

Protecting What Sustains Us *Ontario Biodiversity Strategy*

Working Draft For Public Comment



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Preface

The Ontario Biodiversity Strategy belongs to the people of Ontario, their children and grandchildren.

The process involved in developing this Working Draft reflects the fact that the Ontario Biodiversity Strategy must be “owned” by a broad spectrum of our society in order to be successful.

Government can be a change agent and a partner in implementation, but it cannot be the only actor on this stage. Protecting the diversity of life on Earth – of which we humans are an integral part – requires broad societal consensus and participation.

It is a challenge not for some of us, but for all of us.

The Working Draft was generated through an inclusive process that invited the public and partners in. In October, 2004, the Minister of Natural Resources, Hon. David Ramsay, brought together a representative group, including environmental, industry and Aboriginal leaders, to discuss moving forward on a strategy. With their enthusiastic support, the process of developing a strategy was launched.

From the beginning, the public has been welcomed into the process through a web-based Biodiversity Workbook that provided information to get people thinking and asked for feedback.

Teams with individuals from government and non-government organizations were put to work drafting ideas about how to meet the challenges that Ontario faces and capitalize on its opportunities. Their ideas were critiqued by a team of reviewers. In this way, a constant flow of opinion and dialogue was encouraged.

More than 200 people from over 20 non-government organizations, 12 provincial government ministries and agencies, the federal government, academic institutions and Conservation Authorities volunteered as team members and reviewers.

When the Working Draft is revised and refined, based on feedback, a Final Draft will be posted on the provincial Environmental Bill of Rights (EBR) Registry for further public vetting, after which the Strategy will be finalized.

Developing a strategy is, of course, just the beginning. The Ontario Biodiversity Strategy will achieve its goals and realize its vision only if all Ontarians and all sectors of society engage in “*protecting what sustains us*”.

1 Introduction

The Ontario Biodiversity Strategy is about protecting what sustains us – our collective life support system.

Biological diversity or biodiversity refers to the variety of life, as expressed through genes, species and ecosystems, that is shaped by ecological and evolutionary processes.

The human species depends on biodiversity for its survival. The Earth, our ecosphere, cleans the air we breathe, recycles and purifies the water we drink, absorbs the waste we produce, provides us with food and fuel and shelter, stabilizes and moderates climate, and generally nurtures our bodies and feeds our spirits with nature's beauty, both serene and wild.

The diversity of natural life also provides enormous economic and community benefits through the use of biological resources in forestry, farming, fishing, recreation and other activities. Many Ontarians depend for their living on the natural capital that is created by biodiversity.

For millennia, humankind has existed in balance, more or less, with the other parts of nature. But with growth in the world's population, spread of industrialization, sprawl of urban settlement and intensive use of natural resources, the footprint that people have put on the Earth is now so large and so deep that we are overwhelming the capacity of our natural life support system to cope.

A clear sign that natural ecological processes are stressed is the global extinction of species. It is not just the numbers of species that are being lost that is of concern; it is the pace at which they are disappearing. It has been estimated that fully one-quarter of all the species on Earth could be lost forever in the early decades of this century.¹ They are dying out for many reasons, including destruction of habitat, disruption of the food chain on which they depend, the effects of harmful substances on reproduction, and over-harvesting.

Ecosystems can be very small, like a pond, or very large like the Hudson Bay Lowlands, a far northern ecozone that makes up about one-quarter of Ontario or some 25 million hectares. Ecosystems are characterized by what grows, lives and dies in that space and the interactions of air, water, soil, rock and living organisms. Within an ecozone, there can be many different ecosystems, like forests, wetlands or grasslands. Our largest ecosystem is the Earth, called the ecosphere.

¹ Environment Canada, *Canadian Biodiversity Strategy*, Ottawa, 1995, p. 12.

Ontarians are fortunate to be the stewards of 107 million hectares of land and water. About two-thirds (about 70 million hectares) of the province is forested. Within this province, there are a quarter of a million lakes, thousands of rivers and streams, and large portions of the Great Lakes, which hold nearly 20% of the world's fresh water. Ontario includes three large and very different ecozones in which a host of species have adapted to climatic and other conditions.

Ontario is home to hundreds of vertebrate species, including more than 80 mammals and more than 470 bird species, about 60 reptile and amphibian species, more than 160 species of fish and over 20,000 species of insects, spiders and other invertebrates. There are more than 3,380 species of plants and more than 1,000 species of fungi and algae, and hundreds of lichens and mosses and ferns.

While Ontario still has large areas in the far north where human activity has had relatively little impact, ecosystems in southern Ontario, where the bulk of the population lives and works, are under enormous pressure. About 40% of the species at risk in Canada occur in this province, and the majority of those species are found in southern Ontario. Ontario has been a leader in protecting its biodiversity – enacting the first legislation in Canada to protect specific species at risk, for example – but biodiversity is threatened here, as it is globally, by the cumulative impacts of industrialization and urbanization.

What Does It Matter?

What does it matter if we are losing some of the variety of natural life? There are several answers.

At the level of genes, diversity can provide living things with the potential to survive changes in their environment. The evidence is everywhere of how various species have evolved and adapted over time to live in different climates and ecosystems in different parts of the world. This adaptability, stored in their genes, is the key to their future.

In Ontario's far northern boreal forest, with its long cold winters, the lynx, with paws like snowshoes, can travel in the deep snow, while the wolverine relies on tunnels underneath the snow cover. Black spruce and jack pine dominate the forest because they can capture and photosynthesize sunlight at low temperatures. In contrast, in the rare savannahs of southern Ontario are tall grasslands, black oak trees, and butterflies like the Mottled Duskywing or birds like the Northern Bobwhite that depend on plants and seeds that flourish in warm open spaces full of sunlight.

At the level of the ecosphere, biodiversity maintains what are called ecological “services” which are basic to life on Earth. They include the production of oxygen and removal of carbon dioxide from the air by green plants processing sunlight, the breaking down of organic matter in the earth by fungi, bacteria and other organisms, and the storage, filtering and recycling of water within watersheds.

These ecological “services” are essential to human health, as well as the health of other living things. The availability and quality of water matters not only because we drink it, but because our lakes and rivers host an aquatic food chain from the tiniest phytoplankton to the biggest sturgeon. Biodiversity is essential to food production, which comes mainly from our lands and waters and is usually dependent on weather and climate, soil regeneration, and other ecological processes. Many crops are pollinated by insects to enable them reproduce.

Some of the most common medicines we use are the result of biodiversity. Losing biodiversity means compromising our ability to find new solutions – perhaps a virus that could be used to kill cancer cells in humans or an algae with the potential to feed millions.

Approximately 1.7 million species, including bacteria and fungi as well as plants and animals, have been documented to date, but it is estimated there are many millions more, as yet undiscovered. The Global Biodiversity Assessment’s 2001 Outlook provided a working estimate of 14 million species in total on Earth.

Biodiversity provides natural capital that supports many economic and social benefits. For example, the recreational fisheries on Ontario waters provide more than \$2.3 billion in added value to the economy. Primary agriculture is valued at more than \$3.3 billion. In 2001, Ontario shipped over \$18 billion worth of forest products, including paper products and wood to build homes and furniture – things we use every day with little thought to the diversity of tree species that allows all the different uses of our forests. Recreational uses like camping, fishing, hunting, hiking and cottaging contribute substantially to the economy, and many tourists who visit Ontario also come to see its natural spectacle, whether it is the mighty waters of Niagara Falls or the autumn colours of Algonquin Park.

Scientists tell us that there is much still to discover about biodiversity and how it works. But we do know that the web of life is interactive. It is both local and global. Everything is interconnected. The loss of one plant can disrupt the intimate balance of life in a single ecosystem, affecting other plants, animals and insects that live there, while damage to habitat a continent away can render a local species at risk or even extinct.

The tiny, luminous Karner Blue butterfly that once thrived in meadows in Southwestern Ontario is considered extirpated from Ontario (regionally extinct), as it is from some northeastern states in the U.S. It is endangered elsewhere. The cause is habitat change, which has decimated the wild lupine plant on which the butterfly larvae feed.

Drastic fluctuations in the last decade in the populations of the familiar orange-and-black Monarch butterfly have been attributed to deteriorating forest habitat 5,000 km away in Mexico, where the Monarchs that live east of the Rockies migrate during the winter. There are also concerns about their habitat on their migration paths.

We also know that ecosystems are not fragile or static. They have been shaped by disturbances such as fire that have made them resilient and resulted in patterns of vegetation change as they recover.

