

**PROTECTING, CONSERVING AND RESTORING
BIODIVERSITY IN ONTARIO**

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SUMMARY

Current Status

This paper deals with the protection, conservation and restoration of biodiversity in Ontario. Biodiversity or biological diversity refers to the intricate weave of Earth's living organisms, their interrelationships and habitats, the genetic differences among them, and the ecological processes which sustain them.

It is widely acknowledged that we are presently experiencing, on a global scale, the first mass extinction since the disappearance of the dinosaurs 65 million years ago, and the first ever induced by the activities of a single species - our own. In Ontario, a number of species have gone extinct at the hands of humans while many others are endangered. Likewise, numerous natural communities and ecosystems such as wetlands, old-growth forests and prairies have been greatly reduced in extent. Many ecological processes have also been impaired or endangered, resulting in such impacts as increased run-off, soil erosion, reduced rates of nutrient uptake, lack of pollination, eutrophication of water-bodies and changes in species composition. The loss of genetic diversity, though not as apparent as species diversity, will have serious consequences on the ability of species to adapt to new stresses such as climate change and the introduction of non-native species.

Causes of Problem

Biodiversity loss includes all those changes that have to do with reducing or simplifying the diversity of life on a local, regional, provincial, national or global scale. Dealing with biodiversity loss will require efforts at all of these levels. For the purposes of this discussion, however, the focus is provincial. We examine biodiversity loss in terms of both immediate on the ground threats and institutional shortcomings, since these, we believe, can realistically be dealt with now by the government of Ontario. While each type of threat or shortcoming is discussed separately, in practice it is often a combination of threats that leads to specific examples of biodiversity loss. The key threats include: habitat loss and fragmentation, toxic substances, commercial and recreational use, non-native species, and global trends such as climate change. The institutional shortcomings discussed are in the following areas: decision-making processes, the legislative regime, policy and programme limitations, and ministerial jurisdiction.

Agenda for Change

The paper sets out the following comprehensive vision for protecting, conserving and restoring biodiversity in Ontario:

General Vision:

The entire array of biodiversity values is maintained across the province and where possible restored, and henceforth is permitted to evolve naturally into the future.

Specific Components:

- Ecological processes and evolutionary changes are permitted to carry on without human interference.
- The populations and ranges of all current species at risk (vulnerable, threatened, endangered or extirpated) are recovered to self-sustaining levels.
- No further species are threatened, endangered or extinguished as a result of human activity.
- A permanent system of protected areas free from industrial use is established which represents all natural regions and features of the province, permits natural disturbances to continue, and harbours adequate habitat for all native species.
- Significantly degraded habitats and natural communities greatly reduced in extent are restored to healthy levels.
- Unique, rare and significant features are given recognition and permanent protection.
- The introduction of further non-native species is halted, and those that are already present and adversely affecting native species are brought under control.
- The stewardship of private lands fosters the protection of biodiversity.
- The management of public lands open for industrial use sustains biodiversity at the local, regional and provincial levels.
- Laws protecting biodiversity are enforced and applied equally to all, and used to support conservation action.
- Adequate government resources and incentives are put towards sustaining biodiversity.
- The public possesses a broad awareness of the importance of ecosystems, natural communities and biodiversity in general and that awareness is reinforced through the education system.
- Broad community action to support conservation exists.
- The release of contaminants that harm biodiversity is virtually eliminated.
- Ecological sustainability is, in policy and practice, the overriding priority of all levels of government and the public.

Key Recommendations

The paper makes a number of recommendations to help achieve the above vision for biodiversity in Ontario. The recommendations are broken down into six key areas for change:

- Protecting key elements of biodiversity: completion of the protected areas system; programmes to protect wildlife, including species at risk; protection of ecological processes.
- Sustainable use: improved resource use practices; private stewardship and acquisition; ecological restoration.
- Addressing threats: control of non-native species; reduction and elimination of toxic substances.

- Legislative reform: stronger legislation; enforcement and implementation of laws, regulations and policies.
- Improved understanding: research and monitoring; education.
- Organizational reform: holistic, consistent planning frameworks; public participation; government reorganization.

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PROTECTING, CONSERVING AND RESTORING BIODIVERSITY IN ONTARIO

INTRODUCTION

This paper deals with the protection, conservation and restoration of native biodiversity in Ontario. Lying at a crossroads of the Great Lakes and Hudson Bay, the prairies and temperate forests, and the bedrock of the Canadian Shield and the glacial till plains of the south, Ontario harbours a great variety of landforms and attendant natural communities. Along with this wealth of biodiversity comes the important responsibility to safeguard it.

Biodiversity, or biological diversity, refers to “the variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting.”⁸

It is widely acknowledged that we are presently experiencing, on a global scale, the first mass extinction since the disappearance of the dinosaurs 65 million years ago, and the first ever induced by the activities of a single species - our own.⁹ In Ontario, a number of species have gone extinct at the hands of humans while many others are endangered. Likewise, numerous natural communities and ecosystems such as wetlands, old-growth forests and prairies have been greatly reduced in extent. Many ecological processes have also been impaired or endangered, resulting in such impacts as increased run-off, soil erosion, reduced rates of nutrient uptake, lack of pollination, eutrophication of water-bodies and

Statistics and Trends

Global:

- present rate of extinction worldwide: about 400 times that recorded through recent geological time, and the rate is accelerating¹
- a loss of 15 to 20 percent of all species by the year 2000 is projected²

Canada:

- an estimated 100 hectares of wild lands and wild waters lost to industrial development per hour³
- 285 species and populations known to be at risk nationally; a further 22 species listed as extinct or extirpated

Ontario:

- 5 major natural regions: Carolinian Forest, Great Lakes-St. Lawrence Forest, Boreal Forest, Hudson Bay Lowlands, and Tundra⁴
- approximately 2900 vascular plant, 458 bird, 57 reptile and amphibian, 86 mammal, 158 fish, 137 butterfly species⁵
- at least 5 extinct species, including three fish species unique to the Great Lakes
- about 50 species extirpated since European colonization including Karner Blue butterfly, Timber Rattlesnake
- about 25 animal and 190 plant species vulnerable to extirpation⁶
- specific communities under threat include wetlands, prairies⁷ and old-growth forests

changes in species composition.¹⁰ The loss of genetic diversity,¹¹ though not as readily apparent as declining species diversity, will seriously impair the ability of species to adapt to new stresses such as climate change and the introduction of non-native species.

The desire to maintain biodiversity in the face of such loss reflects the understanding that organisms and natural processes should be protected both for their inherent value and for their importance in sustaining and nourishing humankind. It testifies to a deeply felt sense of responsibility towards the web of life and its intricate, delicate weave. As part of that web, humans have an obligation to ensure the good of the whole. This means seeing to our own welfare; it also means that in so doing we must not interfere with the ability of other species and communities to exist and thrive. They matter for their own sake, regardless of their known utility to humans.

Biodiversity supports the integrity and resilience of the ecological systems upon which all life ultimately depends.¹² Humans enjoy and rely on the many benefits provided by the life forms and processes integral to maintaining the hydrologic cycle, creating soil, purifying the air and water, increasing soil productivity, disposing of waste, pollinating crops, harnessing energy from the sun, regulating the climate and so on. We depend on biodiversity for food and medicine and the very possibility of engaging in such endeavours as agriculture, forestry, hunting, fishing and recreation. A source of spiritual and aesthetic contemplation and inspiration, the diversity of life on Earth enriches all human cultures in countless ways.

The goal of maintaining biodiversity is well accepted in principle by governments at the municipal, provincial, federal, aboriginal and international levels. Industries, labour groups and non-government organizations have likewise pledged their support in a variety of forums.¹³ Various polling data show that the people of Ontario at large, though perhaps not familiar with the term biodiversity, support the essence of biodiversity protection through their staunch backing of protected areas and efforts to protect wildlife and endangered species.¹⁴

This support notwithstanding, our failure to stem the tide of biodiversity loss in Ontario points to the inadequacy of our efforts thus far. It requires that we renew our resolve and

Provincial Government Commitments to Biodiversity

The need to protect species and their habitats has been acknowledged time and time again by the Ontario government through commitments such as: *A Wildlife Policy for Canada* (1990), *Looking Ahead: A Wild Life Strategy for Ontario* (1991), *Statement of Commitment to Complete Canada's Networks of Protected Areas* (1992), *Convention on Biological Diversity* (1992), *Policy Framework for Sustainable Forests* (1994), *Canadian Biodiversity Strategy* (1995), *National Accord for the Protection of Species at Risk* (1996), and *Nature's Best* (1997).

The government's willingness to live up to these commitments has yet to be demonstrated. For example, many of the province's natural regions have little or no protected area representation, and the list of species at risk continues to grow. The biodiversity agenda has not been immune to the political tendency to commit but not implement.

seek out more promising ways of proceeding. Conventional approaches to conservation and resource management, which generally have focused on only one or a few species (typically those of commercial interest) have proven to be overly simplistic.

