# Cities and Biodiversity Case Study Series

## Canadian Best Practices in Local Biodiversity Management

Front and back cover image: “Kelowna.”/Flickr Pompeii Am Götterdämmerug
Inset image: “Reserva Nacional Nahanni.” Flickr/viajeacanada

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# Table of Contents

# Setting the Context

## An Introduction

Biodiversity is complex. The complexity lies in the interconnected relationships between living organisms and their environment and how those relationships drive ecosystem functions. Over the past hundred years humans have increased species extinction rates by as much as one thousand times, while the distribution of species is decreasing spatially.

Until now, there has been insufficient integration of biodiversity issues into broader policies, strategies and programmes around the world. The underlying drivers of biodiversity loss have not been sufficiently addressed (Secretariat of the Convention on Biological Diversity, 2010, 9); however, the news is not entirely grim—without the actions already taken by communities, NGOs and governments, even less biodiversity would exist today.

## Shift in Perspective: From Global to Local

The connection between national governments and biodiversity protection was officially acknowledged in the Convention on Biological Diversity (CBD). Enacted in December 1993, the CBD was the first global agreement to address all aspects of biological diversity, and this global agreement solidified the importance of biodiversity protection and conservation. As humans continue to exert the most significant influence on the rates of biodiversity loss and species extinction, local governments are in a unique position to implement biodiversity actions, and reach out to people about the importance of sustainable biodiversity management.

The first biodiversity-oriented meeting of local governments was in Curitiba, Brazil in March 2007. The meeting produced the Curitiba Declaration on Cities and Biodiversity, which affirmed the need to engage local authorities in the implementation of the objectives of the CBD. In May 2008, the 9th Conference of the Parties (COP) to the CBD took place in Bonn, Germany. ICLEI, the City of Bonn and the Service Agency Communities in One World organized a parallel event, the *Mayors' Conference on Local Action for Biodiversity* where local leaders discussed their contributions to slowing global biodiversity loss. Producing the "Bonn Call for Action", this meeting led to the official acknowledgement of local governments' influence in the CBD and the need to support their role so that local governments may in turn support its implementation.

Canada's involvement as a signatory and active participant in the CBD has provided many opportunities for provincial, regional and local governments to re-examine the way natural spaces connect to everyday life, and the importance of ecosystem services to the species that depend on them.

*Cities and Biodiversity Case Study Series* serves as an introduction to the valuable role of local governments in biodiversity management and provides a snapshot of the work Canadian municipalities are doing to preserve local biodiversity and protect a global common good.

> "National programmes or legislation can be crucial in creating a favourable environment to support effective "bottom-up" initiatives led by communities, local authorities, or businesses.
>
> Global Biodiversity Outlook 3, Secretariat of the Convention on Biological Diversity, 13

# Biodiversity and the Role of Local Governments

Biodiversity is the variety of life on earth upon which human well-being is dependent. Losses in biodiversity, along with the degradation of ecosystem services, have occurred more rapidly in the past hundred years than at any other time in human history. The five main factors driving biodiversity loss are habitat change, overexploitation of resources, pollution, invasive species, and climate change. As cities and towns further develop on their green spaces and encroach on the natural spaces surrounding them, rapid urbanization continues to be a major contributing factor to the loss of biodiversity. Healthy ecosystems ensure long-term sustainability, however, urban regions, and the economies supporting them, consume 75% of extracted natural resources (UNEP, 2009). As urbanization increases and natural resources become more fragmented, the impetus to protect and manage valuable ecological spaces grows.

The pressures on species in urban regions are broad; in order to combat these pressures and to achieve greater progress towards biodiversity conservation, local governments need to strengthen their responses by highlighting conservation and sustainable use of biodiversity and ecosystem services.

Beyond the direct social and ecological benefit— such as provision of food, fibre, medicine, fresh water, pollination of crops, filtration of pollutants, and protection from natural disasters— the sustainable management of biodiversity also contributes to cultural services, such as spiritual and religious values, opportunities for knowledge and education, as well as recreational and aesthetic values.

Commonly, biodiversity conservation and protection have been viewed as the domain and responsibility of national and provincial governments; however, local governments have a crucial role to play in mitigating biodiversity loss. The unique position of local governments, as the level of government closest to residents, along with their specific roles and responsibilities, allows for the development of locally tailored and integrated biodiversity strategies that protect and sustain ecosystems and species. There are a variety of mechanisms available to local governments which can be utilized to drive local action on biodiversity. These include:

**Land Use and Urban Planning**
A key role of local government is to manage local places in a coordinated and planned way that reflects the community's shared vision of its biodiversity.

**Licensing and Regulation**
Local governments set the local regulatory environment through assessment and approval processes, the use of surcharges and rebates and through the enforcement of local laws to implement and enforce biodiversity management and protection policies.

**Facilitation, Advocacy and Leadership**
Local governments are in close contact with community organizations, businesses, residents and other stakeholders at the local level. The influence that results from this contact can be used to develop shared understandings and encourage whole community responses to biodiversity loss.

**Community Service Delivery, Community Development and Civic Engagement**
Local governments are committed to preserving the health, safety and well-being of residents, while ensuring active civic participation.

**Workforce Development**
As responsible corporate citizens, local governments can act as leaders to ensure good occupational health and safety, sustainable business practices and increase local investments and services which foster biodiversity enhancement strategies.

**As biodiversity loss will affect a broad range of government services, integrating biodiversity conservation and protection measures is a matter of sound biodiversity management and good governance.**

Secretariat of the Convention on Biological Diversity (2010) Global Biodiversity Outlook 3. Montréal.
UNEP (2009) Cities and Green Buildings. Retrieved from: http://www.unep.org/urban_environment/PDFs/CitiesAndBuildingFactsheet_20091105.pdf

# About This Publication

As 2010 is the International Year for Biodiversity, it is an important time to take note of the great efforts to protect biodiversity, and at the same time, acknowledge the lessons to learn from various initiatives. Throughout Canada there are many local governments working directly and indirectly on biodiversity activities through their planning, awareness-raising, and decision-making initiatives; however, very little is known about their specific projects and how they can be replicated by others.

The *Cities and Biodiversity Case Study Series* serves as a collection of municipal best practices in urban biodiversity management and protection. The local governments represented here have gained knowledge on biodiversity management, and therefore, these case studies should serve as a learning tool for other local governments interested in engaging on biodiversity actions.

Eleven case studies have been selected from across the country, ranging from the small municipalities to Canada's largest metropolitan areas. Each case highlights a unique ecosystem and the initiatives that are being taken to sustainably manage and protect its biodiversity.

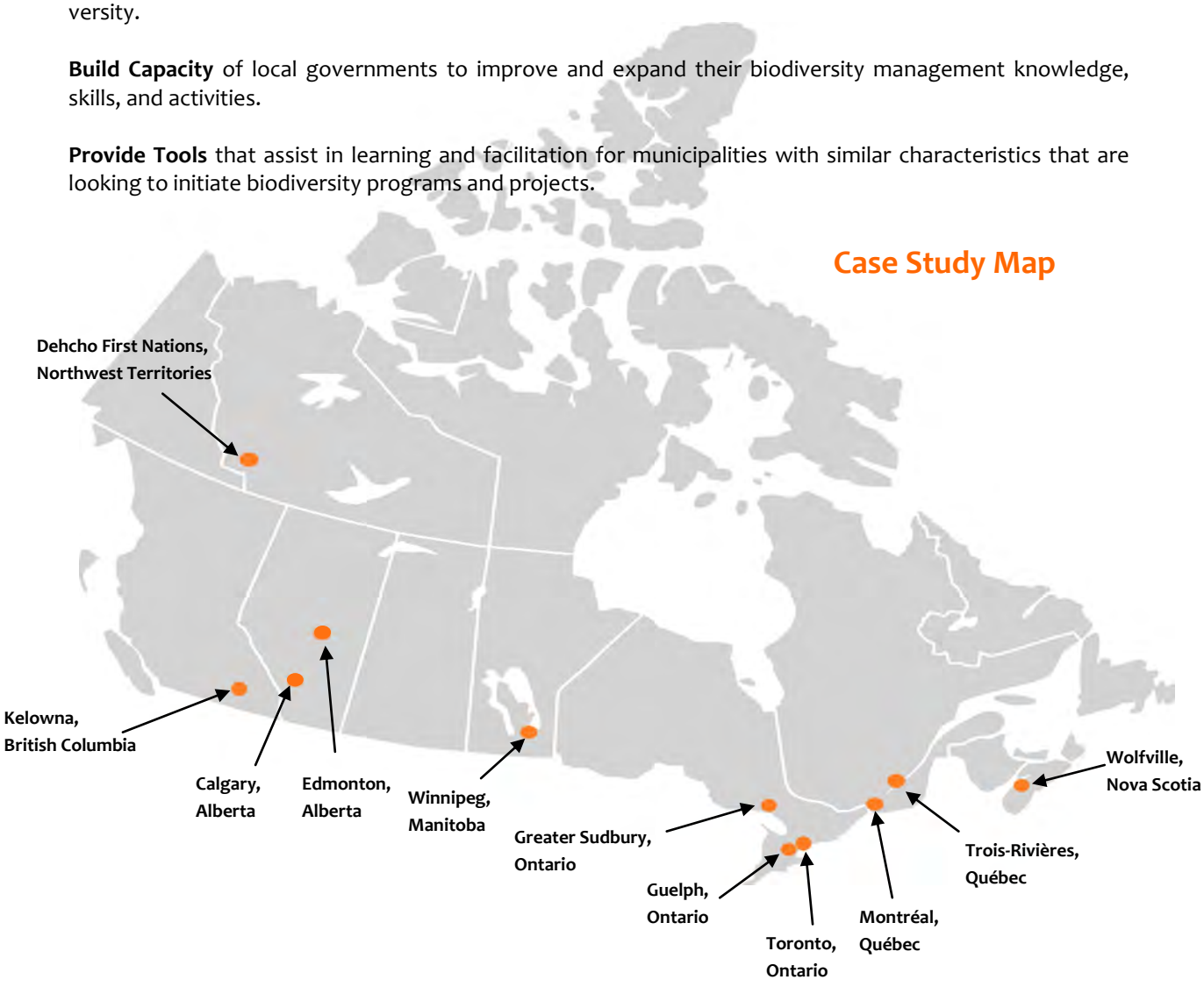
The purpose of each case study is to:

**Highlight** the contributions local governments have made to conservation and the sustainable use of biodiversity.

**Build Capacity** of local governments to improve and expand their biodiversity management knowledge, skills, and activities.

