



Sectoral Integration of Biodiversity in Canada

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1. Introduction

Canada¹ describes efforts in Canada to integrate and mainstream biodiversity considerations into relevant sectoral and cross-sectoral plans, programs, and policies, as required by each contracting party under Article 6(b) of the CBD. Biodiversity is important both as a stand-alone issue and as an interconnected element in action concerning current issues such as climate change, food security, development, and international relations.

Achieving the objectives outlined in the CBD and CBS requires engagement of the main sectors and key actors that impact the conservation and sustainable use of biodiversity. This chapter outlines initiatives in each of the key Canadian sectors outlined by the CBS: federal, provincial and territorial government, urban areas, Aboriginal peoples, academic and scientific institutions, environmental non-governmental organizations (ENGOs), industry and business, and stewardship. Examples have been selected to demonstrate sectoral action and cross-sectoral collaboration across the country, recognizing that the activities of every sector cannot be comprehensively described in this report, which only serves as an introduction to the mainstreaming of biodiversity in Canada.

2. Provincial and Territorial Governments

Virtually all provincial and territorial governments have integrated biodiversity into government initiatives, using a variety of policies, strategies, legislation and voluntary approaches.

Quebec was the first province to develop a provincial biodiversity strategy and action plan in 1996; currently, the Province is developing its third strategy. Developed through public consultation and interministerial collaborations and commitments, its priorities include biodiversity in wildlife, forests, urban areas, biotechnology, and education. Saskatchewan released its Biodiversity Action Plan in 2002 as a supporting document to the province's wider-reaching Green Strategy. Its plan emphasizes shared responsibility, effective public participation, ecosystem-based management, balanced values, knowledge-based decisions and a government leading the conservation of biodiversity. Ontario's Biodiversity Strategy was released in 2005, following cross-sectoral discussion among municipal, environmental and conservation, industry and Aboriginal leaders, with public consultation available through an informative, web-based Biodiversity Workbook. The Strategy outlines action to protect the diversity of Ontario, use and develop the biological assets of Ontario sustainably, and capture the benefits from such use. The Northwest Territories developed its Biodiversity Action Plan in 2005 through a Biodiversity Team consisting of territorial and federal government, First Nations, ENGOs, and citizens. The Action Plan displays the guiding principles of ecosystem based management, sustainable development, and shared responsibility for stewardship and collaboration.

¹ Canada (2009). Canada's 4th National Report to the United Nations Convention on Biological Diversity, Environment Canada, July 2009, 185 pp.

New Brunswick launched a Provincial Biodiversity Strategy on June 18, 2009. The Strategy provides a framework for advancing a coordinated and collaborative approach to the conservation and sustainable use of biological resources, representing a significant evolutionary step forward. Influenced by the Biodiversity Outcomes Framework for Canada, the strategy will be followed up with the development of biodiversity action plans over the next 12 to 16 months. These plans will involve stakeholders and will identify specific actions assigned to Departments that will move us incrementally closer to achieving the strategy's management outcomes. A New Brunswick Biodiversity Secretariat will be established to provide coordination and support to the Strategy.

Several other provinces have integrated the principles of biodiversity into various provincial action plans or strategies. Manitoba has Sustainable Development Strategies for Natural Lands and Special Places, Forestry, Energy and Mines, Soil and Water, and Wildlife and Fish, as well as initiatives such as the Prairie Conservation Action Plan and long-term forest management plans. Alberta adopted a Land Use Framework in 2008 to better manage public and private lands and natural resources in the achievement of their long-term economic, environmental and social goals. The framework provides a blueprint for land-use management and decision-making that addresses Alberta's growth pressures by adopting an ecosystem approach and considering the cumulative impact of development on biodiversity. British Columbia developed a Conservation Framework in 2008 to provide a set of science-based tools and actions for conserving species and ecosystems in the Province.

3. Urban Areas

Urban areas in Canada play a significant role in the management and conservation of biodiversity, both locally, and globally as their patterns of resource consumption affect ecosystems around the world. Urban areas pose a growing threat to biodiversity through urban sprawl, loss and degradation of habitats, hotspots of pollution and greenhouse gas emissions, and the exploitation of species. The Bonn Call for Action, formulated by over 150 municipal leaders from around the world during the Mayors Conference on Local Action for Biodiversity in Bonn, Germany, outlines the commitment of urban areas to biodiversity conservation. Recognizing the experience local governments have in planning, awareness-raising and decision-making, the Call highlights the potential of cities to be key actors in the CBD's initiatives. With over 80 percent of Canadians now living in urban areas, the success of the CBS hinges increasingly on municipal-level commitment and the targeting of urban areas at the provincial and federal level.

City of Greater Sudbury

The City of Greater Sudbury is a growing northern Ontario community that places a high value on the sustainable management and use of resources. To promote cross-sectoral environmental action, EarthCare Sudbury was developed in 2000 as a partnership between the City, over 100 community agencies, organizations and businesses, and hundreds of individuals. Collectively creating a healthier and more sustainable community, EarthCare Sudbury has formulated a Local Action Plan (LAP) which aims to enhance Sudbury's environmental health, take environmental responsibility through local action, and

share the experience gained with Greater Sudbury citizens and other communities. A Monitoring Plan was developed and the first Progress Report was released in 2008.

A variety of initiatives related to biodiversity have taken place as part of the LAP. The Freshwater Ecology Cooperative Unit conducts research on the ecological state of local lakes and, with other EarthCare partners, monitors the quality of local surface and groundwater resources. Thirty-five Lake Stewardship Committees implement restoration strategies using thousands of community volunteers and partners. A Green Space Advisory Panel, formed in 2007, advises Council on improvements to the park and open space system. Initiatives like Rainbow Routes' Learning Through Trails, the Sudbury Community Foundation's Sprouts Program, and the Sudbury Children's Water Festival undertake environmental activities for youth. In addition, the Ugliest Schoolyard Competition engages individual schools in the fostering of schoolyard biodiversity by distributing seedlings and enlisting students in tree-planting projects. Sudbury has won the Federation of Canadian Municipalities-CH2MHILL Sustainable Community Award and was also designated a Regional Centre of Expertise by the United Nations University, joining a network of existing education organizations mobilized to deliver education for sustainable development to a regional community.

Case Study: The City of Edmonton

As of 2007, the Edmonton is one of 19 cities around the world participating in a 3-year international study of local governments' involvement in biodiversity protection. The Local Action for Biodiversity (LAB) Project is headed by Local Governments for Sustainability (ICLEI), an international association of local governments and governmental organizations committed to sustainable development. Key steps of the LAB Project are: inventory and assessment through a biodiversity report, formal declaration of commitment to biodiversity, ongoing implementation of a 10-year Biodiversity Action Plan and Framework, and local implementation of biodiversity intervention projects. The LAB project enables Edmonton to showcase ecological initiatives being undertaken and to learn from other urban areas' initiatives around the world. Establishing the city amongst the leaders in the mainstreaming of biodiversity, Edmonton has been selected to host ICLEI's 2009 World Congress Conference.

Edmonton recently completed its Biodiversity Report, which provides an overview of the City's ecology, outlines their conservation governance structure, and includes an inventory of local biodiversity initiatives, both City- and community-led. Some of these initiatives include: the Natural Areas Conservation Plan; the Plan of Action for a world-class metropolitan riverfront park; the Ecological Conservation Assistance Program to financially reward landowners for protecting privately-held natural areas; the Roadways and Parks Naturalization Master Plan; the Biodiversity Monitoring Wetland Ecology Study; the establishment of a City Farm accessible to urban children and their families; and RiverWatch rafting for students to conduct chemical and biological tests of the North Saskatchewan River Valley. One of Edmonton's new planning tools, the Ecological Design Report, aims to ensure that ecological design principles are integrated into development plans for new neighbourhoods, thus protecting biodiversity by reducing the impact of urban development.