Biodiversity contributes something else to our quality of life that is more difficult to define. The variety of landscape and species is important to our cultural and artistic expression. For many Ontarians, getting outdoors and away from concrete and artificial light and noise is a way to renew the spirit. Seeing a butterfly or hearing a bird call in a city garden provides a moment of wonder and delight.

It is also important to remember that species and ecosystems that are dying out have been on Earth for thousands of years. They have their own intrinsic value. By and large, they are becoming extinct not because of normal processes of evolution, but through the impact of human activity.

Ontario's Strategy

This Strategy is not about nature versus people. It is about living sustainably as part of nature. If we deplete or disrupt our natural capital to the point where it is no longer self-renewing or it is simply gone and cannot be recovered, we risk Ontario's future economic and social viability, as well as our health and quality of life.

This Working Draft sets out a plan in which all Ontarians, communities and sectors of society can and must play an important role. Its vision is about achieving ecological sustainability and sharing responsibility for getting there.

First, it describes a vision for the future, and the Strategy's goals and principles. Next, it outlines very briefly the threats we face and the opportunities we have in Ontario, before moving on to a series of strategic actions.

Ontario's Ecological Regions

Hudson Bay Lowlands: The northernmost ecozone encompasses approximately 25% of the province, and is located north of the Precambrian Shield where limestone bedrock underlies the area along the coasts and inland from Hudson Bay and James Bay. Ontario's largest protected area, Polar Bear Provincial Park, is located in the north of this ecosystem along the coast. Major human activities in this region include fishing, hunting and trapping. The region includes many smaller wetland ecosystems and open upland coniferous forests (taiga). Some important species in the region include:

Mammals: Arctic Fox and Polar Bear

Plants: Rock Sedge, Glasswort and Elephant-head

Insects: Melissa Arctic Butterfly

Birds: Snow Goose, Hudsonian Godwit, Willow Ptarmigan

Fish: Brook Stickleback.

Ontario Shield: This ecosystem occupies more than half of Ontario. The Precambrian Shield underlies the area, extending from the Hudson Bay Lowlands and the limestone in the north to the limestone bedrock in the south. Fire, insects, and wind are important forces of change in the conifer-dominated forests in the central and northern parts and the pine, oak and maple forests in the southern part of the Ontario Shield. Coniferous forests composed of spruce, balsam fir, jack pine, and tamarack dominate in the north. In the south, mixed forests and deciduous forests of tolerant hardwoods (e.g., sugar maple and American beech) are more frequent. Wetlands, including peatlands, are abundant. Mining, logging, fishing, trapping, hunting and camping are major activities in this region. Some important species in the region include:

Mammals: Eastern Wolf, Moose

Plants: Lichens, White Pine

Insects: Denike's Tiger Beetle

Birds: Bay-breasted Warbler, Common Loon

Fish: Northern Pike

Amphibian: Boreal Chorus Frog

Mollusc: Eastern Elliptio

Mixedwood Plains: Ontario's southernmost ecosystem is located on the limestones south of the Precambrian Shield. The Ontario portion of this ecosystem is bounded in the south and west by Lake Huron, Lake Erie, Lake Ontario, and the St. Lawrence River. Vegetation is diverse, characterized by mixed deciduous-evergreen forests and tolerant hardwood forests (including those forests known as Carolinian forests). Alvars and tallgrass prairies also occur. Wetlands are numerous in certain areas, although many wetlands have been drained. The fauna and flora are among the most diverse in Canada. This region has the highest population density, as well as important agricultural activities, including such crops as corn, soybeans, hay and apples, and dairy and beef cattle farming. Some important species in the region include:

Mammals: White-tailed Deer

Plants: Eastern Prairie Fringed-orchid, Sugar Maple

Insects: Monarch butterfly,

Birds: Barred Owl, Wild Turkey

Fish: Brook Trout

Reptiles: Snapping Turtle, Five-lined Skink (lizard)

Mollusc: Northern Riffleshell (mussel)

Great Lakes: The Great Lakes encompass 9% of the province and contain almost 20% of the Earth's freshwater. The lakes support thousands of wetlands, and a variety of aquatic and terrestrial organisms. Ontarians are responsible for the care of large portions of Lake Superior, Lake Huron (including Georgian Bay), Lake St. Clair, Lake Erie, Lake Ontario, and the St. Lawrence River. Transportation, fishing and cottaging are major human activities on the Great Lakes. For example, there are 49 ports on the Ontario portion of the Great Lakes shoreline through which millions of tons of cargo are shipped each year. Some important species in the region include:

Plants: Pitcher's Thistle, Swamp Rose-mallow, Moss Campion

Insects: Lake Huron Locust

Birds: Ring-billed Gull

Fish: Lake Herring, Lake Sturgeon, Lake Trout

Amphibian: Fowler's Toad

Reptile: Lake Erie Watersnake

Ontario's Ecological Regions (Régions écologiques de l'Ontario)



2 Looking Ahead

A Vision for the Future

Looking ahead, where do we want Ontario to be? We envision a future in which:

Together, we have halted the loss of biodiversity and advanced the job of recovery. In key areas under threat from human development, we have restored ecological integrity and brought back endangered species to self-sustaining levels.

All Ontarians recognize that we must live within nature's means – that the Earth does not have an endless capacity to tolerate and absorb the impacts of human activity. We place a high value on our natural heritage and the many benefits that it provides. We are determined to pass our heritage on to future generations.

Sustainable living is a priority and regarded as a responsibility by all sectors of society – governments, business and industry, communities, institutions and organizations, and individual Ontarians.

Ontario has a sustainable economy in which human needs are met, but human consumption and production do not deplete or damage biodiversity. Ecological assets are included in our indicators of economic progress.

The health of species, including humans, and ecosystems has improved. We have removed some of the most harmful substances that were systematically accumulating in nature, and we have reduced pollutants in our water, air and land.

Urban sprawl has been contained and farmland is no longer being lost in southern Ontario, and northern communities are growing again.

Ontario's successful biodiversity strategy is part of a strong, globally significant effort to protect biodiversity and ensure sustainable use of biological assets.

This kind of fundamental change will not happen unless we can capture the imagination and inspire the commitment of the Ontario public. We must create major generational change in attitudes and behaviours over the next 20 to 25 years. This Strategy is meant to begin the process of stimulating interest and involvement.

Biodiversity Goals

Two goals define the path proposed in this Strategy:

Goal 1: Protect the genetic, species, and ecosystem diversity of Ontario.

Goal 2: Sustainably use and develop the biological assets of Ontario, and capture benefits from such use for Ontarians.

Both goals are essential to ensure that Ontario's natural heritage endures. Therefore, we must aim to achieve both goals. Together, they represent a balanced and realistic approach.

It has been more than 15 years since the international Brundtland Commission challenged the notion that economic and environmental interests must compete against each other. But it has been difficult to move the debate away from the belief that we can be either prosperous or "green". These goals are aimed at recognizing the importance of the economic, social and cultural benefits of biodiversity, as well as its ecological and intrinsic values.

We may elect in some parts of Ontario to pursue activities conducive to the protection of wilderness (such as the creation of wilderness parks and strictly controlled ecotourism activities inside them), or the sustained yield of forest or agricultural products.

We have to choose among ecological alternatives:

- natural areas that are protected from use and development;
- other areas in which resources are managed for sustained use (e.g. forestry);
- areas devoted to agricultural uses;
- urban areas dominated by intensive human development.

And within all these areas, there is a need for the maintenance and/or the restoration and rehabilitation of ecosystem health.

Ecosystem health can be characterized as a measure of the level of distress in the ecosystem, its resilience and adaptability, the ability to sustain itself, the degree to which adjacent ecosystems are affected, and the extent to which the ecosystem supports healthy human communities.

This Strategy does not pretend that we will achieve an ideal state quickly or easily. It acknowledges there are many threats and obstacles in our path, as well as opportunities. It sets out practical steps that can be achieved, measured and reported on in the next five years, as well as longer-term objectives to ensure steady progress. Where possible, it identifies a range of stakeholders who can lead the effort to develop solutions. It seeks to involve all Ontarians in decisions about the biodiversity for which they are stewards.

Inventory programs Ontario are discovering or rediscovering species that were either unknown here or thought to be lost. A dragonfly called the Mocha Emerald was recorded for the first time anywhere in Canada in 2003 as part of work on the Sydenham River Recovery Strategy in southwestern Ontario.