**Provide Tools** that assist in learning and facilitation for municipalities with similar characteristics that are looking to initiate biodiversity programs and projects.

## Case Study Map



# Creating a Biodiversity Strategy Based on Past Experiences


## ABSTRACT

Biodiversity conservation has become an important consideration for the City of Calgary, and a Biodiversity Strategy is currently being produced by the City. Calgary's Biodiversity Strategy aims to be a compilation of best practices, policy implementation strategies, and ecosystem research tools with the goal of building upon existing environmental policies undertaken by the City for over twenty years.


**MUNICIPAL PROFILE** **Name: City of Calgary, Alberta** **Population: 998,193** **Area: 848 km²**

Calgary is the largest City in Alberta, and the third largest in Canada. Situated at 1048 metres (approx. 3483 feet) above sea level, the climate is highly influenced by the geographic elevation and proximity to the Rocky Mountains.

Calgary is on the rolling landscape of the prairies and the edge of the Rocky Mountain Foothills. It has an extensive network of open spaces, consisting of parks, natural corridors and trails. The most prominent natural open spaces are located in the City's periphery and along the creeks and waterfronts in the river valley system. The City has taken a strong position on water quality and water resource management, and has been actively working on the protection of natural space resources for over twenty years. The City's water management initiatives have evolved and grown in scope from site-specific practices and consumer education to large-scale actions such as changing by-laws to make water efficiency a requirement and working with industrial and commercial consumers to realize the value of water conservation.

In recent years, biodiversity conservation has become an important consideration for the City, and a Biodiversity Strategy is currently in production. The Strategy, combining best practices with implementation tools, will use two key documents as a reference: the Wetland Conservation Plan and the Open Space Plan.

The Wetland Conservation Plan provides policies and procedures to help the City manage the thousands of wetlands that stand to be impacted by further urban development. The Plan offers a holistic approach to wetland conservation as it provides implementation measures and monitoring options that work best for the City. Issue identification workshops hosted by the City of Calgary's Key Stakeholder Advisory Committee provided input for the development of the Plan, such as strict approval procedures for developments that pose large ecological damages.

The Open Space Plan, focused on managing City parks and all other natural spaces; bringing together a number of recommendations regarding environmental protection practices, impact assessment, and options for protecting environmentally significant areas. The Open Space Plan works to maintain the quality and integrity of natural ecosystems and enhance their structure and functions.

"Calgary Suburban."Flickr/ecstaticist

Looking towards downtown Calgary, the landscape of the city reflects a rolling prairie environment on the edge of the Rocky Mountain Foothills.

## Working Towards a Biodiversity Strategy

The City is preparing a Biodiversity Strategy that will build upon existing environmental policies and utilize their accumulated best practices and knowledge to enhance the protection of biodiversity. The move towards a Biodiversity Strategy also shows that biodiversity is an emerging field of municipal interest and can act as an option for municipalities to use past experiences and group them into a comprehensive biodiversity plan. The City's Biodiversity Strategy will be the next step towards habitat and ecosystem protection by achieving the following:

1. **Serving as an opportunity to update and strengthen existing policies.**
   Though there is a good foundation of municipal tools, it is necessary that documents, such as the Wetland Conservation Plan, are subject to review and improvement. This Plan has strong policies regarding the protection of wetland habitats as well as a component that focuses on land compensation mechanisms. In the future, the City anticipates receiving compensation funds from development amounting to over $10 million. The City's future work looks to incorporate wetland mitigation banking from a regional, rather than city limit, perspective. The City is able to collect compensation funds from proponents of development, and use those funds at a later date for future wetland preservation.

2. **Becoming an umbrella policy for biodiversity protection.**
   The Strategy will encapsulate all relevant planning and protection policies the City currently utilizes, as well as new mandates, specific to the protection of biodiversity. It will approach biodiversity protection from a systems perspective and address the relationships and functions between different ecosystems.

Incorporating these two frameworks is a challenge to the City as currently protection practices take on a land use and development framework that inherently focuses on individual areas, rather than viewing the City as an entire network of ecosystems. The Biodiversity Strategy will incorporate these wider views and serve as the fundamental way to approach the City's environmental protection practices for future efforts.

## Lessons Learned from Past Environmental Practices

In the past, the City has been challenged when working within other legislative frameworks and policies that do not provide the necessary tools for municipalities to protect environmentally significant areas. For the City, Provincial Legislation, such as the Municipal Government Act, are intended to be interpreted broadly by municipalities, and as a result land use decisions can vary considerably from one community to the next. The limit in authority and autonomy has been an obstacle for the City, having clear, consistent environmental protection guidelines would facilitate further municipal action.

## Beginnings of the Biodiversity Strategy

As stated, the City is currently in the beginning stages of a new Biodiversity Strategy and updating its inventory of natural areas, species at risk, sensitive ecosystems, and monitoring known species habitats. Responsibility for the collection of data will fall on various departments, external parties and stakeholders that work closely on biodiversity protection issues. Within the City the Parks Department within the Natural Areas Management Group will lead the production of the strategy, and will work closely with a number of departments, including, Water Resources, Office of Sustainability, and Environmental Management. External stakeholders include community groups, ENGOs, Province of Alberta, Federal Government, as well as neighbouring municipalities and local watershed management groups. Using the expertise and resources of various departments and groups adds an array of perspectives that will help to make the Strategy a comprehensive city initiative.

The City of Calgary recognizes that residents also have a responsibility to ensure that the objectives of the Strategy are achieved. The Environmental Education and Initiatives section of Parks will act as a liaison between the City and the community to assist with public education on what biodiversity is, why it is important to Calgary residents, and how they can get involved in understanding, monitoring and protecting biodiversity in the City.

The interconnected benefits of protecting, establishing, and restoring natural corridors and habitats will ensure that future generations in Calgary live in a City that values the quality of their communities and ecological services. The City has been active in protecting water resources and natural spaces for many years, but now recognizes that biodiversity is the framework that will tie together their previous efforts. With a focus on the biodiversity in Calgary, staff are able to come together and use their existing knowledge to produce a comprehensive plan that will mark Calgary as leader in entrenching biodiversity protection as a core function of municipality.

For more information, visit www.calgary.ca

# Local Native Community Works to Protect National Treasure


## ABSTRACT

The Dehcho First Nations are self-governing native communities located in the southwest corner of the Northwest Territories. The region is home to some of the Country's most diverse and protected landscapes, most notably, the Nahanni National Park Reserve, a legendary icon of Canadian wilderness. The Dehcho First Nations and the Government of Canada have been cooperatively managing the park by incorporating traditional knowledge and connectivity in order to maintain the natural heritage of the geographic region.


**MUNICIPAL PROFILE** **Location: Dehcho First Nations, Northwest Territories** **Population: 1,216** **Area: 30,000 km²**

Established to protect and highlight outstanding natural landscapes and heritage, national parks have a great significance in Canada. Nahanni National Park Reserve (NNPR) was designated as a National Park Reserve in 1972, and was formally incorporated into the National Parks Act in 1976. Globally, the NNPR is recognized as a UNESCO World Heritage Site, the first natural region in the world to receive the designation, as it serves as an outstanding example of the major stages in the Earth's evolutionary history and exceptional natural beauty.

The geological history of the park is unique as the region was not affected by glaciers, and as such, the structural evolution is different from any other part of Canada. The park has a diverse topography, which includes mountain ranges, rolling hills, four canyons, an elevated plateau, broad depressions, and river valleys.

"Nahanni River" Flickr/Mangrove Mike

South Nahanni River

Glaciers covered so much of Northern Canada that most landforms have been altered significantly, as recently as the last glaciations 10,000 years ago. The Nahanni National Park Reserve is a unique case, as the area escaped glaciations due to the mountains in the west which intercepted most of the precipitation during the glacial period and prevented the build up of snow that would form a glacier. As a result, the mountains and river canyons have not been widened or rounded by the crush of ice.

The NNPR built a strong reputation as a legendary icon of Canadian wilderness and features the South Nahanni River, a central feature of the park. The river is a tributary of the Liard River that flows out of the Mackenzie Mountains and spans 563 kilometres (350 miles). The river is also of great importance to the local community of the Dehcho First Nations, which thrives off of the river as a source of local livelihood and connection to the land. Protecting the river and the canyons were driving factors for the establishment of the park as a national reserve.

Nahʔą Dehé is the traditional name for the park, which serves as a reflection of the Dehcho First Nations' heritage. The river is named after the Naha, a Dene tribe of warriors who claimed the Mackenzie Mountains as their territory and were notorious for being protective against all who resided within their borders.

## Dehcho First Nations Using a Cooperative Management Process

Work to protect the park has been a joint effort between the Federal government and the Dehcho First Nations people. In order for the Government of Canada and the Dehcho First Nations to actively work together, Parks Canada has been working through the Dehcho Process, a land-use and self-governance process to maintain the areas ecological integrity and establish long-term management planning. The Dehcho Process is a cooperative management approach that relies on negotiating self-governance practices, land use planning, and resource management. As part of the agreement between the two parties, the Nahʔą Dehé Consensus Team was created, which allowed members to work together cooperatively, while the Park moves to full national park status.

