.d.). ALUS is envisioned as a national conservation strategy; however it is currently being evaluated as a series of pilot projects in select provinces. Norfolk County in Southern Ontario serves as one of the ALUS pilot projects. The data presented below is specific to the Norfolk County pilot project.

Norfolk County is situated in Southern Ontario on the north shore of Lake Erie, within the Carolinian Canada ecological region. The Norfolk Federation of Agriculture and the Norfolk Land Stewardship Council led the effort to establish an ALUS pilot project in the municipality beginning in 2002 (ALUS, n.d.). The Norfolk Country ALUS pilot project was subsequently launched in September 2007 and relies on the voluntary participation of productivist landowners as well as collaborative partnerships with public, private and non-profit institutions.

Eligible productivist landowners who choose to participate “can enrol up to 20% of their workable land” for a period of three years (ALUS[c], n.d). At the moment, only productivist landowners who reside within the designated pilot project area are eligible to participate. A landowner can opt out of the three-year stewardship agreement at any time, although a financial penalty is incurred, if this is before the agreement expires (ALUS[c], n.d).

As a conservation program, ALUS encourages landowners to “take marginal, unproductive, inefficient, or environmentally sensitive lands out of agricultural production” and steward them (ALUS[c], 2012). Ecologically sensitive lands, in this instance refer to landscapes that are stressed from cultivation and must meet the criteria of the Canada Land Inventory, Classes 4-7 (ALUS[d], n.d). Each stewardship agreement is rooted in the site specific conditions of a program participants’ land. The stewardship projects are designed in consultation with the landowner, the Norfolk ALUS project coordinator, and “extension support from the Long Point Region Conservation Authority” (ALUS[c], n.d). Examples of stewardship projects include “the establishment of Tallgrass Prairie and Oak Savannah, reforestation using native Carolinian tree species, domestic and Tallgrass Prairie buffers, pollinator hedgerows, traditional windbreaks, and wetland creation and enhancement” (ALUS[c], n.d). As such, a range of stewardship practices and techniques are employed that vary from site to site so that broader conservation issues like functional connectivity or landscape integrity are considered on a case by case basis, but generally hinge on the priorities established by the farmer (Bennett, 2012).

The price for stewardship activities corresponds to the type of ecological good or service conferred through conservation and whether the landowner continues to use the land for a secondary agricultural use (Bennett, 2012). The price is paid as a per acre premium that ranges between “\$150.00 per acre per year or \$75.00 per acre per year” (ALUS[c], n.d). The premium does not approximate the value of the ecological goods and services produced through stewardship activities, rather “it is based on the average land rental rates” in the area (ALUS[c], n.d.).

The stewardship program depends on external funding from public and private sources including federal and provincial governments, private philanthropic foundations and NGOs. An assessment based on a country-wide ALUS program anticipates that the stewardship agreements pay for themselves by saving more money than they cost. Delta Waterfowl (2007), an ALUS program partner, published the results of a private consultant's report that "estimates the annual cost reduction within government of over \$61 million and a total benefit to society of over \$820 million through the program's positive results in greenhouse gas sequestration, increased value of outdoor recreational activities, and other services". Essentially, the ecosystem functions that are conserved and managed through stewardship best practices reduce the demand for public services or infrastructure.

In addition to providing ecological goods and services, the program endeavours to strengthen the capacity for stewardship practices on agricultural land. Rather than competing with other conservation programs for funding, the ALUS conservation program was proposed to complement existing conservation strategies and seeks integration with them. As a public-private conservation initiative, program partners include "agricultural, non-governmental, conservation, and government organizations" (ALUS, n.d.). The Norfolk County ALUS pilot project has partnered with Ontario Nature on occasion to conserve natural heritage (Bennett, 2012).

While the Norfolk County ALUS pilot project has been implemented with support and interest from the farming community, ENGOs and government bodies, there is limited publically available data pertaining to the program's current status or evaluation.