The incremental impacts of, for example, agricultural, industrial and transportation processes have often fallen outside the ambit of concern until irreversible harm occurs. Management systems have also tended to separate human and non-human spheres, thus failing to adequately take into account the effects of the lives we humans lead upon the life forms we seek to conserve and on whom we depend.

In contrast, the very concept of biodiversity carries “an imperative to consider the complexity of ecosystems” and to proceed with caution in the face of our lack of knowledge.²⁰ Consequently, strategies to protect biodiversity must be premised on the interdependence among species, communities, habitats and natural cycles and undertaken from a holistic perspective, recognizing the limits of humankind’s ability to manage complex ecological interrelationships and acknowledging the close links between biological and cultural diversity.

BIODIVERSITY LOSS

Biodiversity loss includes all those changes that have to do with reducing or simplifying the diversity of life on a local, regional, provincial, national or global scale. Dealing with biodiversity loss will require efforts at all of these various levels. For the purposes of this discussion, however, the focus is provincial. We examine biodiversity

loss in terms of both immediate on the ground threats and institutional shortcomings since these, we believe, can realistically be dealt with now by the government of Ontario. In so

The Importance of Cultural Diversity

Biological and cultural diversity are interdependent. Not surprisingly then, where cultures have been displaced, biodiversity is also at risk: “Wherever empires have spread to suppress other cultures’ languages and land-tenure traditions, the loss of biodiversity has been dramatic.”¹⁵

According to the World Resource Institute’s Global Biodiversity Strategy: “Humanity’s collective knowledge of biodiversity and its use and management rests in cultural diversity; conversely conserving biodiversity often helps strengthen cultural integrity and values.”¹⁶

Aboriginal peoples looking to restore, conserve and regain control over their environment are able to draw from traditional teachings and practices. A recent report, based on four aboriginal communities across Canada, indicates that they are breaking new ground in their efforts to protect biodiversity by putting biodiversity in a broader context which includes community, economic and ecosystem health.¹⁷

In Ontario, as elsewhere in the country, significant natural areas are to be found on the lands of First Nations peoples. For instance, Walpole Island, at the mouth of the St. Clair River, is unsundered territory where native traditions and philosophies have resulted in the preservation of oak savannah and tall-grass prairie of international significance.¹⁸ There these endangered plant communities are managed and maintained with fire, and harbour ninety-seven provincially rare plant species.¹⁹

doing we recognize, of course, that we are passing over the ultimate, deeper causes of biodiversity loss (e.g., over-consumption, loss of cultural diversity, human overpopulation) whose remedies lie with more fundamental, long-term change. Nevertheless, the problems listed below must be addressed if the government of Ontario intends to do its part in maintaining biodiversity. While each type of threat is discussed separately, in practice it is often a combination of threats that leads to specific examples of biodiversity loss.

Problems on the Ground

The immediate problems described here are proving devastating to biodiversity in Ontario as in every part of the world. All require action at the provincial level though some (e.g. habitat fragmentation and loss) lend themselves more easily to provincial control than others (e.g., global trends). Even in the case of transboundary problems such as climate change and ozone depletion, however, the government of Ontario can and must do its part by working on and honouring federal and international initiatives (e.g., international agreements concerning biodiversity, ozone depletion, climate change).

Habitat Loss and Fragmentation

Habitat loss is the greatest cause of declining biodiversity.²⁴ Simply put, native species cannot survive in the wild unless their habitat - their home - is protected. The isolation of remaining habitats through development practices that fragment the landscape (roads, urbanization, agriculture, logging operations, hydro corridors) further contributes to loss of biodiversity, and in fact may be one of the primary causes of the present extinction crisis.²⁵ Fragmented pockets of habitat, though useful for many species, are not sufficient for those organisms that require large home ranges, have complex life cycles or are sensitive to human disturbance.²⁶ When habitat is fragmented, populations of a particular species can become isolated, leading to inbreeding and a loss of genetic diversity; this loss reduces a species' ability to adapt to other types of environmental stresses.²⁷

Karner Blue Butterfly

The destruction of more than 99% of savannahs in southern Ontario²¹ has led to the extirpation of the Karner Blue butterfly. A classic example of species interdependence and the impacts of habitat loss, trouble started when the Karner Blue caterpillar's only food source, wild lupine, began to disappear with the loss of oak savannah through development, disturbance by humans and extensive planting of pines.²²

Recovery plans for the Karner Blue began in 1993. The project aims to restore and protect oak savannah habitat and to better understand the relationships between plant and insect species within the habitat. It involves a 5-year captive breeding program (at the Toronto Zoo), species and habitat inventories, development of habitat quality indices and the reintroduction the Karner Blue. Recovery efforts will benefit the entire ecosystem including the approximately 70 other significant species found there.²³

The Karner Blue's decline also demonstrates the need for a more timely, objective and scientific listing process under Ontario's *Endangered Species Act*. By the time politicians got around to listing it under the Act, it was already too late to prevent its extirpation.

Unfortunately, habitat fragmentation is a defining characteristic of the settled landscape of southern Ontario.²⁸ These fragments harbour many species that are regionally and provincially rare. “For example, in the Rouge Valley Park at the eastern boundary of Toronto, 22% of the native flora and 32% of the breeding birds are considered rare, most of them because of the reduced extent of natural habitat in the surrounding region.”²⁹ On the settled landscapes of the south there is a special case to be made for the conservation of all remaining woodlands. Once the dominant habitat in the region, woodlands have been reduced to rarity in some areas (e.g., woodland landscapes in Essex County are now 3%; Kent County, 4.2%; Perth County, 9%)³⁰ and continue to decline in the Carolinian life zone.³¹ Even in those parts of southern Ontario where forest cover has been increasing in the past 50 years, the average age of the forest stands has dropped, woodlands are being downsized, simplified and fragmented, and key forest species are in decline.³²

As one travels north, large-scale industrial forestry practices give rise to a dramatic and accelerating rate of change towards younger, more divided and less varied forests, and biodiversity is increasingly at risk. Not surprisingly, the range of species that rely on large tracts of mature forests, such as woodland caribou, is retreating in step with the northward advance of industrial development. “Logging roads are a particular problem. These road networks are rapidly expanding into remote wilderness areas in order to reach a declining timber supply. Once built, they continue to provide avenues for hunters, anglers, and others into previously inaccessible wilderness - increasing the strain on formerly well-protected plant and animal communities.”³⁵ There are over 33,000 km of forest access roads for logging in Ontario leading to an ever increasingly fragmented landscape.³⁶

The loss and fragmentation of habitat has resulted not simply in vastly diminished ranges for many species (e.g., caribou, wolves, bears), it has also caused the expansion of many others (e.g. deer, cowbirds). Both of these changes in the distribution of species fundamentally disrupt natural communities. While change is a given in the evolutionary nature of biodiversity, the rapid pace and large scale of the changes brought by humans have outstripped the ability of many species to adapt, resulting in severe disruptions to biodiversity and the endangerment and extinction of entire species. For example, a recently identified threat of our ever-expanding urban environments involves the fatal collisions of birds with human-built structures, an impact caused by, among other things, light pollution and windows.³⁷ These birds have simply not been able to adapt to the rapid rise of cities. Recognizing that

Habitat Fragmentation and Edge Effects

While habitat loss is a well-known cause of biodiversity loss, habitat fragmentation is of equal concern. “The greater the degree of fragmentation of natural habitats within the landscape, the lower is its capacity to maintain biodiversity.”³³ “When natural areas are fragmented, interior-dwelling species are presented with a habitat edge exposing them to numerous edge effects. These include:

- Increased solar radiation.
- Greater extremes in temperature and humidity.
- Increased wind and desiccation.
- Increased predation and parasitism.
- Increased presence of non-native, competitive species, and pathogens.
- Increased disturbance from noise, water and air pollution, motorized vehicles, vegetation clearing and development.”³⁴

some change is inevitable, we must ask: what are the causes and consequences of the change and how can *we* change so that biodiversity decline can be halted?