The only known Ontario population of an arctic-alpine plant called the Moss Campion was discovered in 2000 on an island in Lake Superior on a survey for the Lake Superior National Marine Conservation Area.

The Wider Context

Over the past 25 years, jurisdictions around the world have recognized that the power of human activity to alter our ecosphere must be brought into better balance with the capacity of the Earth to absorb human impacts.

The 1980 *World Conservation Strategy* and the 1987 report, *Our Common Future*, by the World Commission on Environment and Development (popularly known as the Brundtland Commission) laid the groundwork.

In 1991, the World Conservation Union (IUCN), the United Nations Environment Program (UNEP) and the World Wildlife Fund (WWF) partnered to update the 1980 *World Conservation Strategy* with *Caring for the Earth: A Strategy for Sustainable Living*.

The United Nations *Convention on Biological Diversity* was completed at the Earth Summit in Rio de Janeiro, Brazil, in 1992. The World Resources Institute, the IUCN and UNEP sponsored the *Global Diversity Strategy: Guidelines for Action to Save, Study and Use Earth's Biotic Wealth Sustainably and Equitably*, which complements the UN Convention.

Canada was the first industrialized nation to ratify the Convention in December of 1992. Canada published the *Canadian Biodiversity Strategy* in 1995. Its vision is “a society that lives and develops as part of nature, values the diversity of life, takes no more than can be replenished and leaves to future generations a nurturing and dynamic world, rich in its biodiversity.”

Biodiversity Principles

Following on the Rio Earth Summit, Canada developed the Canadian Biodiversity Strategy (Environment Canada, 1995) to respond to the United Nations Convention on Biological Diversity. The Canadian Biodiversity Strategy was adopted by federal, provincial and territorial Ministers on behalf of their respective governments. The principles of the Canadian Biodiversity Strategy (below) have helped to guide Ontario's response over the past decade, and will continue to provide a guiding framework for Ontario's efforts through the Ontario Biodiversity Strategy.

- Biodiversity has ecological, economic, social, cultural, and intrinsic values.
- All life forms, including humans, are ultimately connected to all other life forms.
- All Canadians depend on biodiversity and have a responsibility to contribute to biodiversity conservation and to use biological resources in a sustainable manner.
- All Canadians should be encouraged to understand and appreciate the value of biodiversity and to participate in decisions involving the use of our air, water, land, and other resources.
- An ecological approach to resource management is central to conserving biodiversity and using our biological resources in a sustainable manner.
- Development of decisions must reflect ecological, economic, social, and cultural values.
- Healthy, evolving ecosystems and the maintenance of natural processes are prerequisites for the *in-situ* conservation of biodiversity and the sustainable use of biological resources.
- *Ex-situ* measures may be required to support the conservation of some species and populations and are essential to ensuring the sustainable use of many agricultural, forest and aquatic resources.
- The knowledge, innovations, and practices of indigenous and local communities should be respected, and their use and maintenance carried out with the support and involvement of these communities.
- The conservation of biodiversity and the sustainable use of biological resources should be carried out using the best knowledge available and approaches refined as new knowledge is gained.
- The conservation of biodiversity and the sustainable use of biological resources requires local, regional, provincial, territorial, national and global cooperation and a sharing of knowledge, costs and benefits.

3 Threats to Biodiversity

Natural ecosystems are dynamic and resilient and have evolved in response to a variety of forces and factors. But there are limits to their ability to adapt to rapid changes, many of which are introduced through human activities.

The current population of Ontario is more than 12 million. It is expected to increase by more than four million people, or by one-third, by 2030. Continued population growth and increased demand for goods and services will further impact biological diversity in Ontario.

As long as the human population continues to increase and demand access to and use of natural resources, biodiversity will remain at risk.

We disrupt and degrade life-supporting ecosystems in four basic ways, which act alone or in combination to affect biodiversity:

- We contaminate ecosystems with chemical compounds extracted or mined from the Earth's crust (such as heavy metals and fossil fuels) and with manufactured compounds, including chemicals that persist or bio-accumulate, such as hormone disrupting substances, polychlorinated biphenyls (PCBs), dioxins, ozone depleting chemicals, and many more not naturally found in nature.
- We physically encroach on Earth's ecosystems through road-building, urban sprawl, and many other activities. These activities degrade, eliminate, and fragment habitat.
- We move species around intentionally or accidentally introducing them into ecosystems where they did not naturally live and evolve.
- We use too many ecosystems and their species in unsustainable ways.

Pollution

Pollution is emitted in many different forms, including atmospheric pollution (e.g., sulphur and nitrogen oxides), soil and water pollution (e.g., nitrates and phosphates), pesticides, particulate matter, and heavy metals. There are thousands of pollutants circulating through Earth's ecosystems, and many of these materials have significant, large-scale impacts, such as acid rain on boreal and deciduous forests and associated aquatic ecosystems. Pollution also causes disruption in ecological processes. At the individual and population level, manufactured chemicals and pollutants contribute to a variety of health issues in people and wildlife, including cancer, birth defects, behavioural changes, and chronic illness. Synthetic chemicals that block, mimic or interfere with natural hormone production have been blamed for causing abnormalities in reproduction, growth and development, particularly in fish. Some chemicals deplete the ozone layer, which allows increased ultraviolet radiation to reach the Earth. For example, UV rays can be especially damaging on ecosystems in the early spring when vegetation is young and fish and frogs lay their eggs in shallow water. Human health (e.g., skin cancer) and some food crops are also vulnerable to the effects of a depleted ozone layer.

Habitat Loss

Habitat loss and alteration usually forces diverse natural ecosystems into less diverse ecosystems, such as the conversion of forested land to urban land. Accordingly, the size, shape, and configuration of the habitats in these ecosystems are affected. Habitat loss is particularly serious in southern Ontario where urbanization, agriculture and road density are greatest. In the north, resource extraction and associated roads and bridges can impact biodiversity through habitat changes and/or degradation of local waterbodies. In addition, recreational facilities (e.g., golf courses) and activities (e.g., skiing, use of all-terrain vehicles, boating, rock-climbing, trail-riding) can cut wildlife off from feeding areas, destroy local vegetation and pollute waterways.

Ontario's wetlands constitute about one-third of the provincial land base or about 29 million hectares. Wetlands – marshes, fens and bogs – are among the most productive and biologically diverse habitats on earth and are an essential component of healthy natural ecosystems. Ontario has approximately 24% of Canada's wetlands and 6% of the world's wetlands. Since the beginning of the 19th century, 68% of the original wetlands south of the Precambrian Shield have been converted to other uses.

Invasive Species

Alien species are plants, animals, and micro-organisms that have been accidentally or deliberately introduced into habitats outside their natural normal range. Invasive alien species are those harmful alien species whose introduction or spread threatens the environment, the economy, and/or society, including human health. Invasive alien species originate from other continents, adjacent countries, or from other ecosystems within Canada.

Free from predation and competition that would normally limit their distribution and abundance in their natural habitats, many of these invasive alien species reproduce prolifically, and infest and damage or destroy native trees (e.g., emerald ash borer), agricultural crops (e.g. soybean rust), wetlands (e.g., purple loosestrife), and lakes and rivers (e.g., zebra mussel). Some invasive species inflict significant ecological and economic damage. The zebra mussel, for example, disrupts ecosystem composition and structure, clogs water intake pipes, and fouls public beaches. It is but one of 160 invasive species that have been introduced into the Great Lakes.

Unsustainable Use of Species

Unsustainable use is the harvest of individuals at a rate higher than can be sustained by the natural reproductive capacity of the population being harvested. In Ontario, for example, wild American ginseng has been over-harvested from its natural habitat. In addition, unsustainable use can impact the genetic integrity of a species through selective harvesting and in other instances jeopardize a species' ability to maintain its traditional role(s) in ecosystem composition, structure and function. Regulation of resource harvest through education and effective enforcement, along with a commitment to conservation among fishing, hunting, and trapping communities, has contributed to the sustainable harvest of game and commercial fisheries and game wildlife species. However, unregulated and unsustainable harvest of some species remains a concern.

Climate Change and Other Cumulative Impacts

The combined (cumulative) impacts of pollution, habitat modification, the unprecedented (intentional and accidental) global redistribution of species, and over-harvesting places current ecosystem composition, structure, and function at risk. For example, people have added carbon dioxide, nitrous oxide, methane, and other greenhouse gases to the atmosphere by extracting and burning fossil fuels such as coal, oil, and natural gas. In addition, the drainage of wetlands and the conversion of forests and grasslands to other uses such as urban development also have contributed to the release of greenhouse gases to the atmosphere as carbon stored in these ecosystems is released by decomposition.