The Nahʔą Dehé Consensus Team is comprised of four appointees from the Dehcho First Nations, and three appointees designated by Parks Canada. Together, they took on four main tasks:

1. Review and finalizing of an Ecological Integrity Statement;
2. Preparation of a new management plan;
3. Development of an interim park management agreement (IPMA) to guide the cooperative management process until the Dehcho Process is complete; and
4. Creation of a Memorandum of Understanding between the two parties regarding the park's expansion.

Currently, efforts have shifted to maintaining the management actions outlined in the IPMA. Both parties are moving forward in this process and hope to achieve a permanent management partnership.

**?**

The land area of the park was originally 4,766 km², and early on in its establishment as a National Park Reserve, the area was considered too small to protect all natural features. The Dehcho First Nations established a working group that succeeded in expanding the area of the park to a total of 30,000 km²; making it the third largest national park in Canada and the sixth largest in the world.

## Protecting the Park to Preserve Biodiversity

National parks across Canada create a network of highly significant areas that maintain biodiversity and showcase the extraordinary natural features of the country. Strengthening Canada's network of parks in keeping with global biodiversity efforts, such as the CBD, to raise public awareness on the importance of preserving biodiversity for human livelihoods. The Dehcho First Nations is one example of a local community that plays an active role in the protection of a park that is also their home. By using local knowledge and a cooperative approach to the parks management, the integrity of the river and landscape remains constant and protection of the natural systems will continue for decades to come.

For more information, visit www.dehcho.org/home

Reserva Nacional Nahanni." Flickr/viajeacanada

Nahanni National Park Reserve

# Mainstreaming Biodiversity through Urban Design and Community Engagement


## ABSTRACT

The City of Edmonton is a leader in biodiversity protection and has made education on the importance of biodiversity a major local effort. The City has mainstreamed biodiversity and recognized the roles different stakeholders and community can play to move ecological efforts forward.

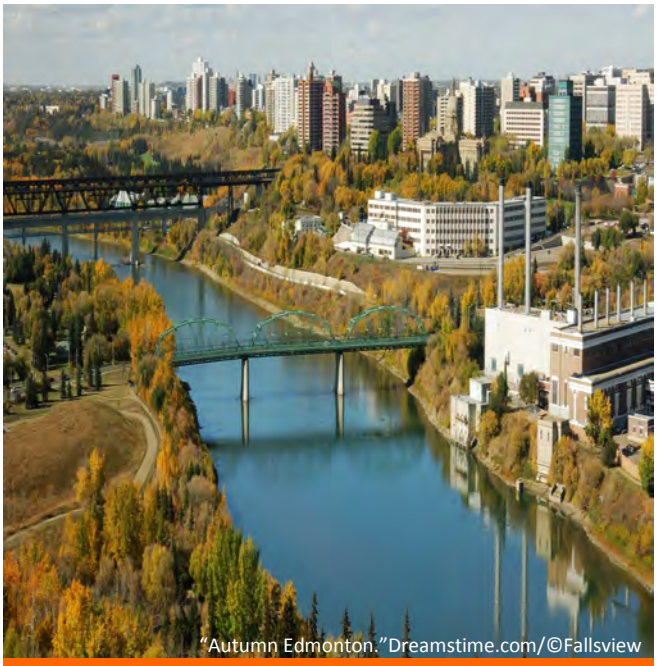

**MUNICIPAL PROFILE** **Name: City of Edmonton, Alberta** **Population: 730,372** **Area: 684 km²**

The City of Edmonton is a large urban centre with the majority of its population living in the city core. The topography of the City is relatively flat, but has many river valley parks that provide opportunities to enhance and protect valued ecosystems. Biodiversity protection is key among City staff and residents as both groups place a high value on natural spaces. The City has become a player in international dialogues as they are a member of many global biodiversity protection efforts, such as: Local Action for Biodiversity (a joint initiative hosted by the ICLEI Africa Secretariat, partnered with the International Union for Conservation of Nature (IUCN)), and participated in the City Biodiversity Index. The Cities Biodiversity Index is a measure of biodiversity levels based on three categories including: diversity of species (plant and animal); type of service the species provide for the city (pollination, carbon sink); and how the city promotes biodiversity (museums, public campaigns).

Edmonton has made biodiversity protection a priority by integrating biodiversity considerations into urban planning, and community engagement practices. These two areas help the City move towards mainstreaming the understanding of urban biodiversity and the benefits of ecological preservation. Through many programs and activities, the City has successfully incorporated biodiversity into various departments and fostered strong community and stakeholder involvement on conservation.

### Ecological Design Approach to Biodiversity Protection

The City has actively protected 3700 hectares of natural areas, and created the largest municipally owned park system in Canada. Throughout the City's growth there have been a myriad of development pressures, but despite this, the City was able to protect five hectares for every eleven hectares of Priority Natural Areas, and worked around Provincial restrictions and limited tools to protect significant lands. As habitat fragmentation is a major contributor to biodiversity loss, the City has incorporated biodiversity and urban design in a *biologically sensitive approach* to city planning.



"Autumn Edmonton."Dreamstime.com/©Fallsview

Edmonton Skyline, and the Edmonton River Valley. The River Valley is one of the longest urban river valley parklands.

As habitat fragmentation is a major contributor to biodiversity loss, the City has incorporated biodiversity and urban design in a *biologically sensitive approach* to city planning. Land acquisition became a key area of interest to the City, and in 2009 Council authorized a $20 million fund allocation and permit borrowing for land acquisition. The Edmonton and Area Land Trust, is a resource established to create partnerships with private landowners and allocate funds to purchase valuable lands.

The City of Edmonton has 299,000 trees on boulevards and parks, and in the last decade, more than 20,000 trees have died to due drought conditions and invasive species. The effects of climate change are expected to further increase these environmental threats to the City's urban tree canopy. As summer drought continues to affect the region, the City will require intensified replanting and restoration actions, while reconsidering which tree species best fit the changing weather conditions.

Invasive species and disease, such as Emerald Ash Borer, are expected to migrate from the south, this threat would have devastating effects on the urban tree count, as both these trees make up about 68% of street trees. The City is working towards an Urban Forest Management Plan that addresses this impact through short and long-term actions, such as inventorying of urban forests and field research to test potential solutions to decreasing tree canopy.

The Land Trust is the result of collaboration among environmentalists, philanthropists, developers and the City. Prior to permit borrowing, the City Council allocated over $1 million for land acquisition and over $1 million for wetland purchasing.

The City has adopted urban planning and design methods that address the loss of natural areas, and utilize an ecological approach to expand the potential for large-scale biodiversity protection. The incorporation of ecosystem functions into city building and municipal operations promoting sustainable development, and the protection of natural systems. The following are some of the key implementation tools to guide planning in Edmonton:

***Ecological Design Report:***
The production of this report included community members in defining specific biodiversity values and outcomes that should be preserved. This engagement strategy has led to outside developers moving towards designing neighbourhoods that are more sensitive to biodiversity values, and reducing community conflicts.

***Ecological Network Model:***
The Ecological Network Model is a planning methodology that merges an ecosystem's existing structure with community design. This approach is meant to increase ecological corridors, create habitats, increase biodiversity, and maintain the integrity of an ecosystem, by viewing the land area as a network of core habitats that are fully connected and integrated.

This model was implemented in 30 neighbourhoods with measurable results. The model is a powerful tool for neighbourhood design as it is aligned with increasing growth demands, while producing healthy and biodiversity rich neighbourhoods.

***Wildlife Passages Engineering Design Guidelines:***
The guidelines provide engineers with a simple methodology for maintaining connectivity at different scales within the community. They are meant to target locations that have been impacted by engineering works, and therefore, require more ecologically sensitive planning guidelines.

The three approaches outlined have led to better neighbourhoods and engineering procedures that preserve Edmonton's biological diversity. Ecologists and biologists interested in the City's efforts are studying the levels of biodiversity, and are finding significant changes and improvements where the three methods have been implemented. The next step is to gather the community to quantify the results of the Design Approach.

### Municipal Policies and Plans for Biodiversity Protection

The various approaches in Edmonton demonstrate that economic viability does not need to come at the expense of the natural environment. The City has many plans and strategies in place that balance development with biodiversity, some of which include:

- Edmonton Environmental Policy: promoting the development of environmentally sustainable communities;
- Protection of the Natural Environment Plan: committing Edmonton to taking a leadership role in protecting its natural heritage and biodiversity;
- Natural Connections Strategic Plan: demonstrating the critical role of habitat connectedness and highlighting ways to approach the issue both structurally and functionally to ensure long-term sustainability; and
- Edmonton's Natural Connections—Biodiversity Action Plan: provides baseline information and next steps that apply an ecological network approach to biodiversity protection;
- Natural Area Management Plan: the City will be re-releasing this plan late 2010 as it integrates conservation planning with operational guidelines for staff and community volunteers; and
- Biodiversity considerations have been integrated into the City's *The Way We Grow, The Way We Live, The Way We Move,* and *The Way We Green* (to the released in late 2010).

As the City of Edmonton implements their environmental plans, the City has leaned that there is a need to measure performance by monitoring implementation, overall effectiveness, and extent of its influence. For a full report on monitoring outcomes, see the City's EcoVision Report.

## Mainstreaming Biodiversity to Community Members

The idea of mainstreaming a concept as broad as biodiversity is an onerous task, as it involves considering all forms of life and their ecological processes. The City has placed a great deal of importance on ensuring that biodiversity is understood by the community and that messages are tailored to reach the greatest number of people. This commitment is apparent in a variety of initiatives undertaken by the City to promote biodiversity awareness to diverse groups, notably the Biokit for New Canadian Immigrants and the Master Naturalists Program.

**Master Naturalists Program:**

Part of the newly-launched *Learn and Serve Program*, Master Naturalists provides the community an opportunity to complete 35 hours of training and field trips in exchange for 35 hours of stewardship volunteer-service in areas such as: natural area monitoring, inventory, naturalization, restoration, and ecological education. Modelled after the City's successful Master Composter and Recycler Program, Master Naturalists provides participants with hands-on educational and awareness raising opportunities and the skills to effectively steward the natural environment. Participants become ambassadors for the City, and for biodiversity stewardship, as they work alongside city staff to build community learning capacity.