Toxic Substances

Discharges and emissions of toxic substances into the air and water and onto land can harm or kill organisms and devastate natural communities.³⁸ Dispersed through activities in agriculture, forestry, mining and other industries, and by municipalities and individuals, these substances are weakening and destroying the bases of major food webs and having major negative impacts on the quality of air, water and land required for the health of all beings.³⁹ Thousands of acid lakes in northern Ontario, rendered essentially lifeless by airborne pollutants, are testimony to the damage that can be done.⁴⁰ In the Great Lakes, a wide range of toxic contaminants is present,⁴¹ affecting the growth, reproductive and hormonal systems of humans and non-humans alike.⁴²

Pesticides are an example of contaminants deliberately introduced into the environment that have played a significant role in the decline of species and the loss of habitat diversity. They may interfere with or cause the breakdown of fundamental biogeochemical processes that support life, including decomposition, mineral oxidation, nitrogen fixation and photosynthesis.⁴³ They are also highly toxic to soil fauna.⁴⁴ Urban use of chemical pesticides and fertilizers is one example. Agricultural landscapes are also of concern,⁴⁵ especially in southern Ontario where farming is intensive and habitat has been severely depleted.⁴⁶ Throughout the province, forestry spray operations are a problem, particularly for non-target species in areas adjacent to or near a sprayed area. Since pesticides can travel far from their original application site through air, water, and soil, their impacts are widespread.⁴⁷

Commercial and Recreational Use

The direct harvest of wild plants, fish and wildlife for commercial use in Ontario includes logging, trapping and fishing. To a lesser extent it also includes the illegal hunting of bears for traditional Asian medicines. Aside from direct mortality to the individuals being harvested, commercial exploitation can also lead to significant population declines, extinctions and loss of genetic diversity.⁴⁸

Commercial fishing, coupled with a wide array of environmental stresses, has contributed to the decline of many species (e.g., Atlantic salmon) in the Great Lakes basin.⁴⁹

Commercial logging has resulted in significant changes in the composition of the Boreal Forest (especially loss of conifers) and a severe decline in old-growth forests (especially in the Carolinian life zone and in red and white pine forests). These changes, in turn, have resulted in population declines in the many species that rely on these habitats. In some cases, certain resource interests that benefit from these changes may discourage the government from trying to adopt a more ecological approach to land and resource management and instead encourage, for example, a timber or game focused approach.

Both consumptive (e.g., fishing, hunting) and non-consumptive (e.g., camping, hiking, mountain-biking) recreation can disturb and destroy plants, fish, wildlife and habitat. The

most obvious examples are overhunting and overfishing. Technological advances (fish finders, all-terrain vehicles, night scopes, infrared binoculars, radios, global positioning systems) and increased access through forestry roads greatly augment the impact of these user groups. In addition, Ontario Ministry of Natural Resources (MNR) policies and procedures for sustaining big game species such as moose, deer and bear have been found to be insufficient in ensuring the sustainability of these species. For example, a 1996 study found that the number of moose was well below the sustainable population target levels in 93% of all wildlife management units within the core moose range.⁵⁰

Meanwhile, the stocking of non-native fish species (e.g., salmonids) by government agencies catering to recreational users still persists despite evidence of negative impacts to native biota.⁵¹ The overuse of an area by less consumptive recreationalists can also have a negative impact on biodiversity through disturbance, trampling, erosion, etc. For instance, of recent concern are the impacts of personal watercraft (jet skis⁵²) that disturb nesting sites and discharge huge amounts of oil directly into waterways.

Non-native Species

Whether accidental or deliberate, the introduction of non-native organisms can seriously disrupt natural habitats and lead to the endangerment and extinction of species.⁵³ When a non-native species establishes itself in a new habitat, controls on its population, such as predators and disease, are often not in place. These organisms may eventually overpopulate, disrupting normal interactions among native species and causing the host community to become unstable.

Few if any natural communities in Ontario have retained their original species composition since European colonization of the area. Non-natives such as Dutch elm disease, chestnut blight, European starling and gypsy moth have all had significant and long-term effects on Ontario's biodiversity.⁵⁵ Over 140 species, including sea lamprey and zebra mussel, have been introduced into the Great Lakes with devastating impacts on native populations and consequently on the fisheries.⁵⁶

Much like non-native species, organisms modified by genetic engineering (OMGE) could pose risks to biodiversity.⁵⁷ For example, genetic diversity within a species could be compromised if novel traits enabled an OMGE to become more invasive of natural habitats or to competitively displace other species. The transfer of genes from an OMGE to a wild relative could result in changes to the genetic structure of wild populations, with unforeseeable consequences.⁵⁸ Further controls at the federal level will be required to reduce the risks associated with OMGE.⁵⁹

Zebra Mussels

The zebra mussel is a non-native species accidentally introduced into Lake St. Clair in 1988. Its explosive growth since then is believed to threaten the ecological integrity of the Great Lakes as well as shipping and sport and commercial fishing. The zebra mussel has the potential to disrupt the food web by voraciously feeding on the microscopic plants needed by aquatic grazers and the larval and juvenile stages of many species of fish. Already there is evidence of reduced growth rates of perch and of the rapid elimination of native North American freshwater clams. Long-term ecological impacts are unknown.⁵⁴

Global Trends

Global trends such as climate change and ozone depletion - the by-products of industrial activities and modern lifestyles - promise to have devastating impacts on the planet's biodiversity. The ozone layer protects life on Earth from deadly ultraviolet rays; its current depletion by synthetic substances such as CFCs is already implicated in the worldwide decline of amphibians and in human health problems. Climate change is suspected to underlie many recent severe weather events that have likewise taken their toll on human and other life.

It is impossible for scientists to prove beyond a doubt the impacts of these global trends on biodiversity. Nevertheless, there is mounting scientific agreement of impending trouble. For instance, according to Harvard scientist E.O. Wilson, "if even the more modest projections of global warming prove correct, the world's fauna and flora will be trapped in a vise."⁶⁰

It is expected that climate change will have a greater than average impact on the biotas of the cold temperate and polar regions - in other words, on the natural communities of places like Ontario. As Wilson explains:

A poleward shift of climate at the rate of 100 kilometres or more each century, equal to one metre or more a day, is considered at least a possibility. That rate of progression would soon leave wildlife preserves behind in a warmer regime, and many animal and plant species simply could not depart from the preserves and survive.⁶¹

Furthermore, organisms in the tundra and polar seas will have no place to go, even with a modest amount of global warming. All the species of high latitudes risk extinction, particularly if they are restricted to low-lying coastal areas (e.g., James Bay), as these will be flooded when the sea rises from the melting of polar ice.⁶²

Institutional Shortcomings

In this section we examine some of the ways that our provincial government and we as a society are organized to deal with environmental concerns. We consider aspects of decision-making processes, the legislative regime, policy and programme limitations, and ministerial jurisdiction. Overall, the picture is alarming. The steps we have taken so far to sustain biodiversity in Ontario are not only inadequate, but have been seriously undermined in recent years.

Decision-making Processes

Failure to acknowledge the importance of biodiversity in decision-making: The government has placed little emphasis on the environmental implications of recent and proposed changes to provincial policies and laws. For example, efforts to streamline the land use planning process resulted in changes to the *Planning Act* that lessened protection

for significant habitat areas. Short-term economic concerns have taken precedence over nearly all other considerations. In Ontario, recent budget and staff cuts to both the natural resources and environment ministries have been particularly severe, reflecting the low priority these areas are to the government. While lip-service is continually paid to the necessary buzzwords (e.g., sustainability, doing more with less), it is evident that environmental considerations, including biodiversity concerns, are not a government priority. The Environmental Commissioner of Ontario (an independent environmental watchdog appointed by an all-party committee of the Legislature) notes that only three ministries mention environmental responsibility in their business plans and that:

Unfortunately, commitments that ministries have made to the environment in their Statements of Environmental Values are not reflected in the majority of the 1997 business plans, which are even weaker than last year's in terms of integrating the environment into ministry business. Mention of the environment has also been deleted from the vision, mission statements, or strategic directions set forth by many ministries in their 1997 business plans.⁶⁴

At a time when public concern for environmental protection remains high and appears to be growing, the government is tending to put environmental considerations at or near the bottom of its agenda. This institutional and governmental failure to reflect the concerns of the citizens of Ontario erects many barriers to the protection of biodiversity and the environment in general.

Information deficiencies: The lack of quality baseline information about biodiversity can seriously hamper conservation efforts. Information gathered through environmental monitoring is key to good environmental decision-making and to evaluate the effectiveness of conservation programs.⁶⁵

In her review of government environmental monitoring programmes, however, the Environmental Commissioner found that “significant environmental information is not being collected, or if it is being collected, is not being analyzed and reported.”⁶⁶ Even where information exists, it is not being used fully to bring about environmental improvement.⁶⁷ The MNR, for example, “has few population surveys for small game species or non-game wildlife, or population estimates for most wildlife species that are vulnerable, threatened or endangered”⁶⁸ and has come under recent criticism for the

Woodland Caribou

The forest-dwelling woodland caribou is an excellent indicator of the systemic effects of large-scale industrial development. A review of its historical and current range and the forestry industry's northward advance leads to a troubling conclusion. In historic times, Champlain noted caribou (rather than deer) along the upper Ottawa and French-Nipissing waterways.⁶³ At present the southern limit of the caribou's contiguous range is much farther north and roughly coincides with the northern limit of industrial forestry. The slow and largely publicly unnoticed retreat of the caribou, with no obvious direct mortality from humans or massive visible die-offs, has allowed the government to ignore the problem. Industry preferences for forestry road access and large-scale clearcutting have trumped the need for protected areas and ecologically sustainable resource use.

mismanagement of those species typically given greater management attention.⁶⁹ The Ministry is also failing to analyze data on big game mortality and to produce provincial or regional reports.⁷⁰

These information deficiencies underline, not only the need for better monitoring and reporting, but also the need to adopt a precautionary approach when planning and implementing conservation measures. While lack of information should not be used as an excuse to avoid action, it does suggest that a large margin for error must be allowed when, for example, designing protected areas, limiting toxic emissions, or dealing with so-called overabundant species.