Atmospheric carbon dioxide has increased 30% since pre-industrial times, and these additional greenhouse gas molecules have trapped new heat and accelerated the rate of global warming and climate change. Climate change will increasingly impact biological diversity in many ways. For example:

- Insect and/or disease outbreak patterns may become more severe.
- Plant species will change their distribution, resulting in new types of forest. It is possible that a significant part of the boreal forest may be displaced by tree species from the south or convert to grassland.
- Animal species distributions will continue to change. For example, the white-tailed deer and Virginia opossum now survive hundreds of kilometres north of their traditional range.
- An increase in the frequency of extreme events (like the ice storm that hit eastern Ontario and Quebec in the 1990s) may affect habitats, particularly habitats that are localized (i.e. separated from other natural areas which might provide a source for replenishing a species that is wiped out locally).

These cumulative impacts affect ecosystems in different ways, at different times, and at different scales. They cause alteration, reduction, and/or loss of ecosystem function, populations and species, degradation, loss and fragmentation of habitat. They also damage human health – in inner cities, for example, asthma is the leading cause of hospitalization of children.

It is in this context that mitigation of the diverse threats to biodiversity requires an integrated, adaptive approach to caring for Ontario's natural assets involving all sectors of society. For example, participation by business, industry and other sectors is critical because the availability of natural resources depends on maintaining biodiversity. Loss or degradation of biodiversity not only affects ecospheric function, but it also damages society's ability to generate wealth and support livelihoods.

The *Species at Risk in Ontario* list includes:

- 10 extirpated (no longer exist in the wild in Ontario, but still exist elsewhere);
- 40 endangered species (facing imminent extinction or extirpation in Ontario) and regulated under the provincial *Endangered Species Act*;
- 32 endangered species that are candidates for regulation under the *Act*;
- 44 threatened (at risk of becoming endangered if limiting factors are not reversed; and
- 46 species of special concern (with characteristics that make them sensitive to human activities or natural events).

4 Opportunities

While there are serious threats to biodiversity in Ontario, there are also opportunities that can be drawn upon to identify and implement solutions. The threats that were described in the last section have not been ignored. Efforts are being made, work is being done – but not on the scale that is required.

The opportunities described below are presented as starting points or foundational elements for achieving the goals of this Strategy and, in particular, putting biodiversity on the public agenda. They are not comprehensive; they include some examples of positive actions or achievements on which we can begin to build.

Ontarians Who Care

Ontarians care about the environment, and many want to participate in efforts to protect biodiversity. Biodiversity may not be a household term, but we know that Ontarians do care about clean air and water. Rising concern has been expressed about the smog that blankets not only our large cities, but also blows northward, affecting lands, waters and communities far from the sources of pollution. There appears to be a growing appreciation of the importance of protecting our water supply.

Ontario households participate actively in 3Rs (reduce, reuse and recycle) programs in communities across the province to try to control our production of garbage. Issues like dwindling landfill capacity and shipping garbage along transportation corridors have captured considerable public attention in recent years.

Ontario has a number of organizations that are dedicated to environmental issues and raise awareness and funds through donations for important conservation activities. In addition, there are a host of other groups and associations (e.g. cottager associations, hunting and fishing federations, public parks supporters, birdwatchers) that get involved in voluntary programs like cleaning up natural areas and monitoring water quality or wildlife.

The Ontario Breeding Bird Atlas is a volunteer-based five-year project to gather data on the breeding distribution of all the bird species that breed in Ontario. Data collection for the second atlas began in spring 2001 and will continue through 2005. As of July 15, 2004, more than 1,300 participants have contributed more than 94,000 hours in the field, checking more than 40,500 locations, and recorded breeding evidence for 288 species.

We can build on Ontarians' interest in the environment to create support and momentum for this Strategy. Our population is better educated and better informed than ever before, but we will have to work to get their attention. One of the best places to start is with young schoolchildren who are fascinated by the natural world in all its variety, and who need opportunities to learn more in outdoor settings.

In October 2004, the York Region District School Board opened the Sibbald Point Outdoor Education Centre. This joint venture between the school board and Ontario Parks will allow up to 7,000 students a year to gain an understanding and appreciation of nature through guided visits in the park.

A Solid Foundation

Ontario has a solid foundation of legislation and policy on which to build actions to protect biodiversity and sustainably use and develop biological assets. Ontario has an established and recognized legislative and policy framework that supports, for example:

- sustainable forest management on Crown lands;
- sustainable agriculture;
- sustainable wildlife;
- protection of species at risk;
- a system of parks and protected areas;
- an environmental assessment process;
- environmental controls on a variety of industrial, municipal and other emissions and discharges into land, air and water;
- environmental monitoring for public health purposes (e.g., smog alert);
- local planning guidelines with direction to take natural heritage into account;
- protection of water sources and regulation of water quality;
- watershed-based planning;
- greenbelt initiatives;
- incentives for landowners to protect natural areas.

More than 27,300 farmers participated in the Environmental Farm Plan (EFP) program from 1993 to 2004. Two thousand workshops were held for farmers to learn more about environmentally sound practices. The program provided incentive funding to implement farmers' environmental plans. Farmers themselves invested \$45 million in these projects, with \$15 million in federal incentive funds. The Ontario Farm Environmental Coalition is leading the next generation of EFP program with federal and provincial partners.

The examples of Ontario's legislative and policy framework mentioned above have evolved over time, and will continue to evolve and be updated, with the benefit of new scientific knowledge, with the input of Ontarians, and in partnership with other levels of government, communities and relevant sectors of the economy. There is an opportunity to add the application of a biodiversity "screen" to this framework – one that examines initiatives and policies in light of the importance of the multiple values of biodiversity (economic, social, cultural, ecological and intrinsic).

A Legacy for the Future

Ontario still has an abundance of species. There are still intact, self-sustaining ecosystems populated with a variety of native species. Ecosystems tend to be healthier in the far north where there are mainly Aboriginal communities, which have a culture of living off the land and in relative harmony with their natural environment. But even in the more urbanized and congested areas of southern Ontario, the efforts of many organizations are having an impact.

There is alarm in the scientific community about climate change and the cumulative impact of the loss of biodiversity on a global scale. That said, we do not want to convey the impression that we are past the point of no return. We can still recover, rehabilitate and pull back from a significant loss of biodiversity.

We are at a critical point, however, if we are going to keep what we have. Therein lies the opportunity – to take action now and over the next few years to make sure that we will be able to pass this natural heritage on to our children and grandchildren.

Through Ontario's Living Legacy, 378 new parks and protected areas covering 2.4 million hectares, were added to the existing system. Almost three-quarters of these new parks and protected areas have been regulated since 1999 under the *Provincial Parks Act* and the *Public Lands Act*. The rest are protected under interim provisions that prevent logging, hydroelectric power development and staking of new mining claims.

The World Wildlife Fund Canada's first-ever Nature Audit, published in 2003, recognized Ontario's action in achieving ecological representation targets in its parks and protected areas. The WWF was also encouraged by work on the Northern Boreal Initiative. The Northern Boreal Initiative involves building cooperative relationships among First Nations, governments, and environmental groups to explore land use and resource allocation north of the 51st parallel that will benefit the economies of Aboriginal communities, provide additional forest resources, and protect the region's ecosystems.

Working Together

The effectiveness of working together – within and across communities, organizations and sectors – to achieve mutually beneficial outcomes for the environment and the economy has been demonstrated. Over the last few years, partnerships have become the accepted way of operating. There is wide recognition that organizations, government or non-government, can do far more with partners than they can by going it alone. The solutions to most issues today lie in a cooperative, partnership approach.

The Ontario Forest Accord is a good example. The Accord was reached by representatives of the forest industry, conservationists and the provincial government. They agreed on a significant expansion of Ontario's parks and protected areas (Ontario's Living Legacy), while also protecting wood supply for industry and jobs for northern communities. They established an

advisory group involving all three partners which developed principles for sharing permanent increases in wood supply between the forest industry and new parks and protected areas to complete ecological representation in the future.

Ontario's Natural Heritage Information Centre helps to identify, document and track Ontario's native species and natural areas, particularly species that may be at risk. Its partner organizations include Bird Studies Canada, Ducks Unlimited Canada, the Federation of Ontario Naturalists, the Nature Conservancy of Canada, the Ontario Ministry of Natural Resources and others. The Centre provides a central repository of information on biodiversity.