Montréal

Montréal, host to the Secretariat of the CBD since 1996, continues to play a significant role in the promotion of biodiversity initiatives at the national and international level. Its mayor figures among the original five mayors who signed the Curitiba Declaration on Cities and Biodiversity and sits on the steering committee of the Global Partnership on Cities and Biodiversity. Action in Montréal ranges from education, conservation alliances, and scientific research to the eco-management of large parks, preservation of urban ecosystems, and eradication of invasive species. The City's 2004 Policy on the Protection and Enhancement of Natural Habitats promotes partnerships and concerted action to integrate and protect natural habitats. Other strategic development tools in place include the Master Plan, Heritage Policy, Strategic Plan for Sustainable Development, Green Strategy, and Tree Policy, which aims to diversify tree species lining city streets and expand canopy cover to offset the urban heat island effect and insect infestations. The City's network of large parks, covering more than 125 hectares, is managed in accordance with a frame of reference emphasizing biodiversity.

Case Study: Saint-Michel Environmental Complex in Montréal

Part of the City's network of large parks, the Saint-Michel Environmental Complex (CESM) is a one-of-a-kind park that has won many international environmental awards for its integration of culture, community, and sustainability. Previously a limestone quarry and the second-largest urban landfill site in North America, the site was acquired by the City of Montréal and turned into a waste sorting and elimination center. Eventually, the site became the CESM and, "the focus of the most extensive environmental rehabilitation project ever undertaken by the City." The areas where waste was landfilled are progressively being developed into a large and beautiful park. The park displays a circuit aimed to make people more aware of both built and natural environments, how nature changes, and where humanity fits within nature.

A number of innovative features have been undertaken by TOHU, la Cité des Arts du Cirque, the non-profit organization located at CESM; these innovations include on-site stormwater retention and treatment, an ice storage cooling system to reduce equipment costs and peak electricity demand, a greenhouse gas neutral heating source, and natural/hybrid ventilation system. CESM was one of 55 projects from around the world chosen to be displayed at the Urban Best Practices Area of the World Expo 2010 in Shanghai. This builds on Montréal's relationship with Shanghai, its twin city, which is already evidenced through numerous joint projects and economic missions. The Montréal Garden in Shanghai and the Chinese Garden in Montréal symbolize the ties between the two cities; the Chinese Garden is the largest garden of its kind outside Asia.

Montréal's Botanical Garden ranks among the world's largest with its collection of 22,000 species and cultivars of live plants that maintain a living storehouse of genetic diversity. The Botanical Garden offers educational activities and the opportunity for youth to learn gardening techniques. A Biodiversity Centre will be added to the Garden in 2010 and will house several important plant, insect and fungal collections. The Centre aims to enhance research collections, foster innovative research and training; and build awareness of biodiversity by providing access to visitors and expert advice to decision-makers. The

Biodôme showcases four vastly different ecosystems of the Americas and spearheads a combination of conservation, education and research-based activities, taking part in national and international species conservation programs. Montréal's Insectarium is the leading museum devoted to entomology, enabling visitors to learn more about insects and arthropods. Additionally, Environment Canada's Biosphère is an interactive museum in Montréal which showcases the water ecosystems of the Great Lakes-Saint Lawrence River regions, informing the public about how issues such as climate change and sustainable development are important to water ecosystems. The Biosphere has, in recent years, taken on a national leadership role with respects to Environmental Education and is a key player in Canada's International Biodiversity Year preparations.

Winnipeg

The City of Winnipeg signed a Memorandum of Understanding (MOU) with the Province of Manitoba in mid-2007, taking a first step toward protecting the city's natural systems. Under the MOU, Winnipeg's ecologically significant natural lands, such as important waterways and natural areas, will be identified for greater environmental efforts and could receive stronger protection as a part of the Province's protected areas network. The Winnipeg and Manitoba governments have agreed to collaborate to enhance protection and conservation efforts including collaborative management and restoration to enhance biodiversity benefits and watershed management, the exploration of opportunities to promote the importance of stewardship, and collaboration in various stewardship forums, land plans, integrated watershed management plans and policies to conserve habitats on private and Crown lands. Also in 2007, City council adopted an Ecologically Significant Natural Lands Strategy, which designates natural areas that are ecologically significant and provides measures for the possible acquisition, preservation, protection and maintenance of such lands.

Among other biodiversity-related initiatives, Winnipeg has developed a Climate Change Action Plan in 2006, which requires quarterly progress reports, and an Environmental Priority Plan. It is currently developing a new Official Plan, themed A Sustainable Winnipeg, which will create a 25-year blueprint for the city's future. Displaying biodiversity in the city, the Living Prairie Museum is Winnipeg's 12 hectare tall grass prairie preserve, representing one of the last remaining fragments of the tall-grass prairie ecosystem and providing habitat to over 160 species of prairie plants and a great array of prairie wildlife. Additionally, Winnipeg's Assiniboine Park Conservatory, the longest established conservatory in Western Canada, serves as a hub for local biodiversity education. Visited annually by thousands of people, the extensive outdoor and indoor gardens serve as formal and informal classrooms for students and interested citizens.

A number of other cities have significant initiatives regarding biodiversity. Metro Vancouver is currently developing its own Biodiversity Strategy, involving NGO guidance as part of its development. Vancouver hosted the Sustainable Cities - Turning Ideas into Action session of the World Urban Forum in 2006, with over 15,000 people from municipalities, organizations, and governments around the world in attendance. Current planning for the 2010 Winter Olympics is focused on minimizing the Games' footprint and maintaining healthy ecosystems in the City, through strategic planning of sites and

identification of species at risk, as well as extensive collaboration with stakeholders, including local First Nations.

4. Aboriginal Peoples

The Aboriginal population in Canada is very diverse. They are organized into three distinct political groups: First Nations, Métis, and Inuit. These groups vary widely in terms of demographics, political structure, cultural heritage, language, cultural practices, and spiritual beliefs. The engagement of Aboriginal communities in biodiversity-related initiatives and cross-sectoral partnerships is also key to Canada's achievement of the CBS goals. Engagement of indigenous communities is outlined in both the CBD and the CBS; the Strategy directs implementation of the Convention with a view to reflecting indigenous values and incorporating traditional knowledge. As Canada's first inhabitants, Aboriginal peoples have a unique relationship with its ecosystems, species, and resources. This relationship is reflected through their cultural and spiritual valuation of land, as well as their direct dependence on ecosystems through traditional activities such as hunting and fishing. They possess valuable knowledge of flora and fauna, gained from thousands of years of close interaction with Canadian ecosystems.

Case Study: Linguistic diversity and Aboriginal land claims

The over 60 current languages of Canada's indigenous peoples belong to 11 major language families; from 2001-2006, there was a 7 percent increase in the number of speakers of Aboriginal languages in Canada. Aboriginal peoples play a major role in the conservation and sustainable use of biodiversity. Given their long-standing occupancy and relationship with the land, Aboriginal communities have constitutionally-protected rights to traditional territories. Modern land claim settlements cover roughly 40 percent of Canada and represent significant amounts of biodiversity under Aboriginal co-management. A large percentage of Aboriginal peoples live in Canada's diverse forests and unique Arctic ecosystems, acting as critical partners in the protection and maintenance of biodiversity across Canada. Co-management with Aboriginal peoples is thus important elements in the conservation and sustainable use of Canada's biodiversity.

The incorporation of traditional knowledge (TK) has been a significant contributor to the effectiveness of Canada's various biodiversity initiatives, providing information regarding the sustainable use of plants and animals, as well as the relationships and current stresses in ecosystems. The importance of TK has been expressly recognized in Article 8(j) of the CBD and utilized in Canada in areas such as biodiversity strategies, land use plans, parks creation and species assessment. More recently, the negotiation of Aboriginal land claims and finalization of other agreements have helped to develop partnerships that promote mutual respect and the protection of cultural and ecological values. Aboriginal peoples are now extensively involved with a variety of stakeholders in the formation of plans and strategies, sharing of traditional knowledge (TK), establishment of protected areas, and formal stewardship of ecosystems in Canada.

