An Enumeration of Protected Areas in Ontario: Remarks about Its Contribution to Ecologically-Based Planning and Management

Paul A. Gray[1], Daniel Paleczny[1,2], Stephanie Janetos[1], Bruce King[1], Thomas J. Beechey[3], and Robert J. Davidson[4]

[1]Ministry of Natural Resources,
300 Water Street, Peterborough, Ontario, K9J 8M5

[2]Currently on assignment with IUCN, Egypt.

[3]Canadian Council on Ecological Areas, c/o Nature Matters
91 Cooper Street, Cambridge, Ontario, N3C 2N5, Canada.

[4]P.O. Box 181, Millbrook, Ontario, Canada.

Abstract

More than 40 categories of areas with various forms of protection have been created to care for natural assets throughout Ontario since the 1890s. The areas, which include public and privately owned sites spanning international, national, provincial, regional, and local designations, have been described in a single document that provides reference information and outlines an initial attempt to classify the designations by IUCN protected area categories. In its final form, this enumeration will assist in the design and management of an ecologically-based network of protected areas in support of initiatives like the Canadian and Ontario biodiversity strategies.

Keywords: *ecosystem health, sustainable living, protected area, networks, IUCN, climate change*

Introduction

Protected areas will make a significant contribution to ecosystem health and human well being in the 21st century. Given an ever-growing need for a comprehensive description and enumeration of protected areas in Ontario, a draft document with information about each type of area that is afforded some level of protection has been prepared (Gray *et al.*, in prep.). A preliminary classification of these protected areas using rules and guidelines developed under the auspices of the IUCN protected area classification system (IUCN, 1994) is also included in the enumeration. This paper explores

potential applications of the enumeration in relation to ecosystem health, partnership and collaboration, the design of protected area networks, the significance of protected areas in relation to the IUCN protected area classification system, examples of current network initiatives, and adaptive management.

1. Ecosystem health is an elusive but critical concept and protected areas are an important part of the equation.

While most people correctly equate ecosystem health with indigenous plants and animals, clean air and soil, abundant and available clean water, wetlands and forests, there is more. Humans are an important part of the ecosphere. From this perspective, Rapport (1995) describes ecosystem health as a measure of the level of (or lack of) resilience to perturbation, the ability to sustain itself, the degree to which adjacent ecosystems are affected, and the extent to which the ecosystem supports healthy human communities. Therefore, ecosystem health is a combination of cultural, social, economic and ecological health defined in relation to the state or condition of the ecosystem that we want to exist. For example, society may elect to protect wilderness, or sustainably use forests, or farm, or all of these. Accordingly, each management prescription requires decisions that result in the evolution of unique ecosystems (Rowe, 1992; Lackey, 1994) throughout Ontario.

In essence, Rowe (1992) suggests that we ask to what extent should we: 1) maintain natural (areas designated for preservation), semi-natural (areas in which resources are managed for sustained use), and/or artificial (areas devoted to high input, intensive use such as farming and plantations) ecosystems; and 2) establish restoration and rehabilitation programs for entire ecosystems? These questions are critical to a vision of sustainable living (e.g., healthy ecosystems and healthy people), establishing goals (such as biodiversity protection targets), and managing our activities. The answers are contingent upon a commitment to, and decisions respecting attainment of, a prescribed level of ecosystem health. The future distribution of protected areas will affect ecosystem health and human wellbeing. The enumeration provides a ‘one-window’ assessment of these protected area designations for use by natural asset planners and managers.

2. Ontario is an ecologically diverse province with many collaborators and partners who can contribute to sustainable living objectives.

Ontario’s rich natural and cultural heritage is, in large part, a function of its great latitudinal length and longitudinal width (1 688 km by 1 553 km)

encompassing more than 107 million hectares and founded on a geological history that spans more than three billion years with features from each of the Precambrian, Palaeozoic and Cenozoic eras. More than 40 designations with numerous types of management zones have been created to care for all, or defined parts, of many ecosystems in Ontario (Table 1). In addition, more than 40 agencies and organizations, over and above the many municipal governments and individual landowners, are directly involved in protecting and/or managing thousands of protected areas.