There are 56 active recovery teams for species at risk in Ontario (49 species-based teams and seven ecosystem-based teams). The teams develop recovery plans through a consultative process involving local landowners, community leaders and others. There have been recovery strategies developed for tallgrass prairie communities, Lake Huron dune grasslands, Lake Erie sand spit savannahs, and watershed recovery plans for the Sydenham, Thames and Ausable Rivers.

Ontario has more than 40 types of international, national, provincial, municipal and private protected area designations. These areas are managed by dozens of organizations, including Conservation Authorities, Parks Canada, municipalities, land trusts, parks commissions and local groups, heritage organizations, and government ministries.

Expanding and Sharing Knowledge

Scientific knowledge about biodiversity is growing rapidly, and practical solutions to protection and recovery issues are being developed through extensive field work.

There are five Chairs in Biodiversity at Ontario universities. A number of important partnerships involving the private and public sectors in agriculture, forestry and other areas are developing new solutions through scientific research. In the field, multidisciplinary recovery teams are calling on the expertise of scientists from many different institutions and organizations.

The Sydenham River Recovery Team has representatives of three Stewardship Councils in the watershed (Lambton, Kent and Middlesex), the St. Clair Region Conservation Authority, the University of Guelph, the Royal Ontario Museum, Environment Canada, the federal Department of Fisheries and Oceans, and the Ontario Ministry of Natural Resources. Development of the recovery strategy involved extensive public consultations. Finalized in 2002, the recovery strategy includes a range of initiatives, including mapping of species at risk, improving stream crossings, working with local farmers on such issues as livestock waste management, working with local planners on municipal plans affecting natural heritage, and raising public awareness.

Scientists caution that there is still so much that we do not know about how ecosystems function, but understanding of genetic, species and ecosystem diversity is expanding. As knowledge grows, there is an opportunity to share it widely and use it to support maintenance, recovery and rehabilitation efforts, as well as to tell us why, where and how species are failing and ecosystems are losing resiliency. Scientists have begun to work with Aboriginal people to ensure that traditional ecological knowledge is available to guide decisions on biodiversity.

A small group of plant scientists and landowners has been working for decades to bring back the majestic American chestnut to southern Ontario. It was virtually wiped out by a killer blight in the 1930s and 40s. Since then, there has been habitat loss, the introduction of other chestnut species and invasive insect species. A national recovery plan has been developed. Twenty-four demonstration planting sites have been established on Ontario farms. Some of the partners in this recovery effort include the Ontario Soil and Crop Improvement Association, private landowners, the Canadian Chestnut Council (an independent group of volunteers), and the University of Guelph.

5 Addressing Ontario's Biodiversity Challenge (2005 – 2010)

This Draft Ontario Biodiversity Strategy is an “umbrella” document that aims to identify, at a strategic level, a series of actions that, taken together, will enable Ontario to achieve its biodiversity goals, which are to:

- protect the genetic, species, and ecosystem diversity of Ontario; and
- sustainably use and develop the biological assets of Ontario, and capture benefits from such use for Ontarians.

The Strategy includes the following strategic directions. Specific recommended actions are grouped under each direction.

Engage Ontarians – Our success will depend on the values that guide how Ontarians behave. We must build a commitment to biodiversity, and develop a variety of ways in which people can participate in maintaining our natural heritage as a legacy for future generations.

Promote stewardship – Private landowners, including farmers, have a key role to play in stewardship of the biological resources of this province, particularly in southern Ontario. Private resource-based companies operating on Crown land in northern Ontario also have a key role in the sustainable use and conservation of biodiversity.

Work together – No one agency or organization retains the scientific expertise, the legal authority, or the financial resources to care for all of Ontario's biodiversity. Partnership is an important tool in the protection and use of biological assets. This strategic direction overlaps all the others. If this Strategy is to be successfully implemented, a broad coalition including private landowners, non-government organizations (NGOs), industrial sectors, urban and rural communities, Aboriginal communities, all levels of government and individual Ontarians must work together.

Integrate biodiversity conservation into land use planning – We do not want to halt all growth in southern Ontario, but there is an urgent need to recognize in our planning rules and processes the importance of open spaces and conserving biodiversity.

Reduce threats – Reducing threats now will be more effective and less expensive than trying to recover what we have lost later. There are many threats to biodiversity and action must be taken on a number of fronts. Where there is a threatened imminent loss of biodiversity, we should act, even if our knowledge is not complete. An area can be put back into development later; once development has occurred, future options are limited.

Improve understanding – We must make use of expanding scientific knowledge and new mapping and other technologies that make information analysis and sharing faster and more effective. But knowledge is not always about the “new”. Traditional knowledge from Aboriginal cultures and rural communities should be valued.

Included in the actions are new initiatives that have been announced and/or initiated since 2003 by the current Ontario government in response to concerns of Ontarians that relate to biodiversity. The recommended actions are numbered, but not in order of priority.

Engage Ontarians

We must increase awareness of the importance of biodiversity and participation in conservation initiatives. A societal commitment to and participation in the care and management of biological assets will in large measure depend on how well we educate Ontarians of all ages about biodiversity and how well we communicate with the public. This strategic direction will be pursued by:

- increasing awareness of biodiversity; and
- strengthening education on biodiversity.

Increasing Awareness

The support of Ontarians is fundamental to the success of this strategy. Individually and collectively, our decisions and actions are crucial to the conservation and sustainable use of biodiversity. There are challenges both in trying to create awareness in people about an issue and in trying to stimulate action. While many Ontarians are interested in environmental protection, biodiversity is not generally a top-of-mind issue. We need to improve public understanding of the importance of biodiversity in sustaining life, the effects of human activities on biodiversity, how to prevent or reverse the current decline in biodiversity, and how individuals can contribute to the conservation of biodiversity.

1. Create an Education and Awareness Task Team that fosters multi-stakeholder collaboration to promote community-based biodiversity education and awareness and environmental citizenship by:

- **developing an implementation plan for education and awareness;**
- **engaging NGOs, industry, government, Aboriginal peoples, communities, rural landowners and the public in the implementation of the Ontario Biodiversity Strategy (e.g. Volunteers for Nature, Pond Watch, Christmas Bird Counts)**
- **strengthening education and awareness programs about the causes of biodiversity loss, its protection and sustainable use; and**
- **providing guidance and resources to existing non-formal educational programs (e.g., interpretive programs, Ontario Agri-Food Education, Conservation Authorities, museums, Toronto Zoo, botanical gardens).**

Strengthening Education

Our greatest hope for change in attitudes and behaviours is the generation that is growing up now. We must instill in our children a conservation ethic and an understanding of what sustainable living means in their lives and for their futures. Education in biodiversity must start early in the education system, and be sustained through secondary school. Ontario must also train the next generation of biologists, zoologists, foresters, farmers and other scientists and

practitioners. Generating interest in these fields in school will encourage more young people to enrol in post-secondary programs.

2. Encourage further development of curriculum-based materials by the Ontario education community to enhance biodiversity education by:

- **supplying the Ministry of Education and the Ministry of Colleges and Universities with science information in a useable form;**
- **supporting further professional development activities that assist teacher/educators to incorporate biodiversity messages; and**
- **providing youth with opportunities to apply their knowledge in field situations (e.g., 4H Programs, Ontario Stewardship Rangers).**

Promote Stewardship

The majority of Ontario's species at risk are found in southern Ontario where most land is privately owned. The support of private landowners is crucial to achieving the goals of this Strategy. We can promote stewardship through effective education, tools and support for landowners. We can also encourage it through incentives. Under this strategic direction, we discuss:

- engaging private landowners; and
- improving incentive programs.

Engaging Private Landowners

Gaining the support of private landowners, including farmers, for conservation, protection and recovery initiatives is critical to achieving our vision. Enhanced efforts to conserve Ontario's biodiversity must recognize the needs of working farms. Many rural landowners have a strong connection to the rural landscape and a sense of stewardship of the natural areas on their land. There are opportunities to build on this knowledge and awareness.

Private sector associations and conservation organizations have effectively initiated and supported some of the most important stewardship activities in the province, especially in southern Ontario. Their actions occur both independently of and in partnership with government agencies. There is a need to improve coordination between stewardship organizations and coordination of conservation and education activities at the community level.