Government and Aboriginal collaboration and engagement

A number of recent federal strategies, acts, and programs concerning biodiversity have recently been developed through strong consideration of, or in collaboration with, Aboriginal peoples. For example, the 2005 Federal Marine Protected Areas Strategy was developed to enhance cooperation, especially with Aboriginal peoples, towards completion of a national MPA network. The Canadian Boreal Initiative brings together partners to create new solutions for boreal forest conservation; board members represent governments, industry, conservation groups, major retailers, financial institutions, scientists, and five Aboriginal groups. The Aboriginal Fisheries Strategy represents a relationship between the DFO and approximately 225 Aboriginal groups in the regulation of food, social and ceremonial fisheries, and employment opportunities related to fisheries management. Aboriginal TK and views are formally incorporated into high-level consultation regarding species at risk through the National Aboriginal Council on Species at Risk (NACOSAR), made up of six Aboriginal representatives. NACOSAR advises the Minister of the Environment on the administration of the Species at Risk Act and provides recommendations to the Canadian Endangered Species Conservation Council.

Provincial and territorial biodiversity strategies have all been developed in collaboration with Aboriginal groups. Additional strategies developed in partnership with Aboriginal peoples include: the Northwest Territories Protected Areas Strategy, where Aboriginal peoples communities played a critical role in ensuring the explicit accommodation of cultural values and respect of all Aboriginal and Treaty rights; Manitoba's East Side Traditional Lands Planning and Special Protected Areas Act, developed in consultation with Aboriginal peoples and granting greater authority to these communities to protect cultural and ecological values while planning for sustainable resource development; and Newfoundland and Labrador's partnership with the Innu Nation to implement a Strategic Forest Management Plan for a 2.27-million hectare management area in central Labrador. The importance of engagement with Aboriginal youth in biodiversity initiatives and traditional practices is also recognized by government and Aboriginal communities. In 2006, the Ontario Ministry of Natural Resources began the Aboriginal Youth Work Exchange Program, offering summer placements for three consecutive years to young Aboriginal peoples interested in natural resource based jobs. Additionally, the Katannilik Park Knowledge Camp introduces Aboriginal youth from Kimmirut to Katannilik Park and the Soper River Valley, with local elders and scientists collaborating to provide on-the-land knowledge of the area's wildlife, plants, and resources.

As a result of comprehensive land claims and self-government agreements, wildlife management and co-management boards can be created to oversee land and water resources on traditional territories designated as settlement lands and settlement areas. Through these boards federal, provincial, and/or territorial governments work with the Aboriginal land claim beneficiaries and other stakeholders, collaborating with communities, governments, and other stakeholders to develop research and management plans and working to ensure the lands are managed to meet community subsistence and cultural needs. The boards provide Aboriginal participants with important input over who has access to lands and resources.

Among other groups representing Aboriginal peoples, the Assembly of First Nations Environmental Stewardship Unit works on a broad spectrum of environmental issues by conducting research, developing policy, and advocating on behalf of First Nations. Additionally, the Centre for Indigenous Environmental Resources (CIER) is a national, First Nation-directed ENGO. CIER was founded by a small group of First Nation leaders who recognized the need for Aboriginal peoples to have the capacity to solve environmental problems affecting their lands and resources. CIER helps to conserve biodiversity by working with First Nations to identify the state of biodiversity in their territories, implement strategies, and work with other stakeholders. A number of planning boards, comprised of members nominated by Aboriginal peoples and government, are in place around Canada to develop land use plans for the local Aboriginal territory.

The First Nations Land Management Act, established in 1999, is a sectoral self-government initiative that allows First Nations to resume control over the management of their lands and resources and to receive training and capacity development. By establishing a government-to-government Framework Agreement with First Nations, the Act allows them to opt out of 34 land administration sections of the Indian Act, giving them far more legal rights over reserve land and potential revenues. As of late 2007, 19 First Nations have operational land management codes. They can establish such governance tools as environmental laws dealing with development, conservation, protection, management, use, and possession of reserve land. Though title to the land remains with the Crown, the day-to-day administration of the lands, its resources, and the right to legislate is the prerogative of the First Nations; oil and gas, fisheries, endangered species, and migratory birds are exempt from the initiative.

Protected areas and model forests

Aboriginal leadership in biodiversity, ecosystem conservation, and land use planning is exemplified in their involvement in the creation and maintenance of protected areas, particularly in the northern territories. To date, Aboriginal peoples have been involved in establishing over one quarter of the total lands within Canada's protected areas. Many of the most significant protected area gains made in Canada in recent years stem from land use planning exercises established following claim negotiations, such as those in the Dehcho, Sahtu and Akaitcho regions of the Northwest Territories.

Case Study: Inuit Impact and Benefit Agreement

The Inuit Impact Benefit Agreement, negotiated between the Government of Canada, Nunavut Tunngavik Inc. and four regional Inuit associations, allows for the creation of 3 new National Wildlife Areas (NWAs) on Baffin Island to protect local species and habitat – including a population of bowhead whale that has been assessed as threatened in Canada.

Co-management committees comprised of both local and federal government members are responsible for the management of each of the protected regions in the Nunavut Settlement Area. The committees will act as stewards of the area, with responsibilities to review permit applications and to develop the area management plan, among other duties. Co-management and collaborative opportunities promote conservation and sustainable use through the inclusion of critical Inuit traditional ecological knowledge

in the development of any management plan – a significant step forward, with respects to community-based management of internationally significant areas.

With great local cultural significance, the Inuit Impact and Benefit Agreement provides for the preparation of Cultural Resources Inventories, supporting the development of the interpretative materials and management plans for the ten existing and three proposed protected areas in the Nunavut Settlement Area, and will identify Inuktitut place names for these areas. Building upon these prospects, the Inuit Impact and Benefit Agreement aims to foster new means of economic development, such as ecotourism, diversifying the Inuit economy, confirming the ecotourism value of National Wildlife Areas, and assisting the Inuit to adapt to evolving socio-economic conditions.

The ecological, economic and cultural benefits associated with the agreement provides a significant step forward with respects to community based management, sustainable development and the conservation of internationally significant areas.

Parks Canada has incorporated TK into park management by establishing a research and planning base camp in Torngat Mountains National Park in 2006 that brings together scientists, Parks Canada staff, and Inuit peoples. Research in the park integrates Aboriginal knowledge and perspectives, while providing important learning opportunities for Aboriginal youth by connecting them with elders who pass on cultural traditions and TK. Additionally, the Strategic Labrador Initiative explores ways to incorporate modern forest science and policy with traditional ecological knowledge of Innu elders in order to define benchmarks for use in sustainable forest management. Agay Mene Park in the Yukon Territory was identified under Chapter 10 of the Carcross Tagis First Nation Final Agreement. A Steering Committee with membership from Carcross Tagish First Nation, the neighbouring Teslin Tlingit Council, and Yukon Government will be engaged in developing a management plan for the park. One of the park objectives, as identified in the land claim agreement, is to “recognize and protect the traditional use of the area by Carcross/Tagish and Teslin Tlingit people in the development and management of the park”.

Aboriginal peoples and Canada’s park agencies collaborate in the management of newly designated coastal conservancies in British Columbia which involve the protection of approximately 1.8 million hectares of ecologically diverse habitat, including critical Spirit Bear habitat, and also the preservation of Great Bear Lake in the Northwest Territories. The Pikangikum, Poplar River, Paunigassi and Little Grand Rapids First Nations have signed a Protected Areas and First Nation Stewardship Accord to promote protection of their traditional lands in Ontario and Manitoba. Together with the provincial governments, they are promoting this area as a potential UNESCO World Heritage Site. Additional co-management initiatives include the Park Management Board for Indian Arm Provincial Park and Ontario’s Northern Boreal Initiative (NBI), which provides opportunities for First Nations to lead community-based land use planning and forest management, and to foster sustainable economic opportunities in forestry and conservation.