City staff and local experts educate the team on various plant communities and restoration techniques. Master Naturalists has the makings for long-term success as it is designed to ensure that these groups do not work in isolation. As a result, the Master programs have created a hub, or network, for local action through the opportunity to make connections with other local naturalists. This has generated local excitement and momentum as it presents what is possible through meaningful collaborations.

**Biokit for New Canadian immigrants:**

The Edmonton Newcomers' BioKit Project is an educational and outreach pilot project that reaches approximately 100 recently arrived immigrant families. Readers are educated on both local natural areas and biodiversity while receiving hands-on training to help them learn about the natural world through positive experiences.

Black-capped Chickadee" Flickr/Shawn McCready

Black-capped chickadee seen at Beaumaris Lake

The Biokit initiative is a two-year pilot project with the following goals:

- Helping the City engage with a wider audience in biodiversity stewardship;
- Making information more accessible to the general public, and particularly to audiences who face significant barriers in exploring and learning about local natural areas; and
- Developing mentorship opportunities for those interested in more involvement opportunities.

The Biokit was developed from Environment Canada's Biosphere BioKit; the City of Edmonton is the first municipality to downscale the biodiversity publication to an audience of recent immigrants.

The Biokit is a result of a partnership with the Edmonton Mennonite Centre for Newcomers and the City of Edmonton Office of Natural Areas. Other partners include the Federation of Alberta Naturalists, Edmonton Federation of Community Leagues, Multicultural Health Brokers, and City of Edmonton Community Services. These groups support the publication's development and distribution and connect multicultural communities. Leaders in the Master Naturalists program are used to deliver the Biokit program.

## Lessons Learned through Mainstreaming Biodiversity

Important lessons have been learned as the City gains experience and insight into the variety of effective ways to manage biodiversity initiatives and further prompt mainstreaming. These include:

1. Integrating biodiversity conservation into the City's vision, policies, and high level plans;
2. Partnerships are strategic ways to work around limited staff and resources;
3. Engage citizens as they demand high standards in biodiversity conservation, and create opportunities for them to demonstrate their interests;
4. Measuring and reporting on progress to help develop a system of effective environmental management;
5. Implementation plans are still being written to build momentum;
6. Participate in biodiversity networks to avoid working in isolation; and
7. Cross-department initiatives allow for biodiversity management to become a priority across different departments and staff.

For more information, visit www.edmonton.ca

# Steady Approach to Biodiversity Recovery


## ABSTRACT

The City of Greater Sudbury has undergone many changes in the past two centuries. At the present time, the City has focused on maintaining its new reputation as an environmental leader, through extensive re-greening programs to restore fragile and damaged landscapes. Through extensive regreening efforts, Greater Sudbury is an example of what is possible by reintroducing nature to the city.


**MUNICIPAL PROFILE** **Name: City of Greater Sudbury, Ontario** **Population: 157,857** **Area: 3,200 km²**

As the most populated city in Northern Ontario, the City of Greater Sudbury has many distinctive characteristics that make it a highly significant region in Canada's history. It is located within the Canadian Shield (a biologically rich geological shield covering almost half of Canada) and is rich in lakes and forests. The shield is also home to mining ores nestled throughout the landscape, of which Greater Sudbury has the largest and most resourceful ore deposits.

For over two centuries, the City of Greater Sudbury was known as a mining community, as the ore deposits located within the Sudbury Basin contain large amounts of nickel, selenium and tellurium. Rampant mining activities affected the environment of the region and contributed to high levels of sulphur in the atmosphere, resulting in an influx of acid rain that chronically degraded the landscape. By the late 1960's, an estimated 84,000 hectares of land was considered barren or semi-barren.

The City is now working to change its image and move away from the strong mining associations that have stereotyped the community.

Currently, the City is maintaining its new reputation as an environmental leader, through extensive re-greening programs to restore fragile and damaged landscapes. Efforts to change the pre-existing social presumptions have presented a set of challenges and opportunities to hone in on a different industry, and move away from a reputation of being an environmentally damaged, mining community. Diversifying the economy has given the City economic strengths in areas, such as commerce, government, tourism, and science and technology research. In the 1970's, the mining companies once employed about 75% of the population, now mining employment accounts for less than 5% of the population.

### Biodiversity and Regreening Efforts

The City's restoration efforts started in 1978 with the initiation of the Sudbury Land Reclamation Project. The project, managed by the Vegetation Enhancement Technical Advisory Committee (VETAC), in partnership with local mining companies and stakeholders, aimed to distribute large amounts of lime into the acidic soil to act as a neutralizer and promote growth. Over 3,300 hectares of land were re-greened, with millions of trees and shrubs reintroduced into the landscape. The positive results have transformed the landscape into parkland, habitat, ecological corridors, and forests. This program marked the start of biodiversity actions for the City, as it was a necessary first step to jumpstart ecosystem recovery. The regreening of the City is locally acknowledged as being a fundamental turning point for the community.

!

The City's history dates back to approximately two billion years ago when a meteorite crashed into the region causing the Earth's crust to crack. The meteorite left behind what is known as the Sudbury Basin, which contains large amounts of nickel, copper, and platinum, making it the largest known nickel ore deposit in the world.

Another effort, the Sudbury Soils Study, commissioned by the mining companies Vale Inco (currently Vale) and Xstrata Nickel, was one of the most comprehensive studies of its kind in Canada. The study analyzed soil quality over a seven year period from 2001-2008 and worked within a 40,000 square kilometre study area. The Ecological Risk Assessment (ERA) portion of the study evaluated current and potential risks to humans and the environment and monitored the risks associated with seven chemicals of concern (COC): arsenic, cadmium, cobalt, copper, lead, nickel, and selenium. COC's are found naturally in the area, but their levels were found to have increased over the years through particle deposits from smelter emissions and other industrial activities.

The ERA was administered by a multi-stakeholder Technical Committee, comprised of members from the Ontario Ministry of the Environment, the Sudbury & District Health Unit, the City of Greater Sudbury, Vale Inco, Xstrata Nickel, and the First Nations & Inuit Health Branch of Health Canada. Alongside the Technical Committee, this study had several other committees involved to ensure that all issues were equally addressed. The committees included an:

- Independent Process Observer to ensure that all stakeholders were given equal access and input to the process, and that public interests were addressed;
- Public Advisory Committee that facilitated community involvement and promoted the movement of information between the Technical Committee and the public; and
- Independent Scientific Advisor that provided input to the Technical Committee to ensure reliable scientific principles and current methodologies were used to conduct the study.

## Creating Greater Sudbury's Biodiversity Action Plan

In March 2009 the ERA portion of the study was released. It found that terrestrial plant communities have been, and continue to be, impacted by COCs in the soil, and other factors, such as soil erosion, low nutrient levels, lack of soil organic matter, and/or low soil pH. The study also found that there are few recognized threatened or endangered species within the study area. This suggests that it is unlikely that COCs from local smelters were having a direct effect on area species. However, deposits from smelters have historically affected habitat quality and, therefore, would influence bird and mammal populations.

In order to move forward with regreening and habitat protection efforts, the City made a commitment to further biodiversity actions by producing a locally driven Biodiversity Action Plan, *Living Landscapes*. The Plan was co-funded by Vale Inco ($60,000) and Xstrata Nickel ($48,000), and marks a long-term commitment to enhancing biodiversity in the region. *Living Landscapes* is guided by the following principles:

- Building on existing accomplishments;
- Ensuring the local community and their needs are considered in biodiversity recovery efforts;
- Developing and promoting educational opportunities;
- Stabilizing soil conditions;
- Developing ecological resilience to guard against future environmental stresses;
- Continuously improving conditions by monitoring and reporting;
- Ensuring that *Living Landscapes* remains a "living document" – one that adapts to changing conditions, interests and priorities; and
- Ensuring the City remains a world leader in land reclamation and biodiversity recovery.


Dire landscape, 1981 (left), transformed landscape due to large-scale re-greening efforts, 2008 (right).


Forest vegetation transplant plot - one of about 250 plots (each 4m x 4m) established in 2010 throughout Greater Sudbury's impacted areas—established to spread and colonize surrounding areas.

### Developing the Biodiversity Action Plan through Community Engagement

The Biodiversity Action Plan was developed under the leadership of the City's Environment Planning Initiatives Section, overseen by VETAC, which together have over 30 years of experience in community-based environmental planning. Based on the pre-established guiding principles of the Biodiversity Action Plan, the City found it necessary to incorporate community concerns into the production of the Plan. The City and VETAC organized stakeholder involvement sessions to gain direct input from a broad range of community members, including naturalists, university and college professors, researchers, government staff and the general public. The facilitated sessions helped to ensure biodiversity actions were aligned with community needs and expectations. Other methods used were the 'Have Your Say Workshops', telephone surveys, and in-person meetings. The community also had a chance to review and comment on the final draft before the release of the Plan in December 2009.

### Community Response to the Biodiversity Action Plan

Before regreening, the landscape was bleak and had been that way for over two centuries. The Community felt they were resigned to living with acidic soils, high levels of acid rain, and few vegetated spaces. This created a grim picture of the region as many residents had been living in Sudbury for generations and knew only this image of the City. The biodiversity efforts provided a spark that showed residents how the City could be changed, and discover what could be achieved by reintroducing nature to the city. Though it is too early to tell how the community will be impacted by the ecological changes initiated through the Biodiversity Action Plan, it is important to consider the social and quality of life benefits that can be achieved by enhancing and protecting biodiversity, such as: outdoor recreational activities; increased number of bicycle and walking trails; City beautification; and improving human health.