Ontario's protected areas are located on federal, provincial, municipal and private lands. Some areas are managed according to narrow and strict objectives (e.g., Nature Reserve Provincial Parks), some permit a wider array of activities (e.g., Natural Environment Provincial Parks or Conservation Areas), and others have multiple national and/or international designations intended to acknowledge the outstanding qualities of an area (e.g., Canadian Heritage Rivers and Ramsar Convention Sites) from a variety of perspectives. Some have legislated protection and are formally described in regulation, some are protected through policy and management guidelines, while others are privately owned. Just as the purposes of protected areas vary, so do the levels of protection afforded them. In some, access to them, and human activities in them, are strictly controlled, while in others a number of land-use activities are permitted.

Most of Ontario (87%) is publicly owned Crown land managed by the Ministry of Natural Resources (OMNR) in partnership with other agencies, non-government organizations and individuals. OMNR's protected areas, forest, lands and waters, and fish and wildlife management programs contribute to a number of objectives focused on ecological sustainability, including ecosystem health, the protection of natural and cultural assets, recreation, and the protection of people and property. In addition, a number of other agencies manage protected areas. For example, Parks Canada cares for a number of parks, historic sites and canals; Environment Canada manages Migratory Bird Sanctuaries and National Wildlife Areas; and the 38 Conservation Authorities work throughout southern Ontario and in some northern Ontario locations to ensure the management and protection of areas with natural and cultural heritage values.

The remaining 13% of the province is privately owned and located mainly in the most populated areas in the south. Given that this area contains the provinces' highest proportion of vulnerable, threatened, and endangered species and habitats, the efforts of private landowners, non-government organiza-

Table 1. Protected area designations in Ontario.

INTERNATIONAL	
Ramsar Convention Sites Biosphere Reserves	Important Bird Areas
NATIONAL	
National Parks National Marine Conservation Areas National Historic Canals National Historic Parks and Sites Canadian Heritage Rivers	Migratory Bird Sanctuaries National Wildlife Areas Marine Wildlife Areas (CWS) National Capital Commission Lands
PROVINCIAL	
Provincial Wilderness Parks Provincial Nature Reserve Parks Provincial Waterway Parks Provincial Natural Environment Parks Provincial Historic Parks Provincial Recreation Parks Conservation Reserves Wilderness Areas Ontario Lands for Life Forest Reserves Ontario Lands for Life Enhanced Management Areas Provincially Significant Wetlands Areas of Natural and Scientific Interest	Wildlife Management Areas Crown Game Preserves Fish Sanctuaries Niagara Escarpment Commission Areas Niagara Parks Commission Parks St. Clair Parkway Commission Parks St. Lawrence Parks Commission Parks Conservation Authority Protected Areas Remote Tourism Management Area Forest Management Reserves Restricted Access Areas
MUNICIPAL	
Municipal Parks and Open Space Rouge Park	Natural Heritage Features in Urban and Rural Areas
PRIVATE	
Agreement Forests Eastern Habitat Joint Venture Programs Nature Conservancy Nature Preserves Federation of Ontario Naturalists Nature Reserves Bruce Trail Association Properties Carolinian Canada Sites	Conservation Land Tax Incentive Program Sites Managed Forest Tax Incentive Program Sites Ontario Heritage Foundation Properties Conservation Easements Land Trust Holdings

tions, and municipal governments are key to ensuring adequate protection and stewardship of species and spaces. For example, the Nature Conservancy of Canada (NCC) and the Federation of Ontario Naturalists purchase or assume responsibility for the care of a number of properties, and Ducks Unlimited, Wildlife Habitat Canada, the NCC, and government agencies collaborate to deliver the Eastern Habitat Joint Venture program.

Ready access to information about each type of protected area will help natural asset managers in short- and long-term planning, policy formulation, and completion of collaborative research projects. The enumeration provides a framework for recognizing (and counting) private, NGO, corporate and agency efforts, and supports and encourages all efforts and collaboration among the many participants.

3. Protected areas can not be managed in isolation if we want them to make a significant contribution to ecosystem health in Ontario.

In addition to the strength of the management prescription applied, an area's contribution to ecosystem health is affected by its size and shape, linkage to other areas, and vulnerability to climate change and other impacts (Bishop *et al.*, 2004: 98 and many others). In an applied context, and as recognized by Parks Canada through the "greater ecosystem" concept in the Pukaskwa National Park Ecosystem Conservation Plan (Burrows and Keddy, 2004) and Carolinian Canada through its Strategic Plan (Carolinian Canada, 1998), protected areas are best managed in relation to the ecosystems of which they are a part, particularly if they are intended to contribute to the maintenance and enhancement of ecosystem composition, structure and function. Protected areas often are used as the anchors of a network – the core zones around which buffers are created and between which corridors are established (Taschereau, 1985; Bishop *et al.*, 2004: 99). In Ontario, linkage-oriented approaches (networks in their own right) like the Niagara Escarpment Biosphere Reserve, the Oak Ridges Moraine, and the Greenbelt exemplify the types of programs needed to keep ecosystems working.