As a federal sustainable development initiative in protected areas, model forests around Canada also exemplify collaboration between stakeholders and Aboriginal communities. The Manitoba Model Forest

has supported the establishment of Advisory Committees composed of Aboriginal community representatives that advise their respective Chief and Council regarding resource management. As well, the Model Forest has integrated First Nations participation into other projects through training and employing Aboriginal youth and incorporating traditional knowledge. The Foothills Research Institute in Alberta has started a multiple-community traditional knowledge and cultural study in partnership with five local Aboriginal communities. The Eastern Ontario Model Forest (EOMF) currently works with industry, First Nations, government, landowners and other stakeholders to develop new ways to sustain and manage forest resources. One of the EOMF's key partnerships – the Mohawk Community of Akwesasne – is mandated to incorporate traditional knowledge into the decision-making, policy-making, evaluation and operating mechanisms of the model forest as a whole.

Local stewardship and business development

In addition to protected areas, model forests, and land use planning, Aboriginal peoples are involved in a variety of other biodiversity initiatives. Local stream and land stewardship by Aboriginal communities is widespread – in Vancouver, for example, a local reserve has worked with the David Suzuki Foundation to restore in-stream habitat through the Musqueam Creek program. Several watersheds in the Yukon, including the Porcupine River, Teslin River, and Yukon River watersheds have been the location of Aboriginal stewardship activities.

Aboriginal TK of ethnobotany and deep understanding of Canada's diverse species is also useful in the development of new medical and scientific discoveries, potentially increasing the valuation and sustainable use of Canadian species. This knowledge is being shared in a range of ways with a variety of local, national, and international stakeholders. For example, the newly created Aboriginal Heritage Garden in New Brunswick, operated by an arm of the Eel River Bar First Nation, showcases the ancestral heritage of the Mi'gmaq culture through features displaying their practical, medicinal, and spiritual use of plants and sustainable development principles. Brokenhead Ojibway Nation is currently working in partnership with the Manitoba Model Forest and Native Orchid Conservation to raise money to build interpretive trails and boardwalks in the Brokenhead Wetlands adjacent to an Ecological Reserve so people can view these wetlands safely and without damaging the rare plants and wetland.

Plans to develop Aboriginal participation in business development are also significant, especially through eco-tourism ventures. Grizzly bear viewing in Ni'iinlii'Njik, British Columbia, involves the Vuntut Gwitchin First Nation in a partnership with government and the tourism industry. This joint effort aims to promote a unique experience for tourists and bring economic development to the local Aboriginal community while protecting the bears and their habitat. Aboriginal tourism businesses have independently pursued sustainability and biodiversity conservation in their operations. For example, Bathurst Inlet Lodge offers paddling, fishing, hiking, and wildlife watching in the Arctic, exemplifying the Native respect of the land and environment, while the Cree Village Eco-Lodge in Moose Factory has earned accolades for its beauty and commitment to sustainability through composting toilets, menu of local meats, and organic bedding. The Squamish Lil'wat Cultural Centre, a world-class cultural centre

formed through a co-management Protocol Agreement between two First Nations communities, was recently announced as a runner up for the 2009 Indigenous Tourism and Biodiversity Website Award.

To support sustainable tourism internationally, the CBD Secretariat hosted an Indigenous Communities, Tourism and Biodiversity workshop series focused on the Arctic region in Quebec City in 2007. The series of training workshops provided an opportunity for attendees to investigate training tools, such as web-based technologies and advertising, which might aid indigenous communities and lead to greater benefits from sustainable tourism projects. For its part, the Ontario government is helping eligible First Nations to carry out land use planning and identify forestry-based economic development opportunities by providing a \$2-million grant to the Forestry Futures Trust, which will accept applications from eligible First Nations communities for relevant business projects.

5. Educational and Research Institutions

Universities, research institutes, museums, zoos, aquariums, and botanical gardens play an important role in biodiversity education and are some of the best places to explore biodiversity and issues relevant to the Convention on Biological Diversity. Such institutions interact directly with the public, and have both the knowledge and the capacity to develop and promote effective action to protect biodiversity.

The Northern Ontario School of Medicine (NOSM)'s Boreal Bioprospecting Initiative (BBI) investigates the diversity of Northern Ontario's boreal forests as it searches for new genetic resources that might be of medical value. The University of New Brunswick is collaborating with local ENGOs in a working group on invasive species, to raise awareness and to evaluate the status of invasive species in New Brunswick. Canadensys, formerly known as the Canadian University Biodiversity Consortium, aims to unlock the specimen information held by Canadian university-based biological collections and share this via a network of distributed databases, compatible with other biodiversity information networks like the Canadian Biodiversity Information Facility (CBIF). In this way, workers in a variety of fields will be able to inform their studies with comparative data from other research centers, including universities, museums, and botanical gardens, leading to the conservation and sustainable use of genetic resources and species. Information found on the CBIF is also provided in significant amounts by academic and scientific institutions, such as the Canadian Museum of Nature (CMN).

Case Study: The Canadian Museum of Nature (CMN)

The Canadian Museum of Nature (CMN) has promoted significant outreach regarding biodiversity in Canada. Its Canadian Centre for Biodiversity has established the online Native Plants Crossroads, which features resources and information on local conservation and community initiatives as well as information on pollination and invasive alien species. The CMN contributes large amounts of data to conservation data centres, is the national focal point for the Global Taxonomy Initiative, and is leading Arctic research such as the ambitious Flora of the Arctic Project, an international Polar Year research project. The CMN has also unified natural history museums by establishing the Canadian Alliance of Natural History Museums. Alliance members have highlighted significant threats to biodiversity, such as climate change during the International Polar Year (IPY) with events such as professional speakers' series.

The renovation of the Victoria Memorial Museum Building at the CMN is scheduled to open on International Day for Biological Diversity in 2010. The renovations, which began in 2004, are transforming the building into a contemporary science museum with new infrastructure, improved environmental and conservation controls, and better visitor amenities.

Botanical gardens also play a large role in Canada's mainstreaming of biodiversity and conservation of species. The Royal Botanical Gardens (RBG), in Southern Ontario, is home to a vast variety of plant species, displaying biodiversity and promoting public understanding of the relationship between the plant world, humanity and the rest of nature. Its nature sanctuaries are among the areas of highest documented plant diversity in Canada. Although the sanctuaries constitute a small protected area (approx. 1000 ha), they include documented wild populations of approximately 23% of the entire flora of Canada. A Six Nations Herbarium is currently under development to connect cultural and biological knowledge.

The approximately 25 botanical gardens in Canada have been cooperating on a variety of projects related to education and the conservation of plant diversity. In 2001, the Canadian Botanical Conservation Network (CBCN) produced the Biodiversity Action Plan for Botanical Gardens and Arboreta in Canada. The 2010 Challenge for Canadian Botanical Gardens updates the 2001 Action Plan. The Challenge reviews the progress on plant conservation and education related to sustainability by botanical gardens, places the International Agenda for Botanic Gardens in Conservation and the Global Strategy for Plant Conservation into context, and indicates how Canadian gardens can contribute to achieving the targets of the North American Strategy for Botanic Gardens in Conservation.

The Canadian Association of Zoos and Aquariums (CAZA) teaches over 1.3 million children and adults in Canada about the impact of human activities and the importance of species conservation. The CAZA-affiliated Toronto Zoo offers a wide range of camps, programs, and school trips that teach youth about the diversity of the world's creatures, interactions between humans and species, and the importance of zoos as ex-situ conservation sites.