3. Enhance and promote private land resource stewardship and biodiversity conservation by:

- **establishing a Biodiversity Stewardship Working Group to identify annual stewardship priorities;**
- **communicating what biodiversity conservation means in the context of private land ownership and existing practices;**
- **developing and promoting best management practices for the conservation of biodiversity on private land, including farmlands;**

- **improving technical assistance and the stewardship support tools available to landowners/farmers where needed (e.g. work sheets, extension notes);**
- **seeking ways to strengthen existing stewardship organizations (e.g., Ontario Stewardship Councils, Conservation Authorities, Land Trusts, NGOs); and**
- **creating recognition programs to profile exemplary stewardship actions by farmers and other landowners.**

Under a federal-provincial-territorial agreement signed in June 2002, a new Agricultural Policy Framework has been developed covering business risk management, food safety and quality, renewal, science and innovation and environment. A bilateral Canada-Ontario agreement was also signed in December 2003. Environment, including biodiversity, is now an integrated component of agricultural policy in Canada.

Under this new agreement, federal funding from Agriculture and Agri-Food Canada of about \$100 million will be available through March, 2008 for programs that facilitate on-farm environmental improvements in Ontario. The four programs are: Environmental Farm Plan program, an education program facilitating the preparation of such plans; Canada-Ontario Farm Stewardship Program, which includes funding for biodiversity projects; Canada-Ontario Greencover Program, which provides funding for riparian buffers, shelterbelts and land conversion; and National Water Supply Enhancement Program which applies to agricultural water supplies.

4. Promote the preparation of Environmental Farm Plans and the adoption of beneficial management practices that contribute to biodiversity conservation on Ontario farms through cooperative work among farm organizations, conservation organizations and the federal and Ontario governments by:

- **implementing the Canada-Ontario Implementation Agreement under the Agricultural Policy Framework to achieve improvements in biodiversity conservation on Ontario farms; and**
- **providing incentives under the Canada-Ontario Farm Stewardship Program and Canada-Ontario Greencover Program to support the adoption of beneficial management practices that contribute to biodiversity conservation.**

Promoting responsible stewardship goes beyond the individual landowner and involves entire economic sectors in pursuing biodiversity conservation and sustainable use.

An innovative approach to promoting sustainable use of the Crown's forests in northern and central Ontario is forest certification. Various forest certification systems tell consumers that they are buying products that come from forests that meet the sustainable use management standards of the certifying organization.

5. Promote the adoption of best practices and environmental management systems by all economic sectors to enhance the conservation of biodiversity and the sustainable use of biological resources (e.g. ISO 14000-EMS, Forest Certification).

Improving Incentive Programs

Well-designed incentive programs to support biodiversity conservation and the sustainable use of biological resources are important tools on private property, supported by legislation when necessary.

The Conservation Land Tax Incentive Program currently provides tax relief to individual private landowners who agree to protect the significant natural heritage values of their properties. In December, 2004, the Ontario government announced that this incentive program would be expanded to make additional categories of land eligible for the tax exemption.

The Managed Forest Tax Incentive Program (MFTIP) encourages private landowners, through a reduction in property tax, to conserve and manage their forested land in a sustainable way. As also announced in December, 2004 the Ontario government has established a committee to provide advice on a new assessment method (similar to the approach used for farmlands) for application to forest properties enrolled in MFTIP.

6. Enhance incentives for landowners to practice resource stewardship and the conservation of biodiversity by amending, in the near term, the *Assessment Act* and updating regulations pertaining to the Conservation Land Tax Incentive Program and the Managed Forests Tax Incentive Program, consistent with the government's December, 2004 announcement.

There are other programs promoting stewardship on private land. These programs may involve government, NGOs and/or private sector organizations. We need to take stock of what is working effectively in Ontario and elsewhere, and be creative in identifying some new solutions that will make a difference to the conservation of biodiversity.

7. Explore opportunities to improve incentive programs to support private land stewardship by:

- **identifying any gaps in existing grants and incentive programs;**
- **learning from creative financial and non-financial incentive programs in other jurisdictions for possible application in Ontario (e.g., Safe Harbour Program); and**
- **identifying the potential for partnerships and/or harmonization between government and non-government grants and incentive programs.**

Work Together

Working together makes our efforts more effective. Partnerships are and should be used in many ways for many purposes – for example, in education, research, policy development, technology development, information management, conservation projects, monitoring and compliance. While working together is part of all the other strategic directions, there are two specific issues dealt with here:

- providing a structure for cooperation and priority-setting; and
- addressing the need for greater coordination.

There are many initiatives related to biodiversity that are happening in Ontario now. But there is not a designated body to coordinate activities, set priorities, monitor and ensure action on the key components of this Strategy. To ensure a focused effort on biodiversity goals going forward, it is recommended that a Biodiversity Council be established.

8. Establish a broad-based Ontario Biodiversity Council to guide implementation of the Ontario Biodiversity Strategy, and to:

- **involve the public, Aboriginal peoples and a wide range of stakeholders in identifying a set of annual implementation priorities;**
- **coordinate implementation planning in association with other groups (e.g., Education and Awareness Task Team (#1), Biodiversity Stewardship Working Group (Action #3), Ontario Biodiversity Science Forum (#28));**
- **build shared accountability by encouraging improved partnerships and collaboration to advance implementation;**
- **evaluate progress and report on implementation annually, with emphasis on the year's priorities; and**
- **lead a five-year review of the Strategy and its implementation, and preparation of an updated Strategy for 2010-15.**

Better institutional coordination is required to support implementation. For example, the responsibility to protect and conserve aquatic biodiversity effectively is a shared responsibility among many parties. In these instances, where mandates, expertise, legislative, policy and management tools are broadly distributed, collaborative efforts with clear protocols and partnerships to enable the most effective use of available capacity and information are essential. The Ontario Biodiversity Council should help to facilitate this effort.

9. Strengthen communication and coordination within and between governments (municipal, provincial, federal and international), Aboriginal peoples, NGOs, the private sector, and other groups on initiatives/issues affecting Ontario's biodiversity, using existing mechanisms where possible.

Integrate Biodiversity Conservation into Land Use Planning

In global terms, we are endowed with an enviable amount of space per capita. But a lot of that space is in the north, while most of the people are living and most of the industry is located along the Great Lakes and the border with the United States. As the population of southern Ontario grows and lands are converted to urban, suburban and industrial land uses with coincident pollution, the ability and capacity of the environment to support healthy human populations and biodiversity is further reduced.

A broad vision of the landscape is needed to provide a context for protected area initiatives and other conservation measures. Biodiversity conservation must be built into all aspects of land use planning. To protect some of the most critical land areas and watersheds, the provincial government must use legislation and policy direction. But there are additional ways to improve integration of biodiversity into land use planning, including better access to information, more

clarity in guidelines, and more technical and other supports for local planners and decision-makers in how to safeguard important natural heritage areas effectively, while maintaining the economic and social viability of their communities.

10. Develop a greenspace initiative for southern Ontario to help Ontarians conserve and restore a network of natural systems that:

- **will support provincial and municipal land use planning initiatives;**
- **respects private landowners' interests by working with willing landowners on a voluntary basis; and**
- **recognizes the need for strategic public investment and incentives.**

In some parts of southern Ontario, urban areas are experiencing rapid growth. Settlement areas are expanding outward at a rapid rate and consuming large tracts of agricultural land and natural systems to provide for low-density settlement. The challenge in these areas is to manage and accommodate new growth in a way that minimizes its potential footprint, so as to increase the opportunity to conserve farmlands, other open spaces, and biodiversity.

For example, the draft Growth Plan for the Greater Golden Horseshoe provides policy direction to identify a natural system to enhance the conservation of valuable resources and to connect with the proposed Greenbelt Plan. It recognizes the importance of a natural system in maintaining biodiversity.

11. Enact and implement a legislative framework that will guide the preparation of growth plans in Ontario to enable decisions about growth to be made in ways that sustain a robust economy, build strong communities and promote a healthy environment and a culture of conservation.

The Ontario government has already moved forward with new greenbelt legislation and an updated Provincial Policy Statement.

12. Implement the *Greenbelt Protection Act* and its related proposed Greenbelt Plan that would enhance the conservation of biodiversity by:

- **generally protecting greenspaces and farmland within the Greenbelt's Protected Countryside area;**
- **identifying and protecting a Natural Heritage System and Key Natural Heritage Features and Key Hydrologic Features;**
- **preventing the expansion of settlement areas within the Natural Heritage System and Specialty Crop areas; and**
- **supporting connectivity within the Natural Heritage System and between key features.**

13. Implement the 2005 Provincial Policy Statement under the *Planning Act* to ensure effective direction to promote managed growth, sustainable development, a strong economy and a healthy environment.