### Moving Forward in Biodiversity Recovery

Fostering community involvement and changing the way a community looks at, and uses natural spaces, requires affirmative action and risks to engage different interest groups. Based on the outcomes of the City's biodiversity efforts, the following points are important lessons learned:

- Build, sustain and nurture partnerships at all levels: between the municipality and school boards, universities, industries, researchers, government agencies, and local naturalists;
- Relationship building with various groups and individuals early in the process;
- Municipalities should help build awareness and recognition of what local groups and institutions are doing on biodiversity-related matters. This is an important role for municipalities as they have access to media and communications tools. A local authority is a fair representative of community needs and is in a position to own up to act on those needs.

For more information, visit www.greatersudbury.ca

# Planning Canada's First Pollination Park


## ABSTRACT

The City of Guelph is working towards completing *Pollination Park*, the first and largest pollinator protection initiative in Canada. The purpose of the park is to provide habitat protection for pollinating species, like bees and hummingbirds, and to act a model upon which future parks can be based. Though the project is a new development, it presents many opportunities to conserve urban biodiversity.


**MUNICIPAL PROFILE** **Name: City of Guelph, Ontario** **Population: 114,943** **Area: 87 km²**

Guelph is a medium-sized city located in southern Ontario. Its current population is approximately 115,000, with an additional 18,000 throughout the academic year as students attend the University of Guelph. The City's population is expected to grow to 180,000 by 2031. This increasing population supports significant commercial and industrial development. As one of Canada's fastest growing cities, development continues to pressure prime ecological space within the city.

In response to these development demands, the City has created progressive environmental policies to ensure the safety and protection of its natural habitats. A component of the City's Official Plan acknowledges the importance of pollinator species and their habitat. This acknowledgment presented a unique opportunity for the City to establish an international first - a designated park for pollinators.

*Pollination Park* is a proposed 45-hectare (112 acre) piece of land that will be located at Eastview Landfill - a decommissioned landfill site – adjacent to a planned community's recreational park. The *Pollination Park* is classified as a biodiversity project with varying levels of formal municipal involvement and stakeholder support. While the City provides the land and political support, the initiative is very much a local one with multi-stakeholder efforts that require input from various parties across the community.

### From Proposal to Planning: Involving Residents

*Pollination Park* was initially proposed by community members advocating for City Council to realize the importance of pollinator species, and the lack of pollinator habitats within urban areas. The engaged community members got together and formed Pollination Guelph, who was later designated by Council to act as the official working group to spearhead *Pollination Park*.


City of Guelph landmark, Church of Our Lady Immaculate

The City incorporated the protection of pollinators into its Official Plan, thereby making Guelph the first municipality to include such progressive goals for pollinator protection into city-wide policies.

A technical committee, represented by City staff and Pollination Guelph members, reviewed all legal matters relating to the creation of the pollinator habitats in Guelph, and acted as the liaison between the City and other stakeholders.

*Pollination Park* represents a progressive biodiversity initiative that was driven by the community. Along with Pollination Guelph, the City hosted a variety of meetings and workshops to educate the public and plan for Pollination Park; education and awareness campaigns have been a large component of the workshops as there were many biases against this project. The main challenge has been raising awareness on the safety of using old industrial spaces, and getting the community to look beyond the grounds as a landfill. By providing more learning opportunities and opportunities for public participation, support is building across the community. Both the meetings and workshops were well received and the momentum for *Pollination Park* continues to build.

> Opportunities to protect, maintain and enhance pollinator habitat within City parks, restoration areas and ecological linkages, land adjacent to storm water management facilities and open spaces will be encouraged
>
> – City of Guelph, Official Plan

**Pollinator Species include:**
Bees, Butterflies, Moths, Beetles, Ants, and Flies


Pollination Park symposium explaining the importance of the Park and role of community members.


Education and awareness campaigns are two large components to the success of Pollination Park.

### From Landfill to Landscape

Working with a team of graduate landscape architecture students and community members, a sample design for the park was created. The design was presented to Council and staff and the City was able to imagine what the park would be, would not be, and how the proposed design would enhance biodiversity on the site. This visioning process opened a dialogue on the image of biodiversity as one that does not solely rely on specially designated natural sites but instead that can exist in remnant and post-industrial spaces within the City.

Developing public spaces on landfills comes with associated risks and challenges that must be acknowledged and accounted for. In the case of the *Pollination Park*, development was met with a specific set of obstacles to overcome, such as regulations concerning the use of a closed landfill, reviewing the methane collection system, limited public access in certain areas, and maintaining soil conditions. Other obstacles included non-native grasses, organizing fundraising activities, and seed sourcing.

Adjacent to the Eastview Landfill, and future *Pollination Park*, are lands with no prior history of industrial activity that will be the future location of the Eastview Community Park. This park will primarily serve as a neighbourhood park and will be a mixed-use area for residents.

Eastview Community Park, approved in 2002, will utilize the non-landfill portion of the site. Located northeast to the Pollination Park, this community park will include features like, an irrigated and lighted sports fields comprising of four soccer pitches and two football fields, outdoor ice rink, and water park. The Park will develop in phases from 2009-2013, costing approximately $3.3 million.

Both *Pollination Park* and the Eastview Community Park present opportunities for the City of Guelph to utilize abandoned spaces, realize the potential ecological value of restoration, with the ultimate goal of increasing biodiversity and have the ability to create ecological and social linkages to the space. The educational and long-term benefits of the parks will help reintegrate parts of the City by coupling notions of ecosystem awareness and urban ecology, and providing biodiversity rich

Pollinator-friendly flower beds at Riverside Park, in partnership with the City's Healthy Landscapes program. The area had many non-native species, which were removed to make way for more desirable species. The plantings had instant success, and pollinator species were observed nesting .

Pollination Guelph, 2010

Promoting natural areas in an urban environment is important for several reasons. Ecologically, they sustain the living organisms in the area, as well as human, social and economic systems, such as recreational and tourism activities. They also establish sound infrastructure for erosion control, and provide landscapes for food production. Creating a habitat for pollinators contributes to conserving vital ecosystem services, which human populations heavily rely on. Pollinators are natural resources, which aid in the production of fruits and vegetables; one in every three bites of food is a direct product of a pollinator. Protecting these species is not only essential to enhancing food and plant biodiversity, but maintaining human quality of life.

### From Education to Engagement

The notion of turning a landfill into a community park was not well received. The City and Pollination Guelph had difficulty capturing the public's imagination on the sustainability aspects of the park. In the end, the media significantly contributed to the acceptance of the park by publishing reports advocating for its benefits. Building from the success of the media's involvement, Councillors, residents and community groups are now using the media to monitor the progress of the park.

As a soft introduction to the benefits of the Park, and biodiversity in general, the City and Pollination Guelph took on garden maintenance practices on residential properties. Historically, local gardens tended towards pristine and tidy lots that removed nesting sites and duff (dead plant material that supports many different kinds of insects at different stages of their life cycle). Many perceived a natural garden as an unkempt and uncontrolled space of neglect rather than intention. The City wanted to turn this image around and showcase the many benefits that come from naturalized gardens – including increased biodiversity, habitat recovery and improved land stewardship. By promoting sustainable gardening practices that enhanced species habitats, the community is beginning to realize the benefits of providing pockets of biodiversity-rich spaces.

In addition, those groups working on the *Pollination Park* are also working on establishing pollinator-friendly plots around the City, including several at the Guelph Centre for Urban Organic Farming and the Arboretum at the University of Guelph. Building relationships with other educational institutions has provided a unique opportunity to engage more people and to show the linkages between different actions that are already happening in the City.

### Next Steps:

Eastview Landfill is currently undergoing infrastructural changes to accommodate the new pollinator plants and species. Until the site can accommodate plants, community members are working on educational and awareness raising campaigns and implementing sample plot sites throughout Guelph.

To learn more about the City's *Pollination Park,* visit www.pollinator.ca/guelph

# Protecting Sensitive Ecosystems and Habitats


## ABSTRACT

The City of Kelowna, located in the Okanagan Valley, between the dry Great Basin and wet valleys to the east and west. There is limited movement and distribution of habitats and ecosystem types; and many of the valuable ecosystems have been lost or fragmented. The Okanagan has highly significant ecological and landscape diversity, which is described unlike any other region in Canada. To further understand and appropriately act to protect their portion of this significant landscape, the City has undertaken three studies that will assist with future conservation measures.


**MUNICIPAL PROFILE** **Name: City of Kelowna, British Columbia** **Population: 120,812** **Area: 211.69 km$^2$**

The City of Kelowna is located in the Okanagan Valley within the British Columbia Interior, situated between the Canadian Rockies and the Pacific Coast. The natural environment in Kelowna is considered among the most beautiful and rare in Canada. The valley is highly diverse with species and plants that are vulnerable and endangered; given the geological landscape, many of these species are within close proximity to one another. This tight network of habitats and species requires strong protection, firstly, by identifying where each is, and then customizing policies that protect identified sensitive areas. Since 1800, it is estimated that there has been a dramatic loss of many sensitive ecosystems: 92% of riparian ecosystems, 77% of broadleaf woodlands, 73% of grasslands, 49% of coniferous woodlands, and 47% of wetlands have all been lost to human succession. The loss of valuable landscapes is tied back to an increasing ecological footprint, ever-increasing population, rapid urbanization, and agricultural developments. The loss of wetlands especially poses a high risk to associated species, as studies have shown that about 80% of wildlife is known to be directly-dependent on wetland and riparian ecosystems, or uses them more commonly than any other habitat locale.

In order to initiate appropriate action, the City of Kelowna issued three separate contracts to generate information on the conditions of these valuable ecosystems for Council and City staff to use for decision-making and to develop valuable tools to assist in the identification and protection of important and sensitive ecological features. These studies provide geographic accuracy to sensitive ecosystem locations, boundaries and biophysical attributes, while increasing awareness around these intrinsically important features.

**Riparian Zone** is the area between land and water. This ecosystem has a large role in biodiversity conservation because it inhabits many different species and has rich soil conditions.