6. Environmental Non Governmental Organizations (ENGOS)

A wide variety of Canadian environmental non-governmental organizations (ENGOS) have integrated biodiversity considerations into their initiatives. ENGOS are often the powerhouse behind many of the activities related to environment action, through activism, education, stewardship initiatives, research, and cross-sectoral collaboration. A number of networks and resources are available to ENGOS to enhance collaboration and action. Environment Canada's Canadian Environmental Network (RCEN), with its 6000 member organizations, actively supports ENGOS involved in public consultation, working groups, or as conference delegates. Co-sponsored by Environment Canada and Parks Canada, Nature Canada's Canadian Nature Network has approximately 375 ENGOS operating at either the local, regional, provincial or national levels, with a combined membership of approximately 100,000 members and supporters. The Canadian committee for the World Conservation Union (IUCN) plays a part in representing Canadian initiatives at the international level, as well as learning from best practices internationally.

Many ENGOs have national initiatives related to biodiversity. The Nature Conservancy of Canada (NCC) is a private, not-for-profit land conservation organization. Since 1962, NCC and its partners have helped to conserve close to 809,371 hectares of ecologically significant land nationwide through land donation, purchase, and conservation easement. NCC has been instrumental in establishing a network of conservation data centres across Canada that serve as permanent and dynamic data banks of the native biodiversity of the country. Ducks Unlimited Canada (DUC) works to conserve, restore, and manage wetlands and associated habitats for Canada's waterfowl by preserving habitats, conducting wetland and environmental research, and delivering education programs. In Ontario alone, DUC and its partners, which include more than 1,700 private landowners, have conserved over 364,217 hectares of wetland habitat. The Canadian Wildlife Federation (CWF) is a charitable organization representing 300,000 members and supporters that work from coast to coast to maintain a bright future for Canada's wildlife. CWF empowers Canadians to help protect wild species and their habitats through publications, award-winning programs and a balanced approach to wildlife issues. Wildlife Habitat Canada (WHC) works to support the conservation of wildlife habitat, running a granting program with a focus on wetlands and waterfowl habitat and initiatives such as the Forest Stewardship Recognition Program and Urban Stewardship Awards of Excellence. Their Wildlife at Work program focuses on corporate sustainability and WHC has worked with more than 1,500 facilities. Nature Canada, with the Canadian Nature Network, has a mission to protect nature, its diversity, and ecosystem processes, with attention to bird conservation, wilderness protection, endangered species, and national parks. Collaborating with governments, scientists, and citizens, Nature Canada focuses on education and advocacy to protect biodiversity.

Bird Studies Canada is a not-for-profit organization that uses the contributions of thousands of volunteer scientists to survey bird populations and undertake targeted research in support of conservation planning. The growth and emergence of land trusts is a new conservation force in Canada. In 2000, surveys were sent to 82 land trusts across Canada. The national land trust survey provided useful information on the land currently protected and on the conservation priorities and objectives of each trust. The Canadian Land Trust Alliance promotes private land conservation and works to strengthen the land trust movement nationally.

Many more ENGOs operate at a provincial, territorial, or local level. Among numerous other ENGOs involved in biodiversity initiatives, the Ontario Federation of Anglers and Hunters (OFAH), with over 655 member clubs across Ontario, has been a major proponent of biodiversity in the Province. OFAH is dedicated to conserving Ontario's fish and wildlife populations, protecting woodland and wetland habitat, and promoting outdoors education; their conservation programming includes elk and wild turkey restoration, Atlantic salmon restoration, the Ringwood Fish Culture Station, the Community Stream Stewardship Program, and the OFAH/Ontario Ministry of Natural Resources Invading Species Awareness Program. The Agence régionale de mise en valeur des forêts privées du Bas-Saint-Laurent in Québec works with private landowners to establish conservation agreements focused on conserving three Exception Forest Ecosystems designated by the Province. Naturalist societies and clubs are active

in a variety of conservation and education initiatives related to biodiversity in many Canadian cities and regions.

With a variety of focuses and approaches to conserving biodiversity, Canada's ENGOs play an important role in meeting the goals laid out under the CBS and CBD. Involved internationally, nationally, provincially, and locally, they work to educate and engage stakeholders, gain information on the state of Canada's ecosystems and species, and carry out stewardship and conservation initiatives.

7. Industry and Business

Virtually all business operations use natural resources in the production of goods or services, or consume products which have direct or indirect impacts on biodiversity. Significant improvements are being made to business operations to ensure the conservation and sustainable use of biological diversity. By taking action to conserve biodiversity, businesses can often increase the longevity of their resources, preserve the ecosystem services that their operations depend on, improve their consumer reputation, and become a regulation leader concerning the environment in their industry. The Conference of Parties of the CBD has noted the need to enhance voluntary commitments of the private sector and strengthen regulation in support of the objectives of the Convention; the private sector is thus far the least engaged major sector globally in biodiversity initiatives. Industry and business are highly influential, with vast knowledge, experience, and resources available; with cross-sectoral collaboration and support, this sector could become a major actor in initiatives to mainstream biodiversity considerations.

A number of standards and reporting initiatives are in place globally and nationally to encourage a high level of performance in biodiversity preservation. The Global Reporting Initiative, World Business Council for Sustainable Development, International Finance Corporation's Business and Biodiversity Guidelines, Wildlife Habitat Council, and International Union for Conservation of Nature all support business and industry efforts to integrate biodiversity considerations and capitalize on benefits. In Canada, natural resource sectors have developed and implemented codes of good practice that promote the sustainable use of natural ecosystems and the conservation of fisheries and wildlife resources. The Biodiversity Stewardship in Resource Industries Initiative has played a significant role in these codes of practice.

A number of initiatives in the fisheries, forestry, mining and prospecting, tourism and agriculture and agri-food sectors are outlined in the sections below. Although, many more examples of mainstreaming biodiversity considerations can be found in other Canadian business sectors such as energy, aggregates, manufacturing industries and transportation.

Fisheries

The Canadian Responsible Fisheries Board (CRFB) promotes responsible fishing in Canada through its Code of Conduct for Responsible Fishing Operations and development of industrial training programs and technical information exchanges in responsible fishing. The Code of Conduct reflects the fishing industry's commitment to ensuring stewardship and sustainability as key elements of Canada's fishing industry.

The leading labeling program recognizing a high environmental standard for sustainable and well-managed fisheries is the Eco-label. Operated by the Marine Stewardship Council (MSC), the Eco-label is an independent, global, non-profit organization that promotes environmentally responsible stewardship of marine fisheries, which includes biodiversity considerations. Exemplifying certification in Canada, the Gulf of St Lawrence northern shrimp fishery has been granted permission to use the Eco-label. Managed under the DFO, the fishery has numerous measures in place to ensure a minimal environmental impact and good management. Otter trawls fitted with Nordmore separator grates ensure reduced bycatch as fish pass through the grate and escape from the trawl. The captain of each vessel keeps a logbook recording the location and number of hours fished and an estimate of quantities caught. Since the early 1990s, at-sea observers have been in operation, in addition to all shrimp landings being monitored at dockside.

Case Study: Clearwater fishery

Clearwater, a Nova Scotia company, has demonstrated a strong commitment to harvesting high quality products while pursuing the sustainable use of the fishery's natural resources. In the company's Code of Business, the protection of the environment is outlined as an integral factor in all decision-making of the Corporation. The company uses a variety of methods to reduce the incidental catch of non-target species. Clearwater also reduces habitat destruction by conducting extensive ocean bottom mapping in partnership with offshore scallop operators, the Canadian Hydrographic Service and the Geological Survey of Canada. This mapping has significantly reduced the area of ocean bottom towed, amount of lost equipment, and fuel use, while maintaining the same harvesting quantity. The reduced disturbance of the ocean floor allows for increased habitat and ecosystem health, as well as reduced energy requirements and subsequent pollution. Clearwater also pursues species-specific conservation through seed boxes, voluntary coral closures, and coral codes of practice, while maintaining relationships with the DFO, academic institutions, industry partners, and NGOs.