Traditional Ecological Knowledges

Of great promise to decision-making processes are the traditional ecological knowledges of aboriginal peoples. As environmental problems worsen, these knowledges are increasingly recognized as valuable to conservation because they combine current observation and experience with knowledge acquired over thousands of years of direct human contact with specific environments.⁷¹

One example has been the conservation and traditional harvest of wild rice at Mud Lake, near the village of Ardoch, by local Metis and Indians. Before colonial settlement, most of the wetlands and waterways of southeastern Ontario hosted profuse stands of wild rice, which were cultivated by aboriginal peoples for thousands of years. In the last century, however, canal systems, pollution, exotic species like carp, and the use of motorized airboats to harvest the rice depleted or destroyed most of the wild rice stands in this part of the province. With this loss, traditional wild rice harvesting itself faded. One exception though was a wild rice stand at Mud Lake nurtured by an Algonquin family. Today the rice continues to be managed and gathered according to the traditional methods that have so far ensured its conservation.⁷²

Impediments to public review and participation:

As the Environmental Commissioner noted in her *1996 and 1997 Annual Reports*, there have been profound changes to the environmental regulatory system in recent years. Amendments are pending or have been made to almost half the statutes and regulations prescribed under the *Environmental Bill of Rights (EBR)*.⁷³ Unfortunately, the rapid pace of change, the sheer number of changes proposed within a short period, and lack of consultation have often impinged upon the public's ability to review or participate in the decisions that have been made.

Public participation in environmental decision-making helps to broaden perspectives, prevent oversights, enhance public support and provide important opportunities to draw upon local knowledge and expertise. Unfortunately the MNR has recently made moves to limit such public involvement. Under the *EBR*, ministries must classify the instruments (the legal documents of approval granted by ministries before companies or individuals can carry out activities that can have an impact on the environment) they issue according to how environmentally significant they are. This determines the type of approvals that will be posted on the Registry for public comment and

the extent of the opportunities there will be for public participation, appeal, review and investigation. As the Environmental Commissioner pointed out, however, the MNR is

“using an *EBR* exception to remove many of the ministry’s instruments from public scrutiny, and is proposing another regulation that defines certain instruments as ‘field orders,’ removing them as well from many of the *EBR*’s public participation processes.” As a result, members of the public will not be able to comment on MNR proposals to grant a forest license, or on proposals to supply forest resources to an individual or company. This move on the ministry’s part, which will limit public scrutiny and comment, does not comply with the intent of the *EBR*.⁷⁴

Aspects of biodiversity that do not qualify as significant for protection:

Government and non-government conservation programmes tend to focus their efforts and resources on significant species and landscapes. What is deemed significant is often a question of scale - regionally significant, provincially significant, nationally significant and so on. While it is no doubt important to consider significance from these perspectives, the conservation of biodiversity also requires a more encompassing viewpoint.

Significance, on a provincial scale, for example, may cause us to ignore (and fail to allocate adequate protection to) natural features of regional or local significance.

One of the weaknesses of conservation programmes traditionally has been the tendency to focus on large game and charismatic species. Falling outside the ambit of concern have been non-game wildlife, invertebrates and most plants.⁷⁷ Little information has been gathered about these species and the few existing research and recovery plans have been severely limited by funding constraints.

In terms of habitat protection, the Ontario government has used the standard of significance to cut back on its conservation responsibilities. For example, with the Omnibus Bill (*Savings and Restructuring Act, 1995*), the government decided to limit its funding to Conservation Authorities by granting tax rebates only for lands deemed provincially significant (i.e., provincially significant wetlands, provincially significant Areas of Natural and Scientific Interest, Niagara Escarpment Natural Areas and Agreement forests). Since only 40% of

“Overabundant” Species

When numbers of a particular wildlife species rise, that species can be regarded as “overabundant.” Recent examples in Ontario include Canada geese, double-crested cormorants and snow geese, all of which have provoked considerable animosity and concern. Ironically, in the past these species were targets of conservation initiatives. Now they are targets of proposals to drastically reduce their numbers.⁷⁵ At the turn of the century, for example, hunting of Canada geese resulted in a dramatic reduction of their numbers, and one sub-species, the Giant Canada goose, was thought to have been reduced to near extinction. The Canada goose was subsequently the subject of extensive Canada/U.S.A. conservation programmes. Today, the Canada goose is regarded as “overabundant” in many urban areas and is subject to a variety of control measures.⁷⁶

The issue of overabundant species raises questions about our knowledge of historic population trends and dynamics and about our presumption to manage wildlife populations when the implications of such management are not clearly understood. Ironically, the so-called overabundance is symptomatic of human-induced changes to the landscape (e.g., agricultural fields, woodland edge, wide expanses of lawn), which favour the species in question.

Conservation Authority lands enjoyed this formal designation, the remaining 60% were left essentially unfunded. More recently, the MNR has asked regional district managers to identify Crown lands that are no longer needed and not environmentally significant so that they can be sold.⁷⁸

The significance standard is also being used by the government to justify its minimalist approach to completing the provincial protected areas system. In the Lands for Life process, the MNR's approach has thus far been to identify only "minimum representative core areas" for protection⁷⁹ and to preserve only one small example of old growth forest per site district.⁸⁰ While chosen sites will no doubt be significant and worthy of protection, their designation leaves the rest of the landscape open to industrial development and, on Crown lands, the possibility of long-term perpetual tenure by the forest industry.

Legislative Regime

Current laws: Significant gaps in protection are evident in the existing legislative scheme. For example, while the destruction of fish habitat is regulated under the federal *Fisheries Act* (or at least intended to be so), other species' habitat is not offered similar protection. Likewise, the Ontario *Endangered Species Act* offers no protection to endangered or threatened ecosystems. It applies only to species at the brink of extinction and their habitat - and not those identified as nationally threatened or vulnerable. As well, little attention is paid to invertebrate species.

The widespread use of discretionary language in provincial legislation affecting biodiversity is also a significant problem - and even where mandatory "shall" language is used, the MNR may still try to interpret it as non-mandatory.⁸¹ Because of this discretionary approach, provincial land use policies meant to protect a broad range of environmental values (wetlands, woodlands, endangered species habitat) will not necessarily be followed in all areas. Similarly, crucial determinations such as the issuance of forestry licenses and plans are left to the near total discretion of the MNR. A similar approach to legislative drafting, which leaves crucial determinations in the hands of Ministers or their delegates, was employed in the new *Fish and Wildlife Conservation Act*.

The lack of clear and accessible environmental protection standards in the forestry regulation regime is another significant problem. A myriad of guidelines, codes, manuals, etc. set out the standards applicable to forestry operations. Many of the most important biodiversity values are only protected by non-binding guidelines rather than regulations.

While gaps in protection are a significant problem, there are a number of existing policies and laws that result in the discouragement of biodiversity protection. The *Drainage Act*, for example, works against wetland protection.⁸² In the same way, weed control legislation and by-laws can impede restoration efforts by encouraging the eradication of native species (e.g., milkweed) even though they are relied on by many others (e.g., the monarch butterfly - a species designated as vulnerable). Similarly, the free-entry mining

system often permits prospectors to acquire development rights in areas prior to any determination of the ecological significance of the area.

Lack of enforcement: Reflecting the government’s overall lack of concern for environmental protection, budgets and staffs in the environmental regulation field are decreasing. For example, Ministry of the Environment (MOE) prosecutions of environmental offences are on the decline as evidenced by a nearly 70% drop in fines from 1995 to 1997,⁸⁸ and biodiversity laws generally have never been adequately enforced. For example, the Ontario *Endangered Species Act* has been in place for over 25 years, but, despite a growing list of species at risk, it has yielded very few enforcement actions.⁸⁹ Cutbacks and policy decisions have also resulted in the government failing to abide by environmental standards, with the MNR having been recently found in extreme non-compliance with the *Environmental Assessment Act* and the *Crown Forest Sustainability Act* by the courts, and convicted and fined under the *Environmental Assessment Act* in a separate incident.⁹⁰ The latter case also evidenced the need to update environmental legislation to allow larger fines and other deterrent options.⁹¹

The MNR’s recent decision to withdraw from the administration and enforcement of the *Fisheries Act* (federal legislation typically administered by the provincial governments), without any arrangement with the federal government to properly take over such responsibility, was subject to criticism from the Environmental Commissioner.⁹²

A recent field audit of compliance with forestry standards in the Algoma Highlands north of Sault Ste. Marie found widespread violations.⁹³ The investigation and enforcement capacities (in staffing and budget terms) of the MNR and MOE do not even approach the level necessary to bring about compliance in the field. Since nearly all activities regulated by the MOE and MNR directly or indirectly affect biodiversity, lax enforcement poses a substantial threat to biodiversity in the province. Whether it is

Wetlands

Wetlands are highly diverse habitats where land and water meet and plants and invertebrates flourish. They are the required breeding and feeding ground for thousands of species.