"Kelowna."/Flickr Pompeii Am Götterdämmerug

City of Kelowna and the Okanagan Valley

## Overview of Quantitative Methods

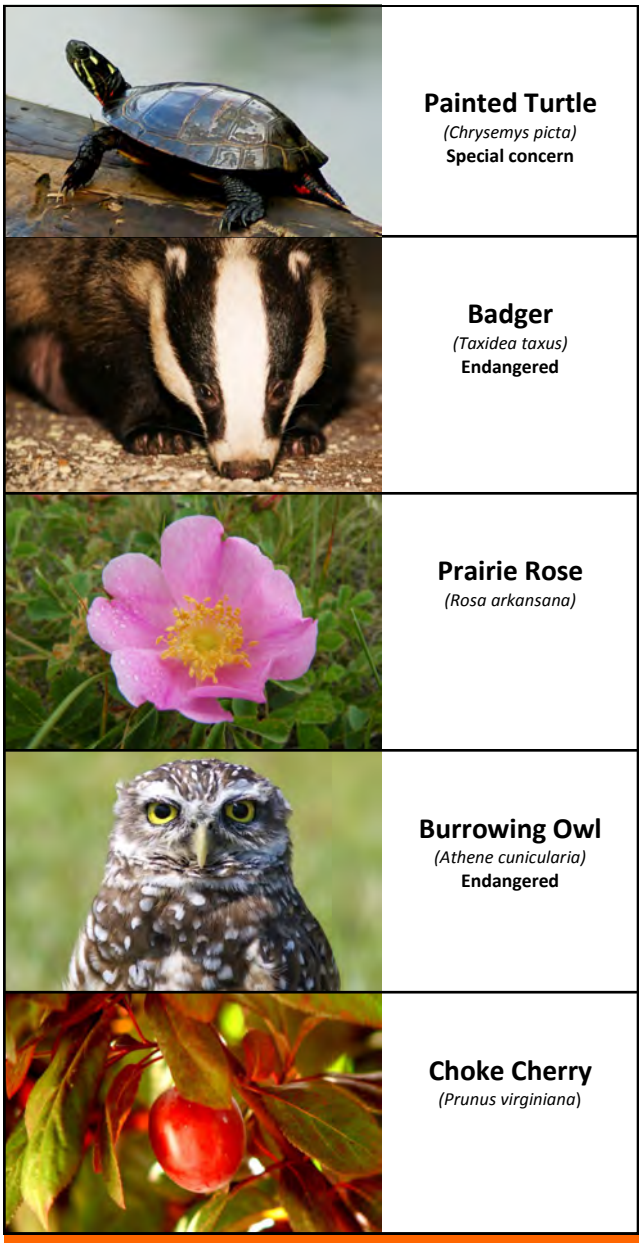
The City had three separate contracts to consultants that have strong scientific and ecosystem mapping backgrounds in plant ecology and biology and an understanding of this region's geography. The information generated by the consultants has been endorsed by Council and is being used for decision-making and the development of tools to assist in the protection and management of ecologically significant areas.

The **Sensitive Ecosystem Inventory (SEI),** conducted in 2007, was commissioned in response to the need for scientific information on ecosystems and other detailed information needed to support future land management planning. The study was cooperatively funded by, the Real Estate Foundation of BC; the BC Ministry of Environment; the City of Kelowna; and the Regional District of the Central Okanagan. The City of Kelowna's Policy and Planning Division allocated $40,000 from its budget., and total project budget was $85,000.

The study area encompassed the City's boundaries, covering approximately 21,500 hectares, and included private and public land, regional parks and crown land. The sensitive ecosystems were categorized into different classes, where all share common characteristics, notably ecological sensitivities, rarity, and wildlife habitat values.

The inventory found that sensitive ecosystems with varying conditions accounted for 28% of Kelowna's land base. The sensitive ecosystems contained many rare and endangered species listed as red and blue species, with their habitats being ecologically fragile, but having high biodiversity, providing specialized habitats for many of these species at risk. Most of the rare species identified are restricted in their habitat distribution and quantity. The study also found that sensitive ecosystems provide many social values including air and water filtration, natural areas for aesthetic and recreational activities, natural resources, and increased property values for developed areas.

The knowledge gained from identifying the priority ecosystems places the City in a better position to support sustainable land use and development decisions that help promote effective stewardship. The inventory is used to inform a range of plans and processes for a number of City departments. In addition to providing input when producing or revising community and parks plans, the inventory will help update the Official Community Plan.




These are some of the species featured in the Sensitive Ecosystems Inventory, as many of these species are considered to be endangered, threatened, or of special concern.

List of photo Credits from Top to Bottom
1. "Painted Turtle on a log" Flickr/ Zevotron 2. "Badger strip tail" Flickr /Andreas-photography 3. "Prairie Rose "Flickr /Kristin Marie Enns-Kavanagh 4. "Burrowing Owl Portrait" Flickr/MrClean1982 5. "choke cherry" Flickr/Terwilliger911

The **Sensitive Habitat Inventory and Mapping (SHIM)** study was a multi-year initiative to track and inventory all named creeks within City limits (except Mission Creek, which given its significance to fisheries and as the largest tributary to Okanagan Lake was the subject of more comprehensive studies). The project was cooperatively funded by the Okanagan Basin Water Board providing $15,000 and the City of Kelowna's Environment and Drainage budgets of $30,000.

Over the course of the study, the scope continuously grew, starting with two large creeks, then progressing to a total of 28 creeks. The study included mapping associated riparian habitats, watercourses and other important fisheries, all of which provided a basis for accurately mapping baseline data for integration into local mapping and planning initiatives. The objective was similar to the SEI study as the final product would result in a valuable tool to increase the understanding of sensitive habitats which were not previously available. The tools will provide a source for interactive GIS/mapping that can be used by other municipalities, regional districts, stewardship groups and interested members of the public.

Further applications for SHIM and SEI results included:

- Assisting with development applications requiring stormwater management and stormwater runoff considerations;
- Updating the Official Community Plan, especially with respect to the determination of Natural Environment Development Permit Areas;
- Determining minimum setback distances;
- Allowing environmental staff to effectively monitor disturbances and changes in habitat;
- Identifying and mapping potential point sources of pollution;
- Guiding decisions and priorities with respect to habitat restoration and enhancement projects;
- Identifying sensitive habitats for fish and wildlife along watercourses; and
- Highlighting areas of potential channel instability or water quality issues requiring further inquiry.

The **Wetland Inventory, Classification, Evaluation and Mapping (WIM)** study was conducted in 2009, and the primary objective was to identify, inventory and map all wetlands and their habitat features. The study was cooperatively funded by the Okanagan Basin Water Board, Ducks Unlimited, and the City of Kelowna's Environment and Drainage budget of $25,000, and total project budget was $50,000.

The inventory study suggests that urban development is the primary factor leading to the degradation of ecological functions within Kelowna's wetlands. Similar to the SEI and SHIM, the Wetland Inventory results were used to inform staff and Council of ecological changes and disturbances. Planning practices, both long-term and current, benefit from inventory and GIS mapping, as they provide a baseline of quantitative data to measure impacts of future actions.

The WIM study:

- Provides a complete understanding of baseline data including the number and condition of remaining wetlands;
- Assists in methods to monitor changes in habitats as a result of a disturbance;
- Guides management decisions and set priorities for habitat restoration and enhancement;
- Identifies sensitive habitats for fish and wildlife; and
- Describes the spatial extent of wetland and floodplain properties.

"Musk rat going, going..." Flickr/malreuxjones

Wetland ecosystems occur on sites where the water table is at, near, or above the soil surface for a long period of time. Drought recovery, flood control and food production are examples of some wetland services.

The following activities can lead to mismanagement of wetlands: encroachment, in-filling, draining, habitat fragmentation, contamination, agricultural activities, and hydraulic alterations.

## Community Engagement Challenges

The primary objective of the various mapping and inventory projects was to produce quantitative technical reports with science-based methodologies, that could be used to inform future conservation actions. Community involvement and education were not primary component of the work, however, they were a secondary goal of each of the studies. Open houses and website updates were the main form of community outreach undertaken by City staff and the consultants hired. The studies generated media attention because of the scale (city-wide) and detail of each study.

The public open-houses were hosted by the various groups involved (City, funders, and consultants) to explain the purpose of each study. Some groups and residents were sceptical of this work as new policies could result in changes to land-use decision-making and could constrain development in or near sensitive ecosystems. This concern unfortunately led to the City and its contractors not being permitted to enter all private properties, which led to gaps in the quality of information with air photos required to identify and interpret the features.

A future goal for the City is to relay all data to the community early, and, where possible, make information available to stakeholders to bring them on side for future activities. Whereas these studies were designed to be informative, rather than consultative in nature, future work could include more opportunities to involve the public. Staff is working towards compiling the information on other media and information outlets and websites that would benefit from a complete study of sensitive ecosystems and habitats.

## New Opportunities

Many opportunities presented themselves once Kelowna acted as a mapping and inventory pioneer and demonstrated that the initiatives were valuable for local governments and land-use decision makers. These successes have led to other municipalities conducting their own SHIM, SEI and WIM studies. The value of the studies provides a benefit to municipal decision-making as decisions are made with a better understanding of the status and location of sensitive ecosystems. This knowledge will help to mitigate further encroachment or burden on those lands.

Some notable opportunities from each study include:

- All information can be used to facilitate the update of the City's Official Community Plan, and any other land use planning purposes. The studies also produced baseline inventory information that assist in the development of performance standards to determine when protection and restoration efforts have been successful;
- The City learned about local concerns, and in the future, will work to address those concerns before engaging on specific activities;
- Staff will continue to ensure that the public is involved from start to finish in future projects; and
- Using comprehensive ecosystem information to build internal capacity and training about its application and value. At present, only a portion of City staff are known to use the tools with any regularity. In the future, all relevant staff will hopefully possess a base knowledge of how to use the information and implement it into projects where sensitive ecosystems exist.

There are ample opportunities to include outside users and disperse the information to a wider audience - qualified professionals, stakeholder groups, non-profits, and even individuals with an interest in ecological conservation. To achieve this, the City has identified outlets that could help make this possible; the British Columbia Community Mapping Network and the Okanagan Conservation Planning Partnership are examples of collaborations focusing specifically on sensitive habitat and mapping studies.