Forest products

Forest industries in some provinces have their own codes of practice, such as in Ontario where industry has partnered with conservation groups like Ducks Unlimited Canada in the rehabilitation of wetlands and streams. Nova Scotia boasts the Colin Steward Forest Forum process which involves the Province's largest forest companies and a group of NGOs in an initiative to address gaps in the provincial system of protected areas by proposing suitable sites while mitigating impacts of land protection on the forest industry.

In addition to legislation, a variety of certification standards are used by industry to demonstrate sustainable use of Canada's forests. Certification can be achieved through Canada's National Standard for Sustainable Forest Management, the International Social and Environmental Accreditation and Labeling (ISEAL) Alliance, and the Forest Stewardship Council (FSC). Canada is the world leader in FSC certification, with over 21% of the world's FSC-certified forests. Additionally, the Natural Resources Canada's Canadian Forest Service and Sustainable Forestry Initiative assist the forestry industry in developing sustainable performance measures.

Among the leading Canadian forestry companies in stewardship and sustainability is Tembec, a Canadian forest products' company principally involved in the production of wood products, market pulp and papers. Tembec operates in sites across Canada, as well as in France, the United States and Chile. In 2001, the company signed an accord with WWF- Canada, collaborating in order to promote the supply and use of forest products certified by FSC. The company certified Ontario's Gordon Cosens Forest, an area four times the size of PEI, under the FSC in 2003, creating one of the largest FSC-certified forests in the world. To meet its environmental commitments, Tembec has adopted an environmental policy and has established two Environmental Management Programs, Impact Zero®, and Forever Green® to minimize the impact of manufacturing activities and forest operations on the environment. Tembec has received awards such as the FSC-Canada Winds of Change award – recognizing innovation in certification on a significant scale – and the Forest Leadership Partnership Award, selected by an international panel for its partnership with WWF.

Mining and prospecting

Although the many different forms of mining processes can significantly disturb land and ecosystems, the implementation of responsible mining practices through exploration, planning, operations, restoration, and research can drastically moderate damage to biodiversity and the environment. The Canadian mining industry is a world leader in environmentally safe and clean mining practices. The Mining Association of Canada (MAC) and Prospectors and Developers Association of Canada (PDAC) have environmental codes of conduct that member companies are expected to follow wherever they operate.

The PDAC, consisting of approximately 6,000 individual - and 950 company and organization - members, encourages the highest standards of technical, environmental, safety, and social practices in Canada and internationally. PDAC offers a freely accessible Internet-based toolkit, Environmental Excellence in Exploration, which describes leading examples of environmental and social responsibility in the minerals industry.

The MAC launched its Towards Sustainable Mining (TSM) initiative in 2004 to align industry actions with priorities and values of stakeholders and improve the mining industry's sustainable development performance. Member companies follow guiding principles and report on indicators that measure their performance for specific mining activities such as tailings management, energy use and greenhouse gas emissions management, external outreach and crisis management. After years of consultation, frameworks have been developed for mining and Aboriginal peoples, biodiversity, and mine closure. MAC's protocol for biodiversity conservation management will undergo its first round of self-assessments in 2009, leading to public reporting in 2010. Recipient of the 2005 Globe Foundation Award in the industry association category, MAC has a history of engagement with conservation organizations, such as the Species at Risk Working Group, Biodiversity Stewardship in Resource Industries (BSRI), and North American Bird Conservation Initiative.

Case Study: The Biodiversity Challenge at Xstrata's Canadian operations

With a strong business case for conserving biodiversity, including social licence, reduced reclamation costs, and anticipation and prevention of costly environmental impacts, MAC- member Xstrata has developed a comprehensive operating standard for biodiversity and land management. Xstrata's 17 standards are based on the principles of sustainable development, and also on the company's belief in operating responsibly and to the highest international standards. The standard supports the company's adherence to emerging industry standards, like the TSM framework on biodiversity, specifying that all major impacts, potential and actual, that the company's activities and operations have on the environment, biodiversity and the landscape must be identified, analyzed, evaluated and eliminated or otherwise addressed. As well, in managing the biodiversity and landscape functions around its operations, Xstrata will use scientifically sound technologies and procedures. To put this strong commitment into action, Xstrata's recently acquired Canadian operations began studies in 2007 to establish current biodiversity conditions and to assess the potential impacts of site activities, with site-specific biodiversity conservation plans subsequently implemented. Xstrata developed an index to help its Canadian sites assess the generic ecological value of their surrounding biodiversity based on habitat characteristics, biological (fauna and flora) components and the reliability of the biological data.

A member of MAC, Vale Inco is the second largest producer of nickel in the world, with three nickel mining operations in Canada. Among other environmental initiatives, Vale Inco is now in the second year of a five-year \$1-million partnership with WWF- Canada that involves sustainability projects at various operating sites. The main objectives are to conserve species at risk, to develop a conservation stewardship approach for Vale Inco in Canada, and to explore work of a similar nature internationally. Vale Inco is also involved in reclamation, including research in the revegetation of disturbed land with native plants.

The Iron Ore Company of Canada (IOC) is also a member of MAC and is one of the world's leading suppliers of iron ore pellets and concentrate and has focused on making sustainable development an integral part of its decision-making. One demonstration of this focus is reflected in habitat restoration under a tailings stabilization project called From Tailings to Biodiversity. The project explores creative uses for the inert tailings of rock and sand produced at the IOC mine near Labrador City, such as the creation of wetland, upland, and riparian habitats. The IOC has constructed a mosaic of habitats spanning over 540 hectares, creating diverse ecosystems rather than stabilizing the landscape through the traditional method of grass monoculture. In 2004, the IOC received the Great Blue Heron National Award from the North American Waterfowl Management Plan, acknowledging significant, long-term contributions that result in benefits to waterfowl and other North American migratory bird populations.

Energy

Canada has considerable energy resources; the country is the 8th highest crude oil producer globally and holds the second largest oil reserves in the world. With these significant resources comes the responsibility to deal with the considerable impacts that resource development can have on biodiversity.

Biodiversity considerations have been mainstreamed into elements of energy resource development in a variety of ways across the country.

The Canadian Association of Petroleum Producers has a Stewardship Framework with an underlying commitment to environmental stewardship and responsible resource development. Members are encouraged to work through a stepped approach that demonstrates continued improvement in performance. The approach includes: stewardship commitment; implementation of a stewardship management system; mandatory benchmark reporting; and internal and external audits. Some member companies have demonstrated a commitment to biodiversity conservation by participating in cumulative effects management, species at risk planning and working in partnerships with conservation organizations. The program started in 1999 as a voluntary initiative, but became mandatory for all members in 2003.

The Canadian Electricity Association has an Environment Commitment and Responsibility Program that commits its members to stewardship related activities and includes a third party verification system. This Association has also signed a Memorandum of Understanding with the Department of Fisheries and Oceans to address habitat issues, identifying stewardship as one of five areas of cooperation. One of its members, the Ontario Power Generation, has implemented a voluntary biodiversity management plan (with implementation and monitoring protocols) focused on species at risk and their habitats.

Canada has 25 percent of the world's peatlands, covering almost 113 million hectares acres of the country, with more than 70 million tons of peat accumulating each year. Of this, Canada's sphagnum peat moss industry harvests only 1.3 million tons. The Canadian Sphagnum Peat Moss Association (CSPMA) is an association of peat moss producers and related enterprises devoted to promoting the long-term health of the industry. Representing 95 percent of Canada's total production, the CSPMA provides the public accurate information on peat moss harvesting, production, value and environmental issues. CSPMA also recently launched a new logo for sustainable peatland management and a national sign campaign to promote the awareness of its successes and commitment to restoration and reclamation of harvested bogs. Members of the CSPMA adhere to the Preservation and Reclamation Policy established by the association, which includes identifying bogs for preservation, leaving buffer zones of original vegetation, leaving a layer of peat below harvesting levels to encourage rapid regrowth, and returning harvested bogs either to functioning ecosystems, forests, wildlife habitats or agricultural production areas. The CSPMA is examining sustainability accounting and evaluating the potential of establishing sustainable peatland standards and certification systems, also taking a lead role in the International Peat Society's efforts to create an international certification for Sustainable Peatland Management. Furthering the sustainable future of the industry, the CSPMA also engages in research investigating restoration practices, natural disturbances regimes, and climate change and emissions management.