Almost one quarter of the world’s wetlands, including salt marsh estuaries, inland marshes, fens, bogs and swamps, occur in Canada.⁸³

Conversion of wetlands for agriculture and urbanization has resulted in dramatic losses of these habitats. In southern Ontario, less than 30% of the original wetlands remain.⁸⁴ Along the Canadian shores of lakes St. Clair, Erie and Ontario, 35% of the wetlands have been destroyed, with an estimated 83% of the marshland lying between the Niagara River and Oshawa gone or degraded.⁸⁵ Firm policies to protect wetlands are lacking and the losses continue. This is especially true for “smaller, isolated and headwater wetlands that not only provide important breeding and feeding sites for many non-game species but provide valuable ecological services of water filtration and stormwater retention across the (Great Lakes) Basin.”⁸⁶

Recent changes to the *Planning Act* have weakened protection measures even further by applying development controls only to wetlands south and east of the Shield and by removing an explicit requirement for impact studies on developments proposed in or adjacent to wetlands.⁸⁷

hunting, forestry, shoreline development, pollution, etc., any failures to properly enforce legal standards will have a detrimental impact.

Deregulation: Notwithstanding the fact that current laws are inadequate, even existing protection measures are being eliminated or weakened through legislative changes. Discretionary and voluntary initiatives are replacing mandatory obligations. As noted above, changes to the *Planning Act* lessened protection of many environmental values. Mandatory government inspections under the *Aggregate Resources Act* and mandatory pre-development financial assurances under the *Mining Act* have also been eliminated. Permit requirements for pesticide uses, a variety of activities on public lands, and certain aggregate operations on the Niagara Escarpment have also been done away with. In many areas, for example, compliance monitoring for environmental protection is being shifted to the regulated industry itself as part of self-monitoring and voluntary initiative processes, despite evidence that government regulation is key to bringing about compliance.⁹⁵

The MNR came under recent criticism for failing to fulfill a requirement imposed by the Environmental Assessment Board for protecting the physical environment from the negative impacts of forestry operations. The Environmental Commissioner noted:

Although these new [MNR] guidelines could help to protect the physical environment of the forest, the forest industry is required only to consider them - not apply them - even though the Environmental Assessment Board had ruled that use of the guidelines was to be mandatory.⁹⁶

Policy and Programme Limitations

Offloading of provincial responsibilities: In its efforts to balance the provincial budget, the government of Ontario has been transferring responsibilities for environmental protection to municipalities and industry. This transfer is taking place without any

The Niagara Escarpment

As southern Ontario's most prominent landscape feature, the Niagara Escarpment has been a focus of biodiversity protection efforts and has been designated a United Nations World Biosphere Reserve. The Escarpment provides a rich diversity of habitats and micro-climates that support plant and animal life not common elsewhere in Ontario, e.g., hart's tongue fern and eastern white cedars up to 1,650 years old (the oldest old growth in eastern North America). It is a favoured destination for recreation, pumping up to \$100 million into local Escarpment economies each year. The Niagara Escarpment Plan (NEP) was the first and largest-scale land use plan in Canada in which environmental protection is given the highest priority. It represents an attempt to integrate development and protection.

Recent policy changes affecting the Niagara Escarpment are a microcosm of the government's lack of environmental vision. In recent years, the Niagara Escarpment Commission (which administers the NEP) has sustained a 37% budget cut accompanied by massive budget cuts to the 7 conservation authorities in the NEP area.⁹⁴ As well, administration of the *Niagara Escarpment Planning and Development Act* has been transferred from the MOE to the MNR (the same agency that promotes aggregates extraction, one of the greatest threats to the Escarpment).

assurance that the newly responsible parties will be able or willing to take the steps necessary to protect biodiversity. As the province withdraws from environmental decision-making, approaches to protection are becoming increasingly fragmented and uncoordinated. With the removal of the provincial representatives from Conservation Authorities, for example, the provincial perspective and input into watershed management is lost. As well, the decision to consolidate planning matters with the Ministry of Municipal Affairs and Housing will reduce the MNR's role in ensuring wetland protection and inhibit progress towards more ecologically-based land use planning.⁹⁷

The Environmental Commissioner outlined concerns about off-loading in her *1997 Annual Report*:

Many of our findings highlight the difficulties people have in getting a problem resolved when several ministries as well as municipal organizations are involved, or when the province passes down to a municipal level of government new responsibilities and service obligations. Often, there is no evidence the municipal level of government has the capacity to solve the problem. For example, local authorities facing watershed management issues often rely on leadership and advice from the province. These are the kinds of problems that need to be dealt with on an ecosystem basis and not on the basis of political boundaries, and their solution needs provincial leadership to be viable.⁹⁸

Off-loading of responsibilities for environmental protection to industries is one way that government ministries are attempting to cope with budget and staff cuts. The MNR announced in April 1996, for example, that the forestry industry would have to take on more responsibility for some aspects of monitoring and compliance with forestry rules. The Environmental Commissioner has criticized the Ministry for the fact that the policies, procedures and guidelines for the forestry industry have been developed and approved without public consultation.⁹⁹

The forestry industry's intention to comply with regulations is cast in doubt, furthermore, by a recent study of forestry operations conducted in the Algoma Highlands. This study found violations of guidelines and regulations at over half of the sites investigated.¹⁰⁰

Funding cutbacks to conservation programmes: In recent years there have been drastic funding cutbacks to conservation programs and agencies. With the passing of the Omnibus Bill (*Savings and Restructuring Act*, 1995), for example, the provincial funding of Conservation Authorities was reduced by 70%, severely limiting the ability of these agencies to undertake such activities as erosion control and watershed management. Similarly, a recent Ontario government report declared that as of 1997, provincial funding would no longer be available for watershed or subwatershed planning projects.¹⁰¹ Notably absent from the decision-making processes leading up to these cutbacks has been any concerted effort to determine the long-term savings that regulation and protection initiatives bring about by preventing problems from occurring in the first place.

As the Carolinian Canada Steering Committee points out in its *1997 Summary Report*, without adequate funding from provincial and federal governments, financial responsibility falls unfairly on the shoulders of others, and conservation measures are consequently limited:

The benefits of conservation are spread far too wide to be captured by local sources alone. In particular, the two senior levels of government have legislated responsibilities and international commitments to conserving biodiversity. They should be expected to be significant funders of conservation activity, both for their own functions and in partnership with others.¹⁰²

Inadequate protected areas system and roadless wilderness policy:

While the provincial government has committed itself to satisfying the Endangered Spaces campaign (a proposal to complete a system of protected areas to represent each natural region) by the year 2000, progress has been slow. At present, of Ontario's 65 terrestrial natural regions, only 5 are considered adequately represented in the protected areas system, 11 moderately represented, 26 partially represented, and 23 have little or no representation. As for marine regions, there is still only one marine protected area in the province. The three most recent annual World Wildlife Fund Canada (WWF) report cards on protected areas gave Ontario "F", "C-" and "D+" grades for terrestrial protected areas and three "D" grades for marine.¹⁰⁸

The MNR approach to interpreting the Endangered Spaces campaign is significantly flawed. As revealed by the provincial government's recent Lands for Life land use planning process, the MNR may seek to satisfy the campaign's primary goal (representation of all the province's natural regions) through minimal representative samples that will be unable to provide adequate habitat for wide-ranging species or allow for natural disturbances such as wildfire. According to this minimalist approach, the MNR justified recent plans (later declared illegal in court) to cut old-growth pine forests in Temagami (already reduced to less than one per cent of their original extent) on the basis that the area to be cut was not significantly different from previously protected areas. The approach completely ignored crucial factors such as natural disturbance regimes, ecosystem rarity, predator-prey systems, and successional

Old Growth Forests

Old growth forests offer critical habitat for plants and animals that young forests are unable to provide. Characterized by complex canopy structure and varying microclimates, old growth forests are the preferred habitat of many species.¹⁰³ Because they contain, for example, old, dead, dying and downed trees, they provide habitat for numerous hole-nesting and insectivorous species such as red-headed and pileated woodpeckers and northern flying squirrel.¹⁰⁴

Sadly, less than 2% of the Great Lakes basin's old growth forests remain. Their absence adjacent to lakes impedes the reoccupation of shoreline areas by top aquatic predators such as bald eagle and osprey.¹⁰⁵ Similarly the loss of mature conifer forests in northern Ontario threatens the preferred habitat of such species as boreal owls, broad-winged hawks and American martens.¹⁰⁶ Despite the losses, the MNR aims to protect only one small example of old growth forest in each site district.¹⁰⁷

stages, which would have demonstrated the need to protect additional old-growth forest areas to achieve adequate ecological representation in Temagami.¹⁰⁹ Should this minimalist approach remain MNR policy, significant tracts of valuable habitats will be assigned to industrial development rather than protected areas, thereby diminishing biodiversity protection prospects in the province.