Our enumeration is associated with a GIS database containing location data for a number of the protected area types and will be useful in planning and implementing linkages and managing networks of protected areas with many partners. This capability will grow in value over time as increasing numbers of public and private protected area managers move toward development and use of integrated databases and planning efforts.

4. All of Ontario's protected area designations are important to the network.

Historically, agreement on a generic definition of a "protected area" has been elusive. Some maintain that "protected area" should be used only to denote strictly managed legislated and regulated sites such as national parks and provincial parks. Others argue for flexibility in the interpretation of the definition and favour assignment of any type of area that receives special consideration for all or some of its natural assets to a protected area category. Paleczny *et al.* (2002) used five broadly accepted criteria (protection objective, strength of commitment, permanence, quality of protection, and timing of protection) that were consistent with the IUCN protected area management categories to assess the degree of protection afforded to areas in Ontario (Table 2). Areas that met the minimum standards for all criteria were categorized as "fully protected", while areas that did not were categorized as "partially protected" or "not protected". It is important to note that

Table 2. Criteria and standards used to compare Ontario's protected area designations with the IUCN protected area classification system (see Paleczny *et al.* [2002] for an initial assessment).

Degree of Protection					
	Criteria				
	Protection Objectives	**Strength of Commitment**	**Permanence of Commitment**	**Quality of Protection**	**Timing of Protection**
Fully Protected					
	Primary and explicit.	Legislation. Regulation. Policy[1]. Land Trusts.	In perpetuity.	Excludes industrial activities and large-scale developments. Managed use.	Year-round.
Partially Protected					
	Secondary or absent but permits conservation.	Policy.[1] Easements. Long- and short-term agreements. Strategies. Plans. Guidelines.	Not protected in perpetuity.[2] Specific predetermined periods (e.g., 1-20 years).	Wider array of uses and activities permitted.	Periods of the year.

[1] Some policies provide a stronger commitment to the protection of an area than others (see the discussion in the text).

[2] For example, a private landowner could request deregulation of a site.

these criteria are not necessarily mutually exclusive. For example, a "partially protected" property with a "short-term agreement" can have a "primary and explicit" protection objective.

We assume that some management of protected areas in the 21st century will be completed within the context of ecologically-based, comprehensive land-use planning. This approach recognizes that protected areas with a variety of attributes and qualities will collectively contribute to the overall health of the ecosystem of which they are a part. Therefore, even though some areas in Ontario's network may not qualify as "completely protected" using IUCN protected area classification criteria, with appropriate management we believe they can perform a role in helping to maintain biological diversity and contribute to long-term ecosystem health. For example, in Ontario, where most of the 61.9 million ha of forested lands are publicly owned, a variety of management reserves account for nearly 4.9 million ha or 7.9% of the province's forested area. Numerous provincial government "best practice" guidelines and published habitat/species guidelines assist forest management planners in the design and care of these reserves. In tandem with "fully protected" areas, such reserves can contribute to a system plan.

Each area description in our enumeration lists the management objectives and/or guidelines to help planners and managers assess the strength and weaknesses of the different types of protected areas that contribute to the system and to explore ways to enhance their function. Moreover, the enumeration provides a preliminary assessment of the degree of protection provided by each type of protected area and compares it to the IUCN protected area management categories.

5. An organized, scientifically-based global-local network of protected areas can help maintain and enhance ecospheric composition, structure and function.

The ecosphere is Earth's largest ecosystem. If we lose ecospheric function, we lose everything. Formal recognition of the need for action and commitment at the ecospheric level is found in the three 1992 Rio treaties (Climate Change, Biodiversity and Desertification) and in a number of subsequent strategic statements developed by jurisdictions around the world (e.g., BCO, 1995; OMNR, 2005).