## Municipal Requirements

Beyond the external consultants working on the three studies, approximately three City staff were involved. These staff included a project manager, environmental support, and logistical support. Though the main mapping and inventory studies were contracted, staff were also involved in some of the field work and data collection components. Staff support for technical programs is thought to be a key to the success of this type of initiative, as it helps to build internal capacity and increases staff knowledge of the natural environment.
By equipping staff with the appropriate knowledge and resources, the City of Kelowna is ensuring that appropriate recommendations relating to sensitive ecosystems can be made in the future.

For more information on Kelowna, visit:
www.kelowna.ca

# Biodiversity as a Key Function of the Municipality

Montréal




## ABSTRACT

Policy implementation, research and education, and community engagement are three pillars in Montréal's efforts to protect local biodiversity. The City is involved in many local and international networks, as they work to share knowledge, lessons learned, and innovative approaches to advocating for the protection of urban biodiversity.


**MUNICIPAL PROFILE** **Name: City of Montréal, Québec** **Population: 1,620,693** **Area: 501 km²**

City of Montréal (Ville de Montréal), an island located along the St. Lawrence River, is diverse in woodland, field, marsh, wetlands, forest, and grassland ecosystems. These ecosystems house a great diversity of species and rare communities of plants. Within the city limits, striking natural landscapes (such as Mount Royal), make up 7,156 hectares of green spaces.

As host to the CBD Secretariat, the City of Montréal has had the opportunity to work with various stakeholders to expand biodiversity research and education. The focus of municipal operations on the protection of natural areas has played a key role in moving the City forward in biodiversity protection efforts, and over many years, the City has developed various tools, programs and policies that increase urban biodiversity.

### Municipal Action and Policy Implementation

Montréal is the first city in Québec to have an official policy for the protection of its natural environments. Adopted in 2004, the Policy to Protect and Enhance Natural Habitats identifies ten eco-territories which encompass key natural environments of superior ecological value within the Montréal metropolitan area. The Policy brings together conservation projects based on an ecological network model in order to create protected natural environments that will be ecologically managed and registered in the Répertoire Officiel des Milieux Naturels Protégés (Official Directory of Protected Natural Environments). Since 2004, more than 500 hectares have been acquired and protected, adding to the City's goal of protecting 6% of its land (soon to be achieved, and surpassed).


Mount Royal (Mont Royal) is a mountain located north of downtown Montréal. The Mount Royal Protection and Enhancement Plan, aims to protect the parks summits, slopes, rock walls, plains and valleys, as well as guide design development projects that ensure long-term sustainability.

## Planning for Proactive Protection: Montréal's Approach to Biodiversity

The City of Montréal is active in policy implementation that addresses different ecosystem functions and economic structures; this pushes the City to take on a balanced approach to ecosystem protection. Merging sound development practices with conservation, the City works closely with a large group of stakeholders and active community participants in overcoming environmental pressures. The following is a comprehensive list of the City's policies and strategies that directly address the management of natural ecosystems across the region:

1. **Municipal Tree Policy (2005)**
   Ensures a long and healthy life to more than a million public trees located throughout the City. This is achieved by gathering tree inventories, arboreal plans, strict rules to protect tree health, supporting research, and creating opportunities for public tree planting.
2. **The Greening Strategy**
   The Strategy reduces the urban heat island effect and maintains infrastructure for sound management of overland runoff. A greening index, the Canopy Index, introduced to illustrate the influence of urban forests and tree populations, shows that tree canopy covers 20% of Montréal.
3. **The Master Plan**
   Reaffirms the City's commitment to protecting natural environments, including 22 City parks (10 of which have a high biodiversity) and more than 1,000 local community parks.
4. **Strategic Plan for Sustainable Development (2007-2009)**
   Through the work of the City and its partners, the Plan aims to improve protection of biodiversity, natural environments and green spaces, by sustainably developing a City suited for all residents.
5. **Policy to Protect and Enhance Natural Habitats (2004)**
   This Policy works to preserve and expand the City's biodiversity, while enhancing quality of life and economic prosperity. The objective is to increase the contact residents have with their natural surroundings.

## Local Action and International Involvement

Montréal is one of five cities on the steering committee of the Global Partnership on Cities and Biodiversity. This involvement aims to support cities in sustainably managing their biodiversity resources, assist in implementing initiatives both locally and globally, and promote dialogue on biodiversity among various groups and cities.

On the international scale, the City of Montréal is active on several local and international networks, to both preserve local biodiversity, and help maintain the circulation of information on biodiversity management between cities around the world. The City participated in the development and testing of the City Biodiversity Index. This new tool will facilitate Montréal's upcoming development of a Biodiversity Conservation Action Plan based on standards proposed by the LAB Initiative. Lastly, the City of Montréal plans to participate in the URBIS Partnership (*see below*) to strengthen its knowledge and develop an ecosystem approach to urban biodiversity that is suited to its urban environment.

The **URBIS Partnership** is a global network of scientists, planners, governments, educators and policy makers, working together to create more resilient and equitable urban regions. Local governments that participate in this partnership share sustainability management practices, research, and policy recommendations.

"Montréal, 03 avril 2010. Crocus." Flickr/DubyDub2009

Example of flora found throughout the City of Montréal.

## Montreal's Nature Museums: Bringing People Closer to Nature

The various **Nature Museums** are one of the City's investments in providing biodiversity education and research opportunities. Made up of four institutions—the Botanical Garden, the Biodôme, the Insectarium, and the Planetarium—together they make up the largest natural science museum complex in Canada. The Nature Museums provide visitors with the opportunity to explore the importance of biodiversity and humans' place within nature. The Planetarium is currently undergoing expansion and is set to re-open late 2012.

**Montréal Nature Museum, Facts and Figures**

- 1.7 million visitors annually, including 650,000 youth and children
- 40% of visitors are tourists
- 15,000 pieces of specialized information
- 22 million website hits
- $586 million in assets
- 22,000 plant species in the Museum's Botanical Garden
- 160,000 insect specimens in the Insectarium
- 1,000 animal and plant species in the Biodôme

The Biodiversity Centre is the newest addition to the Nature Museum complex; located in the heart of the Botanical Garden. The Biodiversity Centre is a joint project between the Garden and the Université de Montréal, and the Institut de Recherche en Biologie Végétale (Plant Biology Research Institute). The Centre, opening November 2010, will house 1.7 million insect specimens, 900,000 plant specimens and 2,000 fungus species. The collections will be shared through the Canadensys information network, an online database of specimen information held by Canadian university-based biological collections and research. The Biodiversity Centre will also provide workspace for more than fifty researchers.

### Montréal's Nature Museums on an International Scale

At the invitation of the CBD Secretariat, representatives from the Nature Museums joined the Steering Committee of the Consortium of Scientific Partners and Institutions, to share their expertise to better contribute to global knowledge on collections that are significant to biodiversity and to raise public awareness of biodiversity issues.

Specialists are highly involved in the academic community and frequently visit and host peers from around the world. Fostering a community of academics, by utilizing the City's educational and research institutions, has led to specialists receiving a high degree of expertise and the opportunity to lecture and host workshops around the globe.

### Taking Action Through Research

Research is a large component of the services provided by the Nature Museums and at the same time benefits the City's actions in preserving biodiversity. Researchers have a strong interest in biodiversity and sustainable development and this interest has given some the chance to create strong partnerships with top experts and institutions from around the world.

Research at the Nature Museums is also participatory. Youth and adults from the community actively contribute to advancing knowledge and protecting biodiversity, through programs such as, acoustic bat inventory studies in Québec, Monarch Watch, and observing impacts of climate change on berry production in the Canadian Arctic; all of which promote active learning and foster responsible behaviour.

There is much to learn about biodiversity, and the City has created ways to foster localized research that prompts community action. Montréal has helped create many opportunities for, not only researchers with special interests in biodiversity, but community members who want to participate in the exploration of this issue.

For more information, visit www.ville.montreal.qc.ca


Montréal's Biodôme, an iconic structure within the Nature Museum complex.

# Community Driven Urban Biodiversity Protection


## ABSTRACT

The City has implemented many important biodiversity actions with the help of engaged and knowledgeable community groups, stakeholders and academics. Three initiatives - the Biodiversity Series, Bird-Friendly Development Guidelines and the Green Roof Bylaw - are notable examples of how fostering multi-stakeholder relationships can build great momentum and implement internationally acknowledged achievements.


**MUNICIPAL PROFILE** **Name: City of Toronto, Ontario** **Population: 2,503,281** **Area: 630 km²**

Located on the northern shores of Lake Ontario, the City of Toronto is the sixth largest urban area in North America, and Canada's most populated city. The City is constantly growing and evolving, with a population projected to reach over 3 million by 2031. Known as a cultural, entertainment and financial capital, Toronto is a vibrant urban centre renowned for its cosmopolitan and international demographic. This diverse and ethnic city has long been home to both community and City driven environmental initiatives.

In Toronto, environmental protection has strong roots among Councillors and community members as residents treasure the natural landscapes within the city. Community driven environmental initiatives have been funded and successfully integrated into City operations, through financial assistance programs and tools such as Live Green Toronto. Live Green provides resources to neighbourhoods and community groups to encourage local environmental greenhouse gas reduction initiatives. Increasingly, biodiversity protection is an emerging topic among local stakeholders and community members, as the City of Toronto is reaching out to more local residents and community groups.

The City has implemented three important biodiversity actions with the help of engaged and knowledgeable community groups, stakeholders, and academics. The Biodiversity Series, Bird-Friendly Development Guidelines, and Green Roof Policy, are notable examples of how fostering multi-stakeholder relationships can build great momentum for biodiversity protection and achieve internationally acknowledged achievements. While at the same time, these initiatives fundamentally benefit the local level as they strive to create a resilient, diverse, and flourishing city.