In keeping with its attempts to maximize the amount of land available for development, the MNR has failed to comply with the intent of the Environmental Assessment Board's requirement to create a Roadless Wilderness Policy for use on forest management lands. Logging roads have a number of devastating impacts on biodiversity including direct impacts on fish habitat, water quality, and fish migration, and indirect impacts such as habitat fragmentation and increased access by recreationalists, mining prospectors, hunters and anglers (often leading to overuse and introduction of invasive species). The MNR's failure to establish roadless wilderness areas within the managed forest land base will cause further reductions in biodiversity.

Privatization and sale of public resources: Despite the fact that public lands are owned by all Ontarians, province-wide consultation does not have to be (and typically is not) carried out on their sale. In recent years, the MNR has looked to sell public lands as a source of revenue and has proposed legislative changes to further encourage this approach to revenue generation.¹¹³

The MNR is also planning to dispose of other Crown resources such as forests through long-term tenure agreements with the forestry industry. Because the forestry industry's primary purpose is to generate revenue from the cutting of forests, increased industry control of our forests will likely lead to increased forest habitat loss and subsequent threats to biodiversity.

Ministerial Jurisdiction

Carolinian Canada

The Carolinian life zone, lying south of a line stretching roughly from Grand Bend to Toronto, is Canada's most diverse terrestrial region in species richness. It is:

- home to more endangered and rare species than any other life zone in Canada,
- the only home for over a third of Ontario's imperiled plants,
- home for 52% of the vertebrate animal species most at risk in Ontario, and
- home to 65% of Canada's species at risk.¹¹⁰

Carolinian Canada is also the most urbanized and intensively farmed landscape in the country, with the result that loss and fragmentation of original wetland, savannah and forest habitats have been and continue to be severe. In addition, the human population in this region has increased 37% in the past 25 years; this trend is expected to continue.¹¹¹ Given these pressures and the area's incredible biological richness, there is an urgent need to put adequate conservation measures into place.

Despite the wide range of conservation programmes in place in Carolinian Canada, funding cuts have seriously reduced their effectiveness. For example, important programmes related to forest management and water quality restoration have been canceled. Loss of biodiversity continues, with over a third of the region's natural communities classified as imperiled or vulnerable to extinction in Ontario.¹¹²

MNR's dual mandate: In designing a governmental system to protect environmental values such as biodiversity, it is essential that the regulating agency have a clear environmental protection mandate. The MOE has little direct jurisdiction over biodiversity issues and concerns itself mainly with pollution regulation. Unfortunately, nearly all important biodiversity values (e.g., fish, wildlife, parks, Niagara Escarpment, public lands) are regulated by the MNR, an agency which is more in the business of promoting resource extraction (e.g., forestry, aggregates) than it is in promoting environmental protection. Because of this dual mandate, conflicts arise between the MNR's historical and still central role in developing the province's natural resources and the MNR's more recent attempts to protect them. Especially in times where short-term economic policies trump ecological priorities (as is the case with the present government), the MNR's role in protecting biodiversity becomes quite minimal. Efforts concentrate on satisfying the needs of the MNR's perceived primary clients (i.e., industry) rather than its actual clients (i.e., the people of Ontario). Without a separate agency advocating for biodiversity protection, such concerns fall by the wayside.

By way of example, the MNR put proposed guidelines for forestry management (protecting the physical environment from rutting, soil erosion, nutrient loss and impacts on surface and groundwater) on the *EBR* Environmental Registry in 1997, stating that significant changes to standard operating practices may be required to protect sensitive sites. And yet, when a forestry company challenged the ministry's estimates of the potential risk of these impacts and objected to many of the recommended practices, the ministry removed many of the recommended restrictions on forestry operations.¹¹⁴

ENVIRONMENTAL MOVEMENT'S VISION FOR THE FUTURE

General Vision:

The entire array of biodiversity values is maintained across the province and where possible restored, and henceforth is permitted to evolve naturally into the future.

Specific Components:

- Ecological processes and evolutionary changes are permitted to carry on without human interference.
- The populations and ranges of all current species at risk (vulnerable, threatened, endangered or extirpated) are recovered to self-sustaining levels.
- No further species are threatened, endangered or extinguished as a result of human activity.
- A permanent system of protected areas free from industrial use is established which represents all natural regions and features of the province, permits natural disturbances to continue, and harbours adequate habitat for all native species.
- Significantly degraded habitats and natural communities greatly reduced in extent are restored to healthy levels.
- Unique, rare and significant features are given recognition and permanent protection.
- The introduction of further non-native species is halted, and those that are already present and adversely affecting native species are brought under control.

- The stewardship of private lands fosters the protection of biodiversity.
- The management of public lands open for industrial use sustains biodiversity at the local, regional and provincial levels.
- Laws protecting biodiversity are enforced and applied equally to all, and used to support conservation action.
- Adequate government resources and incentives are put towards sustaining biodiversity.
- The public possesses a broad awareness of the importance of ecosystems, natural communities and biodiversity in general and that awareness is reinforced through the education system.
- Broad community action to support conservation exists.
- The release of contaminants that harm biodiversity is virtually eliminated.
- Ecological sustainability is, in policy and practice, the overriding priority of all levels of government and the public.

APPROACHES AND RECOMMENDATIONS

This section briefly sets out promising biodiversity protection initiatives followed by recommendations for further action. While the federal government, industry, municipalities, non-governmental organizations (NGOs) and citizens all have roles to play in biodiversity protection, our task here is to outline steps that need to be taken by the provincial government. The recommendations are organized as follows: protecting key elements of biodiversity, addressing threats, sustainable use, legislation, improved understanding, and organizational reform

Protecting Key Elements of Biodiversity

Completion of the Protected Areas System

As recognized in the *Biodiversity Convention*, habitat protection is the first step to be taken in maintaining biodiversity.¹¹⁹ Protection is, in fact, the primary objective of the Provincial Parks system in Ontario. Fortunately, all of our conservation reserves and provincial parks (except Algonquin) prohibit industrial development, unlike a number of other jurisdictions in Canada. As well, with the recent creation of a coordinated parks agency, Ontario Parks, there has been a renewed commitment to developing management plans for each park.

Economic Implications

The costs and benefits of biodiversity conservation recently have been the subject of much attention and research. The regularly published federal study on *The Importance of Wildlife to Canadians*¹¹⁵ helps quantify some aspects of the significant positive socioeconomic impacts stemming from biodiversity. It shows a steady rise in total expenditures by Ontario participants in wildlife-related activities in recent years.¹¹⁶ The MNR estimates that recreational fishing, hunting and wildlife viewing contribute more than \$5 billion annually to the Ontario economy and provide approximately 100,000 jobs.¹¹⁷ Other obvious major benefits include direct commercial harvesting of wild species (e.g., forestry, fisheries), air and water purification, medicines and agricultural crop development.¹¹⁸ While it is clear that implementing the recommendations contained herein will involve substantial government expenditures, they are greatly outweighed by the long-term economic, social and environmental costs of failing to act to sustain the biodiversity of Ontario.

In the opinion of all the leading conservation organizations in the province, however, the protected areas system is far from completed. To this end, the Endangered Spaces campaign, led in Ontario by WWF and the Wildlands League (WL), sets out a science-based approach for developing a system of protected areas that represents each of the province's natural regions. WWF, WL and the Federation of Ontario Naturalists (FON) have mapped out the necessary system for a large portion of northern Ontario. Such a system would have the advantage of protecting large numbers of species, including species at risk.

While the Ontario government has officially endorsed the Endangered Spaces campaign and committed to implement it, its interpretation of the campaign's requirements so far involves only a system of minimal protected areas that are too small to protect wide-ranging species and that permit natural disturbance patterns to continue.