ALUS is an innovative program that addresses the complexity of natural heritage conservation on private land, particularly agricultural land. The stewardship agreements implemented through the program encourage productivist landowners to conserve and renew ecological features and functions by way of financial incentives. Extension services, capacity building and the transfer of knowledge between landowners and project proponents contribute to a long-term shift in thinking and behaviour regarding

**Table 2, Federal and Provincial Grants for Public-Private Conservation Initiatives**

<b>Government Body</b>	<b>Program</b>	<b>Amount</b>	<b>Program Description</b>	<b>Additional Details</b>
<b>Environment Canada</b>	Natural Areas Conservation Program (NACP)	\$ 225 million	Introduced in <b>2007</b> , funds are mediated by the Nature Conservancy of Canada to assist ENGOs that protect ‘ <b>ecologically sensitive</b> ’ lands through <b>voluntary</b> land trust mechanisms using a ‘science-based process’ (Environment Canada [EC]).	Between March 2007 and March 2011 “160,796 hectares of habitat...for 101 species at risk” have been protected (EC).
<b>Environment Canada</b>	Ecological Gifts Program (EGP)	Varies by value of land gifted	The EGP was created in <b>1995</b> , in conjunction with changes to the <i>Income Tax Act</i> . The program “provides favourable income-tax treatment for gifts of <b>ecologically sensitive</b> land” so that <b>donors</b> do not pay tax on capital gains from the land (EC).	As of February 2012 “941 ecological gifts valued at over \$583 million have been donated across Canada, protecting over 142,300 hectares of wildlife habitat” (EC)
<b>Environment Canada</b>	Habitat Stewardship Program (HSP)	Between \$9 and \$13 million a year	Introduced in <b>2000-2001</b> , the HSP allocates funds to <b>voluntary</b> stewardship “programs that conserve and protect species at risk and their habitats” (EC).	“Since its inception, the HSP has contributed to the protection of over 240,000 ha of habitat”
<b>Ontario Ministry of Natural Resources</b>	Conservation Land Tax Incentive Program (CLTIP)	Varies - 100% property tax relief varies based on value and amount of land under stewardship	“The [CLTIP] is designed to recognize, encourage and support the long-term private stewardship of Ontario's provincially significant conservation lands by providing property tax relief to those landowners who agree to protect the natural heritage values of their property. The current tax relief offered is 100 % tax exemption on that eligible portion of the property.” (Ontario Stewardship)	“Only lands identified by the [MNR] as Provincially Significant” that are a minimum ½ acre in size are eligible for the program.  Participants retain ownership and property rights.  Requires annual re-application
<b>Ontario Ministry of Natural Resources</b>	Managed Forest Tax Incentive Program	Varies – participants are “taxed at 25 percent of the municipal tax rate set for residential properties”	This program provides an incentive to private “landowners who own four hectares of more of forest land, and who agree to prepare and follow a Managed Forest Plan for their property”	<b>Require re-application after 10 years</b>
<b>Ontario Ministry of Natural Resources</b>	Species at Risk Farm Incentive Program	Varies - Funding is through the Species at Risk Stewardship Fund and the federal government’s HSP.	The program provides financial incentives to farmers to adopt best management practices that restore and preserve habitat for species at risk while improving farming operations.	The program is part of the Canada-Ontario Environmental Farm Plan and is based on the synergy of land management practices that benefit wildlife and soil and water conservation.

the conservation of natural heritage. The built-in flexibility and adaptability of the program responds to the dynamic character of agricultural operations and makes the program more appealing to a larger group of participants. However, this same flexibility and adaptability contribute to uncertainty. For instance, given that the program is voluntary, some landowners will choose not to participate. If this is the case, is the integrity of the program or connectivity between key natural areas within the pilot project boundaries affected? In addition, the program's dependency on external sources of funding contributes to financial insecurity and jeopardizes the long-term commitment required to implement each stewardship agreement. This is particularly true in a fiscally austere economic climate. Moreover, the variability between stewardship projects makes it difficult to assess the program's accomplishments and whether they achieve broader conservation goals. This is particularly true when landowners opt not to renew the stewardship agreement and cease conservation on their land. Accordingly, incentive-based conservation tools such as stewardship agreements can only offer temporary solutions.

The increase in public-private conservation initiatives, particularly conservation easements and stewardship agreements since the 1990s corresponds to regulatory changes and granting programs introduced by the federal and provincial governments.

#### **4.5 Structure of Financial Incentives**

The rise in public-private conservation initiatives is associated with the incentive-based programs at the federal and provincial levels of government that have been introduced since the 1990s to achieve conservation goals. These incentive-based programs summarized in Table 2 include indirect benefits such as tax relief or direct benefits in the form of funds to finance conservation projects.

All of the programs summarized in the table are voluntary in nature and rely on public-private partnerships to achieve a variety of natural heritage conservation objectives. The length of the conservation initiative however varies between the programs. The lands acquired through the Natural Areas Conservation Program and the Ecological Gifts Program are conserved for perpetuity and provide

for long-term preservation. The Habitat Stewardship Program and the provincial programs summarized in the table are one time or short-term conservation initiatives based on stewardship projects or program criteria that require an annual re-application as in the case of the Conservation Land Tax Incentive Program.