14. Develop provincial guidelines that encourage the enhanced integration of the conservation of biodiversity (including related water quality measures) into municipal land use planning decisions by updating the guidelines for “Significant Habitat” and “Natural Heritage Systems” for municipal planning to address gaps and/or inconsistencies.

15. Improve public, private and NGO access to available biodiversity information (e.g. species at risk, natural heritage values) and technical guidelines to inform land use decisions (e.g. Source Water Protection Plans, Watershed Management Plans, Municipal Official Plans).

Reduce Threats

The threats to biodiversity come from many sources. We have identified actions to address the following subjects during this first Ontario Biodiversity Strategy:

- air and water pollution;
- invasive species (prevention and control);
- species at risk;
- genetic diversity;
- ecosystem representation and integrity; and
- compliance and enforcement.

Air and Water Pollution

16. Reduce the impact of pollution on biodiversity by implementing Ontario’s plans for clean air (including climate change), land and water through initiatives such as Ontario’s Clean Air Action Plan, Nutrient Management and Watershed-based Source Protection.

17. Enact and implement source water protection legislation to both protect water quality and quantity, and enhance the conservation of biodiversity through watershed planning and management.

Invasive Species

Species introductions are a global issue, affecting biodiversity, the environment, economies and trade. In some cases, the introduction of species can be beneficial to society. For example, much of the food we eat has been derived or comes from introduced species that are not considered invasive.

Within Ontario, the Great Lakes Basin is the area most affected to date by invasive species due to its high human population and high degree of industrialization, and the associated demand for offshore commodities. Arriving by ship, train, air and truck these shipments of commodities have a growing potential to introduce species that can be invasive. Once introduced, these species can spread within Ontario through a variety of pathways.

18. Complete the Canadian Alien Invasive Species Action Plan (under the Canadian Alien Invasive Species Strategy) and implement the action plan in Ontario by (but not limited to):

- **preventing introductions of invasive species through the identification and management of high risk pathways (e.g. ballast water, nurseries), and bans on high risk species (e.g. Asian Carp);**
- **improving capability to assess risks of invasions;**
- **building capability to quarantine where necessary;**
- **enhancing early detection capacity, especially in high risk areas;**
- **taking rapid action to eradicate invasive pests; and**
- **limiting the spread/impacts of invasive pests that cannot be eradicated**

Species at Risk

Ontario currently has 172 species at risk (10 extirpated, 72 endangered, 44 threatened and 46 of special concern). We need to reduce the probability that additional species will become at risk and, through time and recovery efforts, reduce the number of species currently at risk.

Defining the bounds of recovery efforts is a challenge. Goals for recovery need to be established for each species (or ecosystem) individually, based on a number of factors including the consideration of what is feasible and realistic to achieve. Ontario is committed to updating its species at risk legislation and programs to complement federal legislation and programs. Ontario is also developing an agreement with Canada on species at risk cooperation.

19. Review and implement updated Ontario species at risk legislation to provide broader protection for species at risk and their habitats, and to include requirements for recovery planning, assessment, reporting and enforcement.

20. Implement the National Accord for the Protection of Species at Risk and the associated framework in Ontario by working in partnership with private landowners and conservation groups to:

- **protect species at risk and their habitats;**
- **prepare and implement recovery plans in a timely fashion (multi-species/ecosystem-based where possible); and**
- **participate in the Canadian Endangered Species Conservation Council.**

Genetic Diversity

Humans rely on biodiversity and its genetic foundation as an invaluable source of biological goods and services. In Ontario, it is the source of diverse livelihoods and natural resources (e.g. fisheries, forestry, agriculture, recreation).

The genetic foundation of biodiversity holds opportunities to maintain and improve our health and quality of life (e.g. discovery of new medicines and foods). Conserving genetic diversity is important for both native species and species valued by humans for agriculture, forestry,

fisheries, and recreation. In-situ (or within natural habitat) conservation is preferred while ex-situ conservation, as an alternative approach, is supported when in-site is not possible.

21. Support the development of a national approach on access to and the sharing of benefits from genetic resources, working with the federal government, other provinces and territories, aboriginal peoples and interested stakeholders.

22. Strengthen institutions and partnership arrangements related to the conservation (including ex-situ) of genetic diversity (e.g. Forest Gene Conservation Association, Seeds of Diversity, Rare Breeds Canada, Toronto Zoo, Trent University DNA Cluster Partnership).

Ecosystem Representation and Integrity

Ensuring that there are representative natural areas protected across Ontario is another key component to conserving the province's biodiversity. There are significant differences in the degree to which natural features are represented within protected areas across the province.

Natural features in the Hudson Bay Lowlands Ecozone are not well represented in the existing protected areas. Of the 10.7 percent of this ecozone protected, nearly all is within Polar Bear Provincial Park. Representation of terrestrial ecosystems in the Ontario Shield Ecozone is more advanced, though some gaps still exist. Protection stands at 10.7 percent of this ecozone, following the Living Legacy Land Use Strategy.

Representation is low in the Mixedwood Plains Ecozone of southern Ontario, which has the greatest species diversity, the most pressures, and the highest proportion of private land ownership. Here, public protected areas account for only 0.6 percent of the ecozone, and protection of natural heritage values relies heavily on private land stewardship, municipal planning, conservation authorities, and non-governmental organizations.

The portion of Ontario's freshwater area that is protected is very low. To date, identifying and regulating freshwater protected areas in Ontario has been largely incidental to terrestrial protection efforts. A framework for assessing aquatic ecosystem representation is being developed.

23. Establish protected areas that contribute to the completion of an interconnected system of protected areas representative of Ontario's ecosystems:

- **in southern Ontario, through stewardship partnerships, securement of important private and public properties, and a review of public lands to determine the potential to establish, and connect where possible, representative protected areas;**
- **in the Ontario Shield Ecozone, through initiatives such as Room To Grow under the Ontario Forest Accord;**
- **in the Hudson Bay Lowlands and northern boreal region, through cooperative planning approaches such as the Northern Boreal Initiative; and**
- **in the Great Lakes Basin, through international, national and provincial agreements and legislation.**

The legislation that applies to Ontario's protected areas (i.e. provincial parks, conservation reserves and wilderness areas) is currently undergoing its first review in 50 years. The focus of the review includes permanent protection and ecological integrity.

24. Enact updated provincial protected areas legislation that enhances ecological integrity and implement the updated legislation by:

- reviewing and updating provincial protected areas policy; and
- working with partners to develop a framework for the preparation and/or updating of management plans for national, provincial and municipal protected areas.

25. Re-establish and/or retain natural linkages and connectivity on the landscape between natural areas, including protected areas, with a high priority on reducing landscape-level habitat fragmentation in southern Ontario, through the securement of lands by such mechanisms as conservation easements, donation, purchase, protected areas and/or long-term leases (e.g. Great Lakes Conservation Blueprint, Big Picture 2002, Algonquin to Adirondacks, Ontario Trails Strategy).

A landscape perspective (including landscape patterns, age class structures and ecosystem composition) is also important for understanding and managing Crown forests. The development of a landscape management perspective requires a shift from the current approach of managing for specific (i.e. featured) species to a new approach that maintains a natural range of forest structure and composition at all scales across the forested landscape (sometimes known as a coarse/fine filter approach).

26. Develop updated Crown forest management guides that provide direction on biodiversity conservation at the landscape, forest stand and site scales.

Compliance and Enforcement

Finite compliance and enforcement resources need to be focused on high-risk areas.

27. Review compliance and enforcement plans and assign a higher priority to ensuring compliance with legislation that protects biodiversity and its sustainable use (e.g., *Endangered Species Act*, protected areas legislation, *Crown Forest Sustainability Act*, *Planning Act*, *Oak Ridges Moraine Conservation Act*).

Improve Understanding

We must continue to discover, retain, use and share new knowledge and information about the composition, structure and function of ecosystems and the impacts of people who live and work in them. People must have the best information available to make the best decisions as they apply to biodiversity.

Our understanding of Ontario's biodiversity is incomplete. Considerable information and interpretation of biodiversity has accumulated, but it is recognized that our knowledge of this complex subject must be improved.