Tourism

Tourism is an important component of the Canadian economy, representing approximately 2 percent of the country's GDP. Sustainable tourism affords travelers access to nature while at the same time

inspiring increased appreciation for the environment and creating minimal negative impact. Canada participates in the CBD's international programme of work on sustainable tourism and is active in supporting sustainable tourism standards and guidelines. The World Eco-tourism Summit was hosted in Quebec City in 2002.

A number of guidelines and organizations provide direction for sustainable tourism in Canada. Since 1995, the Canadian Tourism Commission (CTC) has been working to meet the objectives of sustainable tourism through projects and initiatives such as the Catalogue of Exemplary Practices in Adventure Travel and Ecotourism, released in 1999. Other national bodies include Parks Canada, and the Tourism Industry Association of Canada (TIAC). The Sustainable Tourism Toolkit project developed for the TIAC is an interactive resource in electronic format which facilitates business decisions and presents the business advantages of sustainable tourism. International bodies and guidelines include, among others, the United Nations Environment Programme's Sustainable Tourism in Protected Areas guidelines, Sustainable Tourism Stewardship Council (STSC), Green Globe 21, Global Partnership for Sustainable Tourism Criteria, World Tourism Organization, International Ecotourism Society, and Green Tourism Business Scheme.

Parks Canada issues an annual Sustainable Tourism Award to recognize best practices in the tourism industry, with nominees exemplifying a variety of biodiversity initiatives. One of the award-winners, the town of Bouctouche, NB, implemented NB's Ecotourism Master Plan, leading a community-based initiative that resulted in strong economic renewal and new ecotourism development in the watershed area. Additionally, the Niagara Parks Commission (NPC) seeks to reduce environmental impacts and to improve tourism's contribution to sustainable development and conservation, while generating significant economic benefits for the community. The NPC has funded environmental projects within the Niagara River Corridor Ecosystem that are focused on the protection, preservation and rehabilitation of habitats containing species at risk and is also involved in a number of projects which promote ecological restoration, riparian habitat preservation, natural area conservation, and resource management. The Oak Hammock Marsh Interpretive Centre increases public understanding of the value of wetlands and encourages public support for their conservation through innovative education and outreach programs. The Centre is designed with features such as a green roof, anti-bird-strike windows, and a constructed wetland for sewage treatment.

Exemplifying provincial mainstreaming of biodiversity considerations into tourism, the Wilderness Tourism Association of Yukon (WTAY) promotes the adoption of sustainable practices by its members, such as leave-no-trace operations and conformity to the Ten Principles for Arctic Tourism advocated by the WWF. The Environmental Committee of the Association has prepared a Code of Ethics for tourism operators and successfully lobbied for legislation to provide a framework for accountability by individual operators.

Aboriginal tourism businesses have also pursued sustainability and biodiversity conservation in their operations. Bathurst Inlet Lodge offers paddling, fishing, hiking, and wildlife watching in the Arctic, and aims to exemplify the Native love of the land and the environment, while the Cree Village Eco-Lodge in

Moose Factory has earned accolades for its beauty and commitment to sustainability through composting toilets, menu appreciating local meats, and organic bedding.

Vancouver hosted North America's Ecotourism and Sustainable Tourism Conference in 2008 which provides opportunities for organizations and individuals to gain knowledge of the latest trends in ecotourism and sustainable tourism, learn practical skills, and participate in invaluable networking and knowledge sharing. Canadian organizations who participated included provincial ministries of tourism, environmental NGOs, universities, newspapers, and a wide range of tourism operators.

Agriculture and Agri-foods

The Alberta Riparian Habitat Management Society or 'Cows and Fish', aims to foster a better understanding of how improvements in grazing and other management of riparian areas can enhance landscape health and productivity, for the benefit of landowners, agricultural producers, communities and others who use and value riparian areas. The Society is available to help landowners, agricultural producers, stewardship groups and communities to: understand riparian area functions and values; examine and monitor health of their riparian areas; and evaluate and suggest management strategies. www.cowsandfish.org

The Grazing Mentorship Program offers producers the opportunity to receive individual input and suggestions on how to improve their grazing management practices. Mentors, respected fellow producers with extensive grazing management knowledge and experience, will work with producers to provide suggestions and input on fencing, watering systems, grazing systems, plant growth, forage species selections, dormant season grazing, winter feeding strategies and more. www.cattle.ca

8. Economics

Assessment of the value of ecosystem goods and services

Healthy ecosystems provide human society with a vast diversity of benefits such as carbon capture, pollination, water filtration, and the provision of food, fibres, fuel, shelter, and healthy soil. Damaged ecosystems, such as those heavily harvested or those invaded by alien species (IAS), cost billions of dollars to Canadians each year in lost goods and services; conservative estimates place the combined economic losses and direct costs associated with the invasion of only 16 of Canada's current IAS at \$5.5 billion per year. Though humanity's well-being is totally dependent upon the health of ecosystems, ecosystem goods and services (EG&S) are predominantly public goods with no markets or prices, so are rarely included in current economic measures. The most common measure of economic wellbeing, GDP, does not capture many vital aspects of national wealth and wellbeing, including changes in the quality and quantity of natural resources.

Without a market value, EG&S are often disregarded in decision making; as a result, biodiversity is declining, ecosystems are being degraded and humans are suffering the consequences, both economically and in a variety of other ways. Many international institutions, including the CBD and the

United Nations, have recognized the importance of understanding the economic value of biodiversity for decision and policy making and have encouraged countries to pursue appropriate initiatives.

Case Study: Ecosystem Goods and Services Valuation

The valuation of the vast variety of EG&S, some of which are irreplaceable, and the mainstreaming of biodiversity into economic measures is under development nationally in Canada. Counting Canada's Natural Capital, a study completed in 2006 and supported by the Canadian Boreal Initiative and the Pembina Institute, assesses the value of Canada's boreal ecosystems, which cover 58.5% of the country's land area. Final estimates of environmental services from the boreal were about \$160 per hectare, or \$93 billion per year in Canada. If included in Canada's GDP, services from the boreal alone, not to mention other ecosystems in Canada, would amount to roughly 9% of GDP. Using 2002 figures, the total non-market value of boreal ecosystem services is 2.5 times greater than the net market value of boreal natural capital extraction. This result suggests that the ecological and socio-economic benefits of boreal ecosystem services, in their current state, may be significantly greater than the market values derived from current industrial development—forestry, oil and gas, mining, and hydroelectric energy—combined. This study and others have presented important information for decision-making, showing that it is often in Canada's best economic interest to significantly minimize impacts on ecosystems and value the integrity of ecosystem services before natural capital extraction.

The Value of Natural Capital in Settled Areas of Canada illustrates the economic values of natural capital from four geographically diverse locations in Canada. Offering additional proof that the substitutes for natural capital are often far more expensive to build and operate than those provided by nature, the paper stresses the importance of data collection on EG&S to inform economic measures and decision making. It recommends the use of policies that integrate the true cost of environmental degradation with economic decision making, thus leading to the most economically efficient management of natural capital resources.