`Panorama of Toronto.`Flickr/Fragments of Eternity

Overhead view of the City of Toronto skyline

## Biodiversity Series, an Intimate View of Species Found in Toronto

The City of Toronto City Planning - Environment Section partnered with local experts to produce the *Biodiversity Series*, a collection of publications on the variety of species found within the city, aiming to cultivate a sense of environmental stewardship in residents by providing learning opportunities on biodiversity. Each book within the Series provides a detailed account of where individual species populations can be found, how to protect them, and ways Toronto's urban environment is both a suitable and unsuitable habitat for that species. The Series highlights the interconnected relationships among each species, while emphasizing an appreciation for the current state of biodiversity within the City. Though these are ambitious objectives, the Series represents the first step in a long line of biodiversity actions to come.

The Series is in development by several working groups, which consist of City staff, local experts and academics. Each book in the Series has a separate group responsible for the content, however, each of these works together during the production and distribution of the entire Series. The Environment Section facilitated a series of informal discussions with educational centres, universities, museums, and community group representatives to inform the creation of the Working Groups.

### Topics to be released in the Biodiversity Series:

- Ants
- Bees and Wasps
- Beetles
- Butterflies
- Dragonflies and Damselfies
- Ferns and Grasses
- Fish
- Mammals
- Mosses, Lichens, and Fungi
- Moths
- Reptiles and Amphibians
- Spiders
- Trees and Shrubs
- Wildflowers

The first book in the series, *Birds of Toronto*, introduced readers to many of the bird species found within the City. The booklet explains major issues that threaten bird populations and provides locations for bird-watching activities.

Birds of Toronto goes on to state, "In the face of severe biodiversity loss due to massive urbanization, pollution, invasive species, habitat loss and climate change, the Biodiversity Series will help re-connect people with the natural world, [and] raise awareness of the seriousness that biodiversity loss represents…"

**Biodiversity Strategy for the City of Toronto**

The Biodiversity Series is the public outreach component of the City's biodiversity protection efforts. The Working Groups have been strong advocates for the City of Toronto to endorse a biodiversity strategy, and are currently providing specific recommendations and actions unique to Toronto's species that will inform the Strategy. The recommendations from the Working Groups will help to develop biodiversity-focused policies, programs, and operations.


'Birds of Toronto' was the first guide in the Biodiversity Series released December 2009. The others Series collections (covers featured above) will be released in late fall 2010 and throughout 2011.

City of Toronto, 2010

## Bird-Friendly Development Guidelines

Urban areas pose a great threat to bird populations as birds often collide into large buildings causing hundreds of injuries and fatalities daily. While bird strikes occur throughout the year, the number increases during migratory seasons as most bird populations fly at night while light emanating from buildings obscures natural cues and draws migratory birds into the structures. To address this, the City of Toronto instituted a public awareness campaign, Lights Out Toronto! (LOT!) in 2006,to encourage buildings to switch off office lights by advertising these as the cause of bird fatalities. Awareness efforts were centred around public transit advertisements, brochures, and media releases. This effort helped to protect bird populations and had the valuable co-benefit of reducing the energy required to light office buildings at night.

In addition to LOT!, the City collaborated with the Fatal Light Awareness Program (FLAP) to develop migratory bird policies and public awareness campaigns run by City staff and local volunteers. FLAP, an advocacy group working to reduce the rate of preventable bird fatalities, reaches out to architects, building managers and property owners to help protect bird populations. Formed in 1993, FLAP started by collecting killed and injured birds throughout the City, and now has a large volunteer base that patrol the streets and suburban office buildings from the earliest hours of the morning and throughout the day.


The Royal Bank Plaza in Toronto has close together and angled windows providing visual markers so birds perceive the building as a solid object., preventing bird injuries and deaths.

In January 2006, a working group was established, to include local architects, developers, building managers, academics, bird advocacy groups, and City staff to develop the *Bird-Friendly Development Guidelines*. The group compiled a comprehensive list of design-based development options and strategies to address the issue of bird collisions in two categories – glass design and light pollution. The *Bird-Friendly Development Guidelines*, released in 2007, started as a voluntary initiative to make new and existing buildings less dangerous for migratory birds. The guidelines state that window glass on new construction must be treated with a density pattern of between 10 and 28 centimetres apart or be able to mute reflections for at least the first 10 to 12 metres of a building. The guidelines specify that birds will interpret avoidable objects when distances between visual features are within 28cm, the more effective patterns are 10 cm and lower. The closer together the visual patterns become, the more likely a bird is to perceive something as a solid object. To ensure that buildings meet bird-friendly standards, a rating certification system, the Bird-Friendly Development Rating System, was implemented as a checklist to assess the condition of bird-friendly registration of the building. Other cities, like Chicago, have implemented similar guidelines.

In January 2010, as part of the City's Green Development Standards, Toronto became the first city to mandate bird-friendly development criteria on applicable new development.

**When public campaigns started in 2007, 65% of volunteers for FLAP heard about the creation and goals of LOT! through media promotions, such as the advertisements on public transit and information packages. To date, FLAP volunteers have rescued over 45,000 birds.**

All of these accomplishments by the City and partnering stakeholders have been a result of outreach and newly established working relationships between staff, local experts, and concerned residents. The City of Toronto was able to help protect migratory bird populations by enforcing newly created policies which were a direct result of stakeholder input and community involvement. This is a true reflection of the role of local governments as protectors of the natural systems that are within and surround their communities. Local governments cannot influence the path of migratory birds, however, they are able to make the city a less hazardous zone by advocating for the protection of species found within their boundaries.

## Green Roof Bylaw

The green roofs that can be found throughout the City of Toronto have contributed to the overall greening of the City, while at the same time creating new habitats for local species. The bylaw, in effect as of February 2010, has so far resulted in approximately 60 buildings requiring a green roof. Through this bylaw, Toronto has established itself as a leader in green roof technology and policy implementation, and as the first City in North America to implement a bylaw requiring most new developments to install green roofs.

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According to the City's Green Roof Bylaw and the Eco-roof Incentive Program, a green roof is an extension of an above grade roof, built on top of a human-made structure, that allows vegetation to grow. This addition consists of a designed, constructed and maintained growing medium that supports vegetation. Green roofs are found throughout the City, and in many cases, have become highly enjoyable spaces that add new life and diversity to dense urban spaces.

In 2000, the City partnered with the National Research Council, the Toronto Atmospheric Fund, the Federal Government and Green Roofs for Healthy Cities to initiate a Green Roof Demonstration Project. The groups produced two demonstration green roofs – the podium of Toronto's City Hall and the gymnasium roof of the Eastview Community Centre - as part of a million dollar, three-year project. The objective was to find solutions to overcome technical, financial, and information barriers to allow the City to put together recommendations that illustrate the potential of green roof technology.

City staff developed a Green Roof Strategy to encourage green roof construction on non-city buildings by establishing a pilot incentive program. The incentive program produced 7000 square metres of green roofing, and in 2009, the Eco-Roof Incentive program approved the implementation of over 14 projects, including both private and public buildings.

"Toronto" Flickr/Matthew Burpee

Vibrant green roof located within Toronto's downtown core.

The City, working with Ryerson University students, produced a report exploring the interconnected environmental and economic benefits of green roofs. Some of the benefits described in the report include:

- Mitigating the impacts of urban development on stormwater quantity and quality;
- Reducing the impact of the urban heat island effect;
- Improving air quality;
- Providing enjoyable natural green spaces;
- Reducing energy consumption; and
- Increasing biodiversity and creating habitats.

Another study by the City of Toronto and Ryerson University reported on the potential for green roofs to support plant and animal dispersal. They observed that certain green roof sites were supporting 40 new species of plants that were not in the original design. Seed dispersal and the movement of plant and animal species are demonstrating the similar qualities of green roofs and traditional ground level natural habitats.

As of January 2010, all residential, commercial and institutional developments (with a minimum Gross Floor Area of 2,000m$^2$) must have green roofs in place covering 20-60% of floor area; and in January 2011, all new industrial developments must comply with the bylaw. Currently residential buildings with less than six storeys are exempt.

### *Green Roofs and Biodiversity*

Green roofs are an alternative way to integrate an ecosystem into the urban landscape and increase green space, while maintaining the structure and function of the existing building. Local governments can use green roofs as an extension of biodiversity initiatives as they are an effective way to address some of the major challenges facing the urban environment, such as habitat loss, air quality, and the urban heat island effect.

## Bridging Complementary Biodiversity Actions

A key issue that the Biodiversity Series, Bird-Friendly Development Guidelines, and Green Roof Bylaw make clear, is the need for locally driven policies, research and implementation strategies on biodiversity protection. Each initiative reconnects the people of Toronto with natural spaces, educates residents, creates a link between the City and nature, and raises awareness of the variety of life found in the City. Each of the initiatives, both directly and indirectly, address the serious issue of biodiversity loss and species protection. While at the same time, the success of each demonstrates how local governments can play a significant role in mitigating the loss of species and their habitats while at the same time improving local quality of life.

For more information, visit www.toronto.ca

# Integration of Biodiversity with Urban Development




## ABSTRACT

The City of Trois-Rivières implemented policies that work with developers in order to merge environmental protection practices with urban development. Addressing the impact of development became a priority for the City in order to increase protection efforts for what were identified by the City and residents as highly ecologically significant territories.


**MUNICIPAL PROFILE** **Name: City of Trois-Rivières, Québec** **Population: 129,100** **Area: 289 km²**

The City of Trois-Rivières is located on the northern shore of the St. Lawrence River, at the confluence of the St. Maurice River. The City has high industrial activity and has a large port off the St. Lawrence Seaway. The economy of the City has shifted from predominantly pulp and paper production to smaller industrial activities such as aeronautics, light-metal production and furniture production.

The City's shifting focus towards sustainable economic growth, recognizes that environmental protection must be incorporated into development. Trois-Rivières adopted the following policies to serve as planning and guidance tools: a Sustainable Development Policy, a