The co-ordination and integration of scientific effort, traditional ecological knowledge and information management for biodiversity requires developing knowledge partnerships and a process that is inclusive and transparent. Allocation of effort and resources directed to both address critical biodiversity knowledge gaps and traditional ecological knowledge is required.

28. Establish an “Ontario Biodiversity Science Forum” (that includes but is not limited to academia, government, Aboriginal people, industry and non-governmental organizations) to focus the biodiversity science agenda and foster science partnerships by identifying knowledge gaps and recommending science priorities in areas such as:

- **improving our understanding of ecosystem functions and relationships (e.g. inter and intra-species competition, predator-prey relationships, population-habitat linkages, taxonomy, genetic diversity);**
- **evaluating existing and aiding the development of new habitat/ecosystem and species/population management guides, best management practices and other conservation tools;**
- **improving our understanding of the economic and non-economic valuation of biodiversity;**
- **identifying gaps in available expertise (e.g. Ontario taxonomy/systematics) and recommending solutions to address such gaps; and**
- **supporting enhanced training (i.e. science and technology transfer).**

29. Work in partnership with Aboriginal peoples and organizations to integrate Traditional Ecological Knowledge into decisions about biodiversity conservation.

The distribution of biodiversity will continue to shift in response to changing environmental conditions (e.g. climate change), human-induced alterations to the landscape (e.g. residential and industrial development) and resource use.

30. Continue to review new monitoring information and knowledge to ensure that the use of biological assets (e.g. forests, wildlife, fish, water) is sustainable, biodiversity is conserved and ecological integrity is maintained.

Given the inherent complexities of species and ecosystems, together with the inordinately high economic cost of recovery actions, it is not only advantageous but paramount that degradation or loss of species and communities be prevented or at the very least avoided. The early identification of species or ecosystems at risk is vital if prevention measures are to be undertaken. In addition, we need enhanced capacity to assess the risks from invasive species and genetically modified organisms.

31. Enhance the current risk assessment capability in Ontario so that ecological, social and economic risks to biodiversity from threats such as climate change, invasive species and the

release of genetically modified organisms can be better evaluated, so that priorities for contingency plans and response teams can be identified.

32. Develop and implement pathogen (i.e. wildlife and plant disease) surveillance, prevention and emergency response protocols, based on the relative risk of various wildlife diseases (e.g. Chronic Wasting Disease in ungulates, Avian Vacuolar Myelinopathy in eagles, Sudden Oak Death, Soybean Rust) to wildlife populations, crops and humans, and support research programs that improve risk assessments and develop response options.

We need to monitor and report on the state of Ontario's biodiversity over time. Biodiversity indicators or indices need to be chosen so that the condition of biodiversity in Ontario can be assessed.

33. Report on the "State of Ontario's Biodiversity" every five years and issue a first report by 2010 that will:

- describe biodiversity reporting standards (criteria and indicators);
- establish benchmarks for biodiversity in Ontario, to allow future reports to track progress in meeting conservation and sustainable use goals;
- identify challenges, risks, threats and opportunities (e.g. MNR's State of Resources Reporting program, Ontario Breeding Bird Atlas); and
- be preceded by a brief interim report within two years.

34. Review and implement improved inventory, monitoring and assessment programs to support public reporting on the "State of Ontario's Biodiversity" and to improve the establishment of baseline information and tracking trends through time related to species/ecosystem status and land cover change.

35. Strengthen the Natural Heritage Information Centre partnership to manage (receive, process, and share) biodiversity information and establish mechanisms and protocols that streamline the sharing of data on species, biological communities and ecosystems, while protecting the security of sensitive data.

Reviews

Through the process of developing the Strategy, a number of subject areas related to other legislation and/or policy direction were identified where further review is needed before any potential actions can be defined and recommended.

36. Review other relevant legislation and regulations to identify gaps and issues (e.g. disincentives), and propose changes in the legal framework for the conservation of biodiversity and/or sustainable use of biological resources that may include (but is not limited to):

- improved land trust, and conservation easement legislation;
- species of increasing conservation concern (e.g. Canada yew, wolves);
- native wildlife, plants, invertebrates;

- **critical habitat and sensitive natural heritage features; and**
- **invasives through high risk pathways, and pathogens.**

37. Review other relevant resource management and planning policies to identify and address policy gaps and issues (e.g. disincentives) related to the conservation of biodiversity and the sustainable use of biological resources that may include (but not limited to):

- **classification system for aquatic areas including the Great Lakes;**
- **sustainable management of harvested wildlife including those harvested plant and animal species for which harvest regulations are currently not in place;**
- **management of introduced species for recreation and/or farming;**
- **strategies to reduce conflicts associated with “problem” wildlife populations, especially in agricultural areas;**
- **enhancing the coordination of Ontario Trails planning and delivery**
- **conservation of genetic diversity;**
- **increased accessibility to property assessment data (e.g. sites of conservation interest); and**
- **improving the effectiveness of multi-ministry input into municipal planning.**

6 Moving Forward

This section of the Strategy will identify priorities for action in 2005 and discuss a few important considerations about how the Ontario Biodiversity Strategy is implemented. People who have participated in the development of this first Strategy indicated a strong preference for continuing to work together in an open and inclusive process, and for broadening the participation of the public, aboriginal people, stakeholders, academics and government agencies. A first step in this process would be the creation of an interim Biodiversity Council to provide direction on 2005 action priorities and guide implementation. The completion of this section of the Strategy will depend on agreement to form an interim Council and consensus of the Council members on priorities and on how the Strategy will be moved forward.

Priority Actions for 2005

This Section will identify priorities from the actions in Chapter 5.0 for implementation in 2005. The priorities were discussed and approved by the interim Biodiversity Council (the lead for implementation discussions for each priority is identified in brackets):

1. ()
2. ()
3. ()
4. ()
5. ()
6. ()
7. ()
8. ()
9. ()
10. ()

Implementation discussions will commence with the announcement of the Ontario Biodiversity Strategy

The Importance of Partnerships for Implementation

This Strategy indicates that the protection and sustainable use of Ontario's biodiversity is a shared responsibility for all Ontarians. The involvement of all Ontarians is necessary if we are to achieve our Vision. Partnerships between all organizations – government agencies, aboriginal peoples, environmental groups, industries, associations, universities and others – are a vital part of working together. Each organization brings a mixture of the expertise, skills, information and resources that are necessary to successfully implement the actions that we are agreed to take together. Continuation of the open and

inclusive process for discussion won't be easy – the values and interests of people and organizations may differ and conflict – but it will support the identification of shared interests and formation of partnerships.

The Importance of Involvement of Aboriginal Peoples

Aboriginal peoples have depended on biodiversity for food, shelter, cultural and spiritual purposes for thousands of years, and indigenous communities continue their relationship with the land and its resources today. Chapter 5 identifies the need to work with these communities to make their knowledge and expertise available for decisions about biodiversity. The involvement of aboriginal people is critical to the successful implementation of this Strategy. The World Commission on Environment and Development emphasized in 1987 the importance of preserving traditional knowledge, while the Convention on Biological Diversity and the Canadian Biodiversity Strategy reinforce the need to respect, preserve and maintain the knowledge innovations and practices of aboriginal communities and to seek community-based, local responses to the Strategy. The existing aboriginal and treaty rights of aboriginal people are recognized by the Constitution, affirmed by the Supreme Court, and must be respected in implementing this Strategy.

Communication

This Biodiversity Strategy is for all Ontarians. Efforts must be made by the organizations that are represented on the interim Council and others to communicate the Strategy to the public across the province and to continue to seek broad input and ideas about the directions and actions that are identified in Ontario's Strategy. The proposed Education and Awareness Task Team (Action 6) could provide support to such an effort by the Council. The process of review and renewal of the Strategy in 2010 is a second major opportunity to communicate with the public and organizations and to again broaden the dialogue. Using the Strategy as a touchstone for launching the actions, many of which will engage particular sectors of the public that are interested in that specific action, will also communicate the broad direction of the Strategy and provide context. Public awareness of biodiversity is critically important to the successful implementation of this Strategy. An OBS website will provide access to the Strategy, implementation plans, annual reports and opportunities for involvement.

Implementation Planning

The priority actions for 2005 provide a starting point for discussions among partners about implementation of each action to define the particulars of what will be done, who will do what, the needs for resources (expertise, skills, technology and money), and when the action will be completed. The open and inclusive approach that has been started to develop the Strategy should be continued as implementation is planned and delivered. Implementation plans can be reviewed by the Biodiversity Council and placed on an OBS website.