The International Institute for Sustainable Development recently completed phase I of a report entitled An Ecosystem Services Assessment of the Lake Winnipeg Watershed. The report estimates that billions of dollars could be gained by restoring the natural environment of Lake Winnipeg, the most eutrophic of the world's largest freshwater lakes. The degraded state of the lake is a result of a multitude of human activities influencing water and nutrient flows on its approximately 950,000 km² multi-jurisdictional watershed. Seventeen ecosystem services commonly used in the literature were examined for each land cover type; the report concluded that if pre-settlement landscapes could be re-created, they would provide, on an annual basis, between \$500 million and \$3.1 billion of ecosystem services, and between \$80 million and \$1.4 billion worth of carbon offsets in the emissions market.

The economic value of nature is also apparent through the participation in, and expenditure on, nature-related activities in Canada. To understand the economic benefits of wildlife-related recreational activities, surveys on the Importance of Wildlife to Canadians were undertaken by Statistics Canada in 1981, 1987, and 1991. Work was then reframed in the 1996 Survey on the Importance of Nature to Canadians, which expanded to address more nature-related activities, such as camping and boating. The

survey examined the popularity of these activities, participation in these activities according to the natural areas in which they take place (such as the ecozones of Canada), and the significant benefits to the economy resulting from spending on these activities. The Survey found that, in 1996, Canadians spent \$11 billion on these nature-related activities.

Mainstreaming of the economic value of nature and EG&S has been brought to the next level by several research projects that investigate recommendations to industry, business, government, and other stakeholders. For example, in 2007, Environment Canada and participating banks released a research paper on the Relevance of Canadian Banks' Activities to the Sustainability of Canada's Boreal Region. The paper identifies options for Canadian banks to consider in developing lending, procurement and other strategies, fostering greater alignment of social, environmental and economic interests with the sustainability of Canada's boreal region.

In addition to studies investigating the value of EG&S and providing recommendations, there are currently several initiatives in Canada that offer compensation to encourage the mainstreaming of biodiversity into the economy through the conservation of nature and EG&S. These programs use measures such as: conservation agreements, which limit development rights in exchange for compensation; tax credits, such as those offered through the federal Ecological Gifts Program and the Manitoba Riparian Tax Credit Program; and annual rental payments, such as those offered through the Rural Water Quality Program in regions of Ontario to pay for land set aside for stream buffer strips, cover crops, shelterbelts, environmentally friendly cropping practices or retirement.

9. Human Health

Increasing research and initiatives have been undertaken recently to investigate the interconnections between the biodiversity and human health. The International Symposium on Biodiversity and Health, held in 2003 in Ottawa, presented a number of linkages between biodiversity and health. Firstly, the loss of biodiversity endangers important ecosystem services, such as protection against flooding and erosion; the filtration of toxic substances; the stabilization of local climates; and the provision of food, shelter, and important materials. Additionally, the loss of species deprives humans of tools for biomedical research; over 50% of commercially available drugs are based on bioactive compounds extracted or patterned from non-human species. Biodiversity is also important in providing models for medical research that help researchers understand normal human physiology and disease. Denning bears for example, including Canadian species such as polar bears and North American black bears, have been the focus of large amounts of research applicable to osteoporosis, renal failure, type I and II diabetes mellitus, obesity, and severe anxiety. Biodiversity can also reduce the risk of human contraction of infectious disease. For example, the risk of getting Lyme disease, a vectorborne disease in Canada and many other countries, is reduced when high levels of vertebrate-species diversity exist. A growing number of studies have also investigated the important effect of biodiversity and nature on human psychology. Nature is surprisingly beneficial for the brain, with studies demonstrating improved recovery from illness, restoration of attention and working memory, reduced symptoms of attention

deficit disorder, and reduced stress, domestic violence and aggression, with increasing contact with nature. A recent paper has demonstrated that the psychological benefits of green space are closely linked to the diversity of its plant life, as subjects that spend time in a biodiverse park score higher on various measures of psychological well-being when compared with less biodiverse parks.

Many cross-cutting issues affect both biodiversity and human health and well-being, including pollution, loss of green space, climate change and degradation of genetic resources and adaptive potential. As such, there are a number of initiatives in Canada that include or integrate elements of biodiversity and human health. The international One World - One Health initiative seeks to promote, improve, and defend the health and well-being of all species by enhancing cooperation and collaboration between physicians, veterinarians, and other scientific health professionals.

An ethnobotanical study conducted for Health Canada revealed that more than 200 plants, fungi, and lichens are used for various purposes by Indigenous people in Canada. In Canada, approximately 80% of Aboriginal communities are located within the nation's boreal or temperate forests; the Northern Ontario School of Medicine's Boreal Bioprospecting Initiative (BBI) aims to gather information for medical research using traditional knowledge and scientific methods, while ensuring the benefit-sharing of new developments with the Aboriginal communities.

10. Stewardship

Much of what Canada has achieved with respect to the mainstreaming of biodiversity can be recognized under the heading of "stewardship". Stewardship is generally seen as the responsible management of air, land, water and biodiversity that ensures the sustainable use of natural capital, maintenance of ecological integrity and conservation of biodiversity for future generations. Stewardship is often manifested at the community or individual level; Canada has gained a reputation internationally for its strong stewardship programs and initiatives involving Aboriginal communities, governments, and citizens across the country. Since the 1980s, stewardship programs have grown and evolved, becoming a mainstream delivery mechanism for conservation programs in Canada. It is currently estimated that there are millions of active environmental stewards in Canada, with several thousand organizations of many kinds, some linked together in an array of social networks; the contribution of these stewards is worth millions of dollars and contributes significantly to the preservation of biodiversity.

Stewardship has been ingrained into approaches concerning the prevention of species endangerment and biodiversity loss. Canada's Stewardship Agenda (CSA), approved by the Federal-Provincial-Territorial Resource Ministers in 2002, is a plan for collaboration that proposes operating principles for stewardship under their vision of Canada as "a nation where Canadians are actively working together to sustain natural life-support systems". Canada's Stewardship Portal has compiled a variety of case studies based on geographical region, which outline several stewardship initiatives, including objectives, actions, and results for each project. The 2009 State of Stewardship in Canada Report prepared by the Centre for Environmental Stewardship and Conservation (CESC) outlines a wide variety of provincial and territorial initiatives.

Support for stewardship at the provincial and territorial level is also significant. For example, the Ontario Ministry of Natural Resources' Ontario Stewardship program includes 42 community-based stewardship councils involving thousands of partners. Approximately 16,000 volunteers take part in more than 600 Ontario Stewardship projects every year, including natural resource education, shoreline restoration, wildlife habitat enhancement and forest-related, community-driven initiatives. Under Ontario Stewardship, more than 1,000 educational events have been hosted, more than 1,500 hectares of wetlands and headwater areas have been restored, and more than 40 kilometres of shoreline have been rehabilitated.

There are several community-based ecosystem and species monitoring programs raising public awareness on biodiversity issues by enlisting the help of Canadians in the collection of scientific data. Wormwatch, Frogwatch, Icewatch and Plantwatch are all programs under the Environmental Monitoring and Assessment Network that involve Canadians in citizen science and stewardship. A variety of networking bodies, including the Land Stewardship Resource Centre in Alberta and Fish and Wildlife Management Board Stewardship Program in the Yukon, promote local participation in stewardship initiatives.

Communities of stewards in Canada also include hunters, trappers and loggers. Their contribution to stewardship is described in reports such as *Investors in Habitat*, *Hunter Contributions to Wildlife Habitat Conservation in Canada*, *trapping - Trappers: Stewards of the Land*, and *woodlot owners - Private Woodlot Owners-Meeting the Stewardship Challenge*.

Active stewardship networks, such as the Stewardship Centre for British Columbia, the Land Stewardship Centre of Canada, the Stewardship Network of Ontario, the Canadian Land Trust Alliance and the Stewardship Association of Municipalities provide a forum for sharing information and collaboration on regional and national stewardship issues and programs. A number of conferences scheduled in 2009 will focus on strengthening stewardship. These include: *Strengthening Stewardship Investing at Every Step* to be held July 8-11, 2009 and the *Canadian Heritage River Conference* held June 14-17, 2009.