An additional concern in the creation of protected areas is that the interests of aboriginal people be considered. Treaty and aboriginal rights must be respected. Where proposed protected areas may impinge upon aboriginal interests, those groups affected should be involved in the planning and management from the outset.¹²⁰

Recommendations:

The Government of Ontario should:

- permanently protect the proposed protected areas system for the Lands for Life planning region identified by WWF, WL, and FON from industrial development through provincial parks and conservation reserves designations;
- identify and protect a similar system for the remainder of the province;
- for the already degraded southern Ontario landscape, protect existing remnants of natural habitat and create a new restoration class of reserves to recreate adequate habitat to complete the system of protected areas;
- ensure that the creation of new protected areas respects all treaty and aboriginal rights;
- implement the provincial protected areas system in a manner that: preserves or recreates connections amongst protected areas, provides buffer zones around protected areas, permits natural disturbances to continue and wide-ranging species to thrive, and is in keeping with the precautionary principle which favours conservation where knowledge is incomplete;
- amend the *Provincial Parks Act* to: require the maintenance of ecological integrity as the overriding objective, prohibit industrial development in all parks and conservation reserves, make the preparation of park management plans mandatory, provide for a system of ecological reserves protecting unique and sensitive sites from disturbance, and provide for a system of restoration reserves in areas of high degradation;
- develop a policy and system of substantial roadless wilderness areas in the industrial use zones to increase the protection of biodiversity outside protected areas; and
- consolidate management of parks, conservation reserves and roadless areas under one parks agency and legislative scheme.

Protection of Ecological Processes

The protection of individual species and habitats will not preserve biodiversity unless the ecological processes upon which all species depend are also protected. While the adoption of the present recommendations will foster the protection of ecological processes, specific emphasis must be placed on maintaining such processes as pollination, nutrient cycling, nitrogen fixation, and mycorrhizal associations.¹²¹ Many government activities, such as the MNR's and Ministry of Agriculture's promotion of the use of pesticides, which detrimentally affect ecological processes, have not been properly assessed and regulated.

Recommendations:

The Government of Ontario should:

- conduct an independent audit of all government legislation, policies and activities affecting biodiversity to determine how they can be modified to better foster the protection of biodiversity and ecological processes, and then implement the recommendations of the audit.

Programmes to Protect Wildlife Including Species at Risk

The MNR and NGOs participate in the two government-led national programmes for species at risk: the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which lists species at risk, and the Recovery of Nationally Endangered Wildlife (RENEW), which develops recovery plans for some species at risk. In Ontario, there is also an additional listing body, the Committee on the Status of Species at Risk in Ontario (COSSARO). In addition to government programmes, WWF's Endangered Species Recovery Fund funds scientific research and action necessary for the recovery of Canada's species at risk; this is an essential step in preparing and implementing recovery plans. WWF's toxicology programme advocates a reduction in use of pesticides including those that harm species at risk.¹²² The Canadian Nature Federation (CNF) is attempting to address the shortage of data on less well-known species at risk such as invertebrates. Ontario has an outdated and rarely enforced *Endangered Species Act (ESA)* and has endorsed the *National Accord for the Protection of Species at Risk*, but has done little to implement it. Additionally, the significant deficiencies of the province's general wildlife management policies have been uncovered recently by the Provincial Auditor. However, the MNR's recent decision to terminate the spring bear hunt may be a sign that more efforts will be made to reform wildlife management policies.

Recommendations:

The Government of Ontario should:

- amend the *Endangered Species Act* to: include all extirpated, endangered, threatened and vulnerable species and their habitat, require mandatory recovery plans for all listed species, remove the "wilful" requirement from the prohibition section, require the mandatory adoption of a list of species at risk regularly updated by a scientific committee, and incorporate all of the commitments made in the National Accord;
- develop and fund the programmes necessary to ensure that wildlife legislation is enforced and that all identified species at risk are recovered;

- require land use planning decisions to be consistent with the Natural Heritage section of the *Provincial Policy Statement* (which includes protection for the habitats of species at risk) under the *Planning Act*;
- improve wildlife management by updating baseline information and monitoring with a view toward maintaining healthy, self-sustaining populations and preventing any further species from becoming at risk; and
- implement a research and incentive programme to reduce the fatal collision of migrating birds with human-built structures

Addressing Threats

Control of Non-native Species

In order to promote public awareness of the impacts of non-native species on biodiversity, NGOs have published and distributed educational materials and are actively lobbying governments to fund research programs on the control of non-native species in the Great Lakes basin. Despite government and non-government efforts, non-native species introductions continue and their effects worsen.

Recommendations:

The Government of Ontario should:

- prohibit the intentional introduction of non-native species (including organisms modified by genetic engineering) without environmental assessment studies on potential impacts,¹²³ and develop guidelines for control grounded in the precautionary principle prior to licensing the introduction;
- develop educational materials to teach about the consequences of introducing non-native species;¹²⁴
- support research into the extent of introductions and the ecological damage being caused to native biodiversity by non-native species;¹²⁵ and
- adequately fund research programmes to develop strategies to understand, deal with and where possible reduce the ecological impacts of non-native aquatic species such as zebra mussels and sea lamprey in the Great Lakes.¹²⁶

Reduction and Elimination of Toxic Substances

Numerous NGOs have been involved in efforts to promote awareness of the impacts of toxic substances on biodiversity and have urged governments to put into place legislation and incentives to reduce and eliminate the use and production of such substances. They have played a critical role in pulling together scientific information demonstrating the impacts of contaminants on humans and wildlife. Through public awareness campaigns, they have provided target groups such as farmers with information on the impacts of pesticides and have also sought to educate the general public about the dangers of common household cleaners. NGOs are supporting organic farming and ecoforestry initiatives as pesticide-free alternatives to industrial agriculture and forestry. Government efforts on specific substances of concern such as DDT have been effective, but progress on many fronts has been slow. Ontario's industries constitute one of the largest pollution sources on the continent.

Recommendations:

The Government of Ontario should:

- support efforts to reduce and eliminate the introduction of toxic contaminants into the environment through funding, public education and policy and legislative reform;
- set an unequivocal goal of zero discharge for all persistent toxic substances; and
- support initiatives and pilot projects in organic and sustainable farming and ecoforestry through funding and policy reform.

Sustainable Use**Improved Resource Use Practices**

While a properly planned protected areas system will be able to protect many biodiversity values, resource use activities outside the system must also be managed to sustain biodiversity. Where resource use is ongoing, better practices can be implemented to help mitigate the adverse effects associated with such use. A recent unsuccessful attempt by the MNR to convince a court that its old timber management approach to forestry was sufficient to satisfy new obligations under the *Crown Forest Sustainability Act* helps demonstrate the provincial government's reluctance to embrace sustainable use in practice.¹²⁷

Recommendations:

The Government of Ontario should:

- reinstate the requirement for financial assurances to be put in place before mining activities are approved;
- reinstate mandatory government inspections of aggregate operations;
- replace the free-entry mining system with a regime that places the protection of biodiversity as the top priority;
- replace the wide array of non-binding guidelines for forestry with mandatory requirements to protect biodiversity values;
- replace the minimal 3 metre streamside buffer requirement for forestry operations with a minimum 30 metre no-harvesting zone around all watercourses¹²⁸ (while allowing for a greater buffer zone for more significant features); and
- where industry receives benefits from the utilization of public lands, require it to pay for the programmes necessary to protect biodiversity on such lands (the user pays principle).

Private Land Stewardship and Acquisition

Because much of Ontario's threatened biodiversity coincides with the largely privately held southern Ontario landscape; private land stewardship to protect biodiversity is essential. Carolinian Canada and other organizations work with private landowners to try to improve biodiversity protection with the use of such tools as conservation agreements, easements and covenants. The provincial government has put in place a number of measures to improve biodiversity protection on private lands (e.g. easements, provision of plants and information, reductions of taxes for some woodlands, conservation lands, Niagara Escarpment Natural Areas, and endangered species habitats).

A number of NGOs protect biodiversity and habitat by direct acquisition of land. The provincial government currently provides some funding and tax incentives for the acquisition of significant areas. Unfortunately, some lands acquired for conservation purposes are now being logged for profit by government agencies such as local Conservation Authorities.

Recommendations:

The Government of Ontario should:

- support the acquisition of conservation lands by local land trusts and other bodies through substantial grants and other incentives;
- broaden the scope of lands eligible for favourable tax treatment to all lands expressly dedicated to long-term conservation;
- publicize private land stewardship options and encourage landowners to utilize conservation incentives by providing information and advice;
- prohibit commercial logging and other harmful development on conservation lands acquired with the assistance of charitable organizations; and
- develop, fund and implement a major land acquisition programme in southern Ontario to help complete the protected areas system.

Ecological Restoration

Protecting in the sense of preserving landscapes is not an option in those parts of Ontario where natural systems have been destroyed or degraded over large regions by agriculture, urbanization and industrial activities. In these areas, one promising approach to biodiversity conservation, supported in large part by NGOs such as the Evergreen Foundation, is ecological restoration. Restoration projects aim to repair "damage caused by humans to the diversity and dynamics of indigenous ecosystems"¹²⁹ through the reintroduction of native species and the re-creation of native habitats, ideally taking into account both genetic and broader landscape diversity.¹³⁰ In some cases, these efforts represent a means of linking and expanding upon isolated fragments of natural areas. Since restoration projects often involve volunteers, children and local residents, they also provide an opportunity to educate the public about native species, ecological relationships and biodiversity through hands-on experience.