The concept of linking protected areas as a way to help keep the ecosphere connected and functioning has been described and researched for decades. For example, the Man and Biosphere (MAB) program was established

in 1976 to promote and demonstrate a balanced relationship between humans and the ecosphere and to support the creation and maintenance of a world-wide network (the "World Network of Biosphere Reserves") of areas designed to contribute to the conservation of biological diversity and the sustainable use of ecosystems (Taschereau, 1985; Canada/MAB, 1987:1; Hawksworth, 1995:553). Accordingly, Biosphere Reserves are comprised of core areas, buffer zones and linkage areas. The Niagara Escarpment Biosphere Reserve, for example, encompasses 190 654 ha, where core areas encompass 33%, where buffer zones encompass 59.5%, and where transition areas comprise 7.5% of the system. There are 115 parks of varying sizes located along its length, comprising 50 071 ha, which is 70 to 75% of the final long-term goal. Land is still being acquired for the parks and open-space system and for the completion of the end-to-end Bruce Trail.

Large conservation organizations have embraced the ecosystem approach including the ecoregional programs adopted by the NCC and World Wildlife Fund and the biological corridor model used by Conservation International and the Wildlife Conservation Society's "Living Landscapes" program (Bishop *et al.*, 2004: 100). The "Big Picture" project, for example, aims to reverse the impacts of fragmentation in the southwest by increasing awareness and promoting a spatial image of a natural heritage system to which Ontarians can aspire (Jalava *et al.*, No date). Proactive conservation that focuses on landscape-scale ecosystems can provide acceptable long-term results at the lowest cost, and therefore a long-term objective of the "Big Picture" project is to expand conservation planning beyond the existing islands of green (Jalava *et al.*, No Date). The area descriptions in the enumeration will help people make decisions about network design, particularly related to the creation and spatial arrangement of core, buffer and linkage areas. In addition, the enumeration lists protection goals and objectives for each type of area.

6. 21st century protected area network management programs must be adaptive.

We live in times of rapid and unprecedented change where the ecosphere is being reshaped by the combined effects of human-induced primary impacts (i.e., habitat modification, pollution, invasive species and over-harvest), secondary or cumulative impacts (i.e., climate change), and natural disturbances such as wild fire and insect defoliators. Like forest management, parks and protected area management decision-making historically has been based on the assumption that the climate and other ecological forces and

factors will remain relatively stable (similar) for long periods into the future. For example, as an important part of ecological diversity, most protected areas are designed to represent specific natural assets (including species) for long periods of time (e.g., in perpetuity) (Scott and Lemieux, 2004). As a result, many jurisdictions are not prepared to manage protected areas in response to 21st century climate change. We agree with Lemieux *et al.* (2005), Scott and Lemieux (2005), Spittlehouse (2005), Welch (2005), and others who suggest that decision-makers will need to shift their approach to protected area planning and management and use new techniques in the design and implementation of system plans, the formulation of system goals and objectives, the definition and treatment if invasive species, the size and shape of networks, and the application of adaptation-oriented policy. The enumeration provides a description of legislation, policy, and management practices for each type of protected area. With ever-improving GIS and data management capabilities, this will be important in assessing the adaptive management needs of individual protected areas and groups of protected areas at various mapping scales (in small and large ecosystems) in the 21st century.

Concluding Remarks

We have completed a comprehensive enumeration of Ontario's protected areas and suggest that it will assist in planning and managing individual and linked protected areas in the 21st century. This enumeration provides ready access to information through a 'one-window' assessment and description of protected area designations in Ontario, including selection criteria, degree of protection, and management objectives and guidelines, which will help natural asset planners and managers with short- and long-term planning, policy formulation research, and network design. The work is timely in regard to current efforts to develop the Conservation Areas Tracking and Reporting System (CARTS) to meet the reporting needs of agencies and organizations such as the Canadian Council on Ecological Areas, the Canadian Parks Council, and the World Commission on Protected Areas, as well as supporting other initiatives such as OMNR's Natural Spaces Program.

References

BCO. 1995. *Canadian Biodiversity Strategy: Canada's Response to the Convention on Biological Diversity.* Biodiversity Convention Office, Environment Canada: Hull, Quebec. 80pp.

Bishop, K., N. Dudley, A. Phillips, and S. Stolton. 2004. *Speaking a Common Language: The Uses and Performance of the IUCN System of Management Cat-*

egories for Protected Areas. Cardiff University, IUCN – The World Conservation Union and UNEP – World Conservation Monitoring Centre: Gland, Switzerland. 191pp.