The programs examined all require verification that the lands being conserved are 'ecologically significant' as a means to prioritize and distinguish between landscapes that provide critical ecological functions and services and those that do not. Federal and provincial criteria exist to determine the ecological significance of natural heritage landscapes and the critical features and functions within them. In Ontario, the Provincial Policy Statement describes the ecological features and functions that are of provincial interest and the meaning of 'significant' in Policies 2.0 and 6.0. The Ministry of Natural Resources' Natural Heritage Reference Manual provides further details. The implication here is that the prioritization of ecologically significant land ensures that these critical landscapes are protected while public funds are allocated efficiently and systematically. This of course raises several questions about the quantity and quality of natural heritage needed to sustain social and ecological systems and if in fact flexible, voluntary initiatives achieve conservation objectives.

Some of the programs summarized in Table 2 were introduced recently such that program results are limited or unavailable. Older programs, such as the federal Ecological Gifts Program which was established in 1995 in conjunction with changes to the Income Tax Act, have facilitated the conservation of 142,300 hectares of habitat at a value of \$538 million (Environment Canada, n.d). This type of quantitative data however conveys a limited amount of information about the type and quality of natural heritage features that are being conserved. Similarly, the literature regarding conservation easements is generally quantitative. The dollars spent, area protected or aggregate information are the easiest quantitative data to report. However it is difficult to assess the impact of public-private



conservation initiatives based on quantitative data alone. The following section analyses the impacts of an incentive-based public-private conservation program in a qualitative case study format.

#### **4.6 The Social Dimension of Conservation Initiatives**

The impact of public-private conservation initiatives to protect natural heritage through easements and stewardship agreements are variable and difficult to assess (Merenlender et al., 2004). The implication is that the flexibility of both tools which make them appealing to landowners also makes it difficult to determine if conservation goals are being achieved. Another important angle of this discussion is the impact of these conservation initiatives across various social groups.

The work of Sandberg and Wekerle (2010) provides some idea of the impact of public-private conservation initiatives through their analysis of the gentrification and neoliberalisation of the Oak Ridges Moraine. The Oak Ridges Moraine is a geological landform of ecological significance protected through the Oak Ridges Moraine Plan and subsumed within the Greenbelt Plan Area (referred to in Section 2). Sandberg and Wekerle argue that the neoliberalisation and gentrification of the Oak Ridges Moraine is facilitated by “the increased presence of financial and tax policy instruments to promote private conservation” (2010: 48). The financial and tax policy instruments they refer to are the incentives to encourage landowners to “put ecologically sensitive lands in conservation status” administered through the federal Ecological Gifts and the Natural Areas Conservation Programs (see table 2) (2010: 49). Most of the land within the Oak Ridges Moraine is privately owned but conveyed to land trusts through conservation easements (Sandberg and Wekerle, 2010).

Sandberg and Wekerle explain that the landowners who participate and ultimately support public-private conservation efforts in the Oak Ridges Moraine share similar demographic characteristics as “they are older, affluent, white and professional” and more often than not exurban residents (2010: 50). This particular group of landowners, exurban estate owners, as argued by Sandberg and Wekerle

(2010), lobbied for natural heritage protection to preserve the aesthetic character of their community and, to preclude future intensification.

Sandberg and Wekerle are critical of public-private conservation initiatives based on the notion “that they neglect who is benefiting from, and paying for, conservation” (2010: 50). This critical response is echoed in the work of Merenlender et al., who caution that social equity is an important consideration that is absent from public-private conservation initiatives (2004). Sandberg and Wekerle and Merenlender et al. all agree that these incentive-based conservation initiatives “may increase the disproportionate influence of the landowner class...it may be that wealthy landowners are benefiting disproportionately from the land trust approach to conservation” (Merenlender et al., 2004: 72).

There are two additional points of interest to emerge from this analysis. First, the widespread use of public-private incentives in one geographic area can signal consensus and political approval for regulatory conservation measures. In the instance of the Oak Ridges Moraine, the individual actions to conserve land through easements as well as the lobbying efforts of wealthy landowners contributed to the implementation of provincial legislation to protect the landscape.

The second point is that the Oak Ridges Moraine and Greenbelt legislation, enacted after the inception of Ecological Gifts Program, serve as a primary layer of conservation that restricts development within the boundaries of the plan areas so that the lands conveyed through conservation easements after 2005 are already protected. This has allowed some landowners, estate owners, within the Greenbelt area to collect ‘compensation’ for expropriated land rights, whereas others, farmers, have not. Both points suggest that a particular group of landowners used the rhetoric of natural heritage conservation for their personal benefit. The implication here is that public-private incentive-based tools to encourage conservation should be implemented in coordination with local or regional conservation land use policies to ensure equity and the wise use of public funds.

This case study raises important questions for future research about social equity in conservation initiatives, particularly in terms of the opportunity cost of funding, access to open space for recreation or the distribution of public benefits from ecosystem services. Admittedly, the priorities of conservation initiatives vary, so the question becomes at what scale should social equity be a concern? This case study also suggests that public-private conservation efforts can be coordinated with traditional land use planning tools.

## 5.0 Discussion

Contemporary efforts to conserve natural heritage, as alluded to in the preceding sections, are characterized by challenges and opportunities that contribute to a complex situation. This is particularly true given that natural heritage conservation initiatives occur at the interface of ecological, social and economic systems. These systems are dynamic and are inter-related. Accordingly, complex situations cannot be addressed through a single set of responses and require a range of complementary, integrated solutions “at different scales” of intervention (Kay, 2008: 3). Re-conceptualizing the challenges and opportunities of natural heritage conservation initiatives from the perspective of different systems at different scales – spatial scales and scales of organization – can help identify and expand the understanding of interactions, relationships, and trade-offs between alternative responses.

Natural heritage conservation is examined at two different spatial scales in this paper: (1) through Ontario Nature’s Greenway Initiative as a network of linked cores and corridors at the provincial-level, and (2) at the field level, on individual properties. This is important as the interface between social and ecological systems is subject to change at different scales of inquiry. For example, at the provincial-scale, the conservation objective is to re-create a natural heritage system of linked cores and corridors, but at the field-level, on privately owned land, the conservation objective shifts to preserving specific functions or features depending on the context. While functional connectivity should not be interpreted as being limited to physical connectivity, this raises several questions for consideration: what is the spatial distribution of conservation easements or stewardship agreements in relation to the Greenway Initiative? Are lands protected through conservation easements or stewardship agreements adjacent to existing protected areas? Do they form a network of cores and corridors? Are the terms and conditions of the easements and agreements being enforced? What natural heritage features and/or functions are being protected?

Acquiring a conservation easement or stewardship agreement is not the end goal of a conservation program, although as noted in the literature review, this is the reality. Monitoring the administration of incentives by way of cultural mapping or spatial analysis can provide some indication of how the program objectives at the provincial-level and field-level are being carried out. The addition of cultural variables to abiotic and biotic variables in ecosystem mapping can also serve to illustrate and address equity issues in conservation planning, such as those raised in the Oak Ridges Moraine case study. This strategy can also serve as a means to demonstrate the connection between culture and nature.

In this sense natural heritage conservation is not a linear process. Just as ecosystems constantly move to new states of equilibrium, natural heritage conservation programs should incorporate feedback from monitoring to improve the design of the program. As suggested in the literature, there is also a need to combine conservation efforts with traditional planning tools to take advantage of the synergies produced through collaboration.

The analysis of conservation initiatives at different spatial scales can be expanded upon and complemented by examining natural heritage conservation at different scales of organization. In this instance the scales of organization include regulatory, publically-led conservation initiatives; public-private partnerships and market-based initiatives. As with the analysis at spatial scales, each level here incurs trade-offs. At one end of the continuum, publically-led conservation initiatives restrict access to land or development rights to achieve conservation objectives through the creation of public parks or greenbelts. The trade-off here is public goods in exchange for reduced property rights (of select property owners) if the restrictions on land use are imposed on privately owned land. The issue with privately owned land is particularly interesting. Property rights in Canada are not constitutionally recognized as they are in the US. However, it appears that the motivation to develop partnerships with private landowners to achieve conservation objectives is necessary given that ecologically significant

land is privately owned and acquiring it through expropriation or land use restrictions is politically and financially unfavourable.

In the middle of the continuum, where conservation relies on public-private partnerships, private gains are made in a trade-off for natural heritage features or function. Given that these partnerships depend on the voluntary cooperation and negotiation of landowners the trade-off is that select natural heritage features or functions are conserved as opposed to most publically-led approaches which now focus on the protection of a landscape based on watershed or bio-regional qualities. It can be argued, on an even larger scale, national or global for instance, that many federal or provincial parks and nature reserves are also fragmented landscapes. The implication is that without monitoring or feedback in the program design, the integrity and functional connectivity of the natural heritage landscapes or features being conserved are unknown. This is even more of a concern given that humans can never quite know how much natural heritage should be conserved to sustain present and future populations.

The issue is admittedly more complicated than the trade-offs between public goods and private benefits as different groups of private landowners and populations are also affected locally in addition to the rural/urban divide. Urban and exurban residents benefit from higher land values and ecosystem services, whereas productivist landowners are at the bottom of the benefit spectrum and are expected to contribute more. Moreover, the public-private conservation programs analysed in this paper target rural landowners, overlooking the potential for natural heritage recovery in urban areas. This approach perpetuates the rural/nature- urban/unnatural thinking that contributes to natural heritage degradation. However, natural heritage conservation planning can be reconceptualised to include human-made infrastructures that provide ecological goods and services. The idea is not to replace natural ecosystems, but rather to complement or renew the natural functions and features that have been disrupted by development. If human-made infrastructures are designed to reveal ecosystem

processes rather than bury them, especially in urban areas where human populations are concentrated, a new relationship based on the connection between culture and nature can be cultivated.

Market-oriented approaches will continue this pattern of trade-offs. On the one hand the market economy is creating the problems that contribute to landscape fragmentation and the subsequent loss of natural heritage. On the other it is seen as a mechanism to promote the protection of natural heritage. One argument from this perspective is that markets for natural heritage conservation are underdeveloped and require some government and stakeholder cooperation to facilitate their growth in order to encourage more people to participate in conservation activities.

Another implication at this end of the continuum, however, is the commodification of nature and the intersection of values and science. The neoliberalisation of nature and paying for goods and services provided through ecological functions forces us to reconsider our relationship to nature. Should nature be priced or conserved for its intrinsic value? Natural heritage conservation has traditionally relied on a normative, utilitarian and elitist 'rhetoric' to justify certain types of land use (Vaccarino, 2008). Establishing a province-wide greenway is similarly based on an ethic to protect nature, not science. Is the commodification of nature really any different? Managing landscapes through the creation of a greenway is part of a larger narrative and need to manage human behaviours within the context of sustainability. The need to manage human behaviours within this context is based on the growing acceptance of the natural environment as being the foundation of human systems and not external to them.

The discussion here illustrates that planners are only beginning to understand the full range of advantages and disadvantages associated with incentive-based approaches to natural heritage conservation. So while public-private incentive-based conservation initiatives address the insufficiencies of regulatory tools, particularly at the field level of intervention, they in turn generate trade-offs that reinforce the need for conventional regulatory tools to achieve broader conservation objectives. The

fact that both regulatory instruments and public-private incentive-based tools are insufficient when utilized on their own iterates the need for a combination of public, private and third sector approaches that integrate natural heritage conservation strategies, where planning choices and trade-offs are made clear.



## 6.0 Moving Forward

There is a renewed contemporary interest in greenways, particularly as a planning tool to conserve natural heritage. Greenways were first used by modernist architects and planners to mediate the negative effects of urban development and reconcile the divide between rural and urban lifestyles. Greenways have since evolved from their original function as amenities for urban populations to a landscape design intervention to conserve natural heritage. The Greenway Initiative, proposed by Ontario Nature endeavours to reconnect the province's fragmented natural landscapes through a greenway system of cores and corridors.

Public-private incentive-based conservation tools are one of the strategies currently being utilized to implement the broader conservation objectives of the Greenway Initiative. The rationale to incent conservation and stewardship through public-private partnerships is to avoid the politically- and financially- unfavourable consequences regulatory approaches have traditionally incurred. However, public-private incentive-based conservation tools, such as conservation easements and stewardship agreements, also generate trade-offs. Moreover, assessing whether public-private incentive-based conservation tools achieve broader conservation goals is complicated by the flexibility that makes them attractive to private landowners. If natural heritage stewardship on private land is necessary to conserve and maintain functional connectivity between the ecological features and functions that sustain all living systems, then voluntary, incentive-based stewardship agreements are insufficient tools in and of themselves. The trade-offs that are made in public-private incentive-based conservation initiatives demonstrate that 1) they are not a substitute for regulatory approaches that restrict land use and, 2) natural heritage conservation and stewardship on private land will not restore landscapes to a state that predates development. As such, there is a need for an integrated approach to natural heritage conservation that addresses temporal, spatial and organizational issues of scale.

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