Recommendations:

The Government of Ontario should:

- support ecological restoration projects through partnerships, funding, recovery programmes and the provision of expertise;
- undertake restoration projects in Provincial Parks, especially those in southern Ontario that have suffered biodiversity loss through over-development, over-use, and the introduction of non-native species;
- initiate policy and legislative reform to require those who engage in industrial activities on public lands and waters to actively restore biodiversity and ecosystem function to those sites upon completion of their projects; and
- Revise the *Weed Control Act* and its regulations so that they do not impede conservation and restoration efforts.¹³¹

Legislation

Legislative Reform

The provincial and federal governments have passed a wide range of laws to help promote the protection of biodiversity, but there are serious shortcomings. For example, most species are offered little to no habitat protection in legislation even though it is recognized that habitat loss is the most important cause of decline. As well, Ontario's recent policy commitments, such as the *National Accord for the Protection of Species at Risk*, have not been implemented through the required legislative improvements. In all, significant legislative efforts are required to fill in gaps in protection and to better protect biodiversity through the use of clear mandatory duties and prohibitions.

Recommendations:

In addition to implementing the specific legislative reforms recommended in other sections, the Government of Ontario should make the following general legislative changes:

- amend current legislation and regulations affecting biodiversity to replace discretionary powers to protect biodiversity with mandatory duties where possible;
- add the protection of biodiversity and ecological processes as a fundamental purpose of legislation affecting biodiversity;
- pass legislation to better protect the many species afforded little or no habitat protection (e.g., birds); and
- widen the scope of the *Environmental Assessment Act* to include all proposals and permitting processes that may significantly adversely affect biodiversity values, and phase out the use of exemptions.

Enforcement and Implementation of Laws, Regulations and Policies

Progressive biodiversity protection laws and policies are only useful if enforced and implemented. Too often, important improvements on paper do not have their intended effect on the ground because of a lack of resources and political will. The government has the central role and responsibility to undertake enforcement and carry out implementation. Declining enforcement on the part of the MOE and the MNR is reducing the effectiveness of existing legislative standards protecting biodiversity and the environment in general.

Recommendations:

The Government of Ontario should:

- allocate adequate government resources to fully enforce laws that directly concern biodiversity (e.g., *Fish and Wildlife Conservation Act*, *Endangered Species Act*, *Provincial Parks Act*, as well as those federal laws in which the provincial government has an enforcement role to play: *Fisheries Act*, *Migratory Birds Convention Act*) and general environmental protection laws whose proper enforcement will also benefit biodiversity (e.g., *Environmental Protection Act*, *Ontario Water Resources Act*, *Environmental Assessment Act*);
- develop an effective inspection, reporting and audit system that will accurately assess the degree of compliance with all laws, regulations and policies intended to protect the environment;
- allocate adequate government resources to fully implement policies to protect biodiversity (e.g. *Biodiversity Strategy*, Nature's Best Program, Natural Heritage portion of the *Provincial Policy Statement*);
- reduce barriers to citizen enforcement actions by amending the *EBR* to: remove requirement for citizens to show unreasonable government action before proceeding with enforcement actions to protect the environment, and restrict awards of costs against citizens to clearly frivolous cases; and
- require the MOE and MNR to issue timely annual compliance and enforcement reports to the Ontario legislature that provide detailed and complete data on who is in non-compliance, who was prosecuted or levied with administrative penalties, and who was convicted.

Improved Understanding

Research and Monitoring

While monitoring does not protect or restore biodiversity *per se*, it is vital to making informed decisions regarding the environmental consequences of activities and decisions. Biodiversity declines can result from decisions made in the absence of proper baseline monitoring data. NGOs, as well as most Ontario universities and thousands of volunteer naturalists and landowners contribute to the research and monitoring agenda but significant government resources are required to implement a comprehensive biodiversity research and monitoring programme. The creation of the public/private partnership Natural Heritage Information Centre is a positive step towards improving access to research information.

Recommendations:

The Government of Ontario should:

- develop and implement a biological survey equivalent to the Ontario Geological Survey, including as potential partners: Natural Heritage Information Centre, universities, colleges, museums, Ontario Parks, ministry research branches, environmental groups;¹³²

- establish and run a voluntary land registry that includes both regulated protected areas and comparably protected natural areas (e.g., fish and wildlife management areas, Conservation Authority lands, Biosphere Reserves, private nature reserves, First Nation protected areas);¹³³
- substantially increase funding available for biodiversity research and training;
- initiate a programme to properly inventory and study less well-known species such as plants and invertebrates; and
- complete the inventory of significant natural features meant to be protected under the Natural Heritage section of the *Provincial Policy Statement*.

Education

Biodiversity and conservation efforts will be of little long-term value without public, community and school-based education efforts that promote awareness of existing problems and foster an ethic of conservation. Current approaches of ENGOs include the publication of field guides, magazine articles and reports, programmes for school groups, and interactive exhibits at museums and interpretive centres. Hands-on, participatory approaches to education through involvement in specific projects (e.g., biological surveys, research, habitat restoration, stream clean-ups) are supported, organized and carried out by many ENGOs and have proven particularly effective.

In addition to these efforts, biodiversity and conservation issues should be emphasized in the public school system. Unfortunately, recent funding cutbacks to education are hampering the ability of many Boards of Education to maintain outdoor education centres where the bulk of environmental education often occurs.

At the post-secondary level, there is a need for an increased emphasis on natural history and conservation education.¹³⁴ Trained researchers are required to carry out recovery projects. Land, wildlife and water resource managers currently in the field also need to receive training in the science of conservation biology.¹³⁵

Recommendations:

The Government of Ontario should:

- support the biodiversity and conservation education programmes of ENGOs through partnerships and funding and by reaching out to educators through workshops and educational materials;
- provide adequate financial support to maintain and enhance environmental education programmes at all levels;
- integrate environmental education programmes across the curriculum;¹³⁶ and
- ensure that government employees whose work relates to resource management or impinges upon the conservation of biodiversity receive training in conservation biology.

Organizational Reform

Holistic, Consistent Planning Frameworks

While NGOs recognize the importance of involving local citizens and agencies in conservation initiatives, they also underline the need to maintain a broader provincial perspective in land use planning and to integrate approaches to conservation across the landscape.¹³⁷ Recognizing that the division of land and waters along municipal and property boundaries does not respect naturally defined boundaries, they advocate watershed, landscape or ecosystem approaches to planning.

The recent withdrawal of government support from watershed planning initiatives and from such agencies as the Niagara Escarpment Commission and Conservation Authorities is a step in the wrong direction and needs to be corrected.

Recommendations:

The Government of Ontario should:

- encourage the development of watershed management plans at the local level, and provide both technical and financial resources and assistance to municipalities and Conservation Authorities in developing and implementing such plans;¹³⁸
- renew its commitment to Niagara Escarpment protection through: improved funding for a Niagara Escarpment Commission (NEC) that retains full administration of the Niagara Escarpment Plan (NEP), and assurance that all future appointments to the NEC are committed to support the NEP;¹³⁹
- appoint provincial representatives dedicated to biodiversity conservation to all Conservation Authorities; and
- restore biodiversity protection measures under the *Planning Act* and the Natural Heritage section of the *Provincial Policy Statement*.

Public Participation

NGOs have long recognized the need to ensure public awareness of and participation in matters relating to conservation. Approaches have included education programmes, publications, citizens' guides, letter-writing campaigns, workshops, and public meetings. Involvement in government processes around land use planning, forestry management and park management has also been encouraged. Groups like the FON actively support Environmental Advisory Committees whose role is to provide local municipal councils with advice and expertise regarding the environmental aspects of land use planning.

Given the recent downloading of responsibilities for environmental protection to municipalities, the Ontario government has a duty to ensure that citizens and agencies at the local level have the means and expertise to assume these responsibilities and to ensure the protection of biodiversity.

Recommendations:

The Government of Ontario should:

- ensure there is improved public participation in land use decision-making through public consultations involving: Ontarians from all parts of the province; First Nations; public scrutiny of the best available information; and adequate public comment periods on the Environmental Registry;¹⁴⁰ and

- provide information and expertise regarding biodiversity conservation to citizens and agencies involved in land use planning and management.

Government Reorganization

Because the MNR's dual mandate of resource extraction and resource conservation has not permitted it to adequately protect biodiversity, a governmental reorganization would facilitate greater biodiversity protection.

Recommendation:

The Government of Ontario should:

- transfer responsibilities for biodiversity protection including administration of parks, public lands, conservation authorities, Niagara Escarpment, fish, wildlife and endangered species from the MNR to a new ministry, which may be combined with the existing Ministry of the Environment.

Addressing Global Concerns

Under international agreements and as a wealthy people enjoying the benefits of an advanced industrial society, Ontarians have a global responsibility to conserve biodiversity.

Recommendations:

The Government of Ontario should:

- participate in regional, national and where appropriate international cooperative efforts to conserve biodiversity; and
- identify linkages to global issues and address them domestically.

ENDNOTES

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