Burrows, F. and C. Keddy. 2004. *Pukaskwa National Park – Ecosystem Conservation Plan Executive Summary*. Parks Canada. Available online at: http://www.pc.ca/pn-np/on/pukaskwa/natcul/natcul2d_E.asp .

Canada/MAB. 1987. *National Action Plan for Biosphere Reserves in Canada*. Report No. 19, Canada/MAB, Canadian Commission for UNESCO: Ottawa, Ontario. 23pp.

Carolinian Canada. 1998. *Conservation Strategy for Carolinian Canada: Summary Report*. Carolinian Canada: London, Ontario. 15pp. Available online at: http://www.carolinian.org .

Gray, P.A., D. Paleczny, R.J. Davidson, T. Beechey, B. King, and S. Janetos. In Prep. *Ontario's Protected Areas: A Synopsis*. A Technical Discussion Paper. Ontario Ministry of Natural Resources: Peterborough, Ontario.

Hawksworth, D.L. 1995. The resource base for biodiversity assessments. Pp. 546-605. In: V.H. Haywood, Editor. *Global Biodiversity Assessment*. Cambridge University Press: Cambridge, U.K. 1140pp.

IUCN. 1994. *Guidelines for Protected Area Management Categories*. IUCN, The World Conservation Organization: Gland, Switzerland. 261pp.

Jalava, J., P.J. Sorrill, J. Henson, and K. Brodribb. No Date. *The Big Picture Project: Developing a Natural Heritage Vision for Canada's Southern Most Ecological Region*. Available online at: http://www.carolinain.org/technical_paper.htm .

Lackey, R.T. 1994. *The Seven Pillars of Ecosystem Management (Draft Report)*. U.S. Environmental Protection Agency: Corvalis, Oregon. 22pp.

Lemieux, C., D. Scott, and R. Davis. 2005. Climate change and Ontario's provincial parks: Preliminary analysis of potential impacts and implications for policy, planning, and management. Pp. 21-35. In: M. Beveridge, J.G. Nelson, and S. Janetos (Eds.). *Climate Change and Ontario's Parks. Proceedings from the State of the Art Workshop: Climate Change and Ontario Parks*, 25-27 February 2004, Dorset, Ontario. Parks Research Forum of Ontario, University of Waterloo: Waterloo, Ontario. 88pp.

OMNR. 2005. *Protecting What Sustains Us: Ontario's Biodiversity Strategy*. Ontario Ministry of Natural Resources. 44pp. Available online at http://www.mnr.gov.on.ca/mnr/pubs/biodiversity/obs_english.pdf .

Paleczny, D.R., P.A. Gray, T.J. Beechey, R.J. Davidson, and J.V. Jalava. 2002. Ontario's protected areas: An examination of protection standards with a provisional application of IUCN's protected area management categories. Pp. 850-962. In: S. Bondrup-Nelsen, N.W.P. Munro, G. Nelson, J.H.M. Willison, T.B. Herman, and P. Eagles (Eds). *Managing Protected Areas in a Changing World. Proceedings of the Fourth International Conference on Science and Management of Protected Areas 14-19 May 2000*. Science and Management of Protected Areas Association, Wolfville, Nova Scotia, Canada.

Rapport, D.J. 1995. Ecosystem Health: Exploring the Territory. *Ecosystem Health*. 1:5-13.

Rowe, J.S. 1992. The Ecosystem Approach to Forestland Management. *The Forestry Chronicle*. 68: 222-224.

Scott, D. and C. Lemieux. 2005. Climate Change and Protected Area Policy and Planning in Canada. *The Forestry Chronicle*. 81: 696-703.

Spittlehouse, D.L. 2005. Integrating Climate Change Adaptation into Forest Management. *The Forestry Chronicle*. 81: 691-695.

Taschereau, P.M. 1985. *The Status of Ecological Reserves in Canada*. Canadian Council on Ecological Areas and the Institute for Resource and Environmental Studies, Dalhousie University: Halifax, Nova Scotia. 120pp.

Welch, D. 2005. Climate change adaptation for parks managers. Pp. 51-58. In: M. Beveridge, J.G. Nelson, and S. Janetos (Eds). *Climate Change and Ontario's Parks. Proceedings from the State of the Art Workshop: Climate Change and Ontario Parks,* 25-27 February 2004, Dorset, Ontario. Parks Research Forum of Ontario, University of Waterloo: Waterloo, Ontario. 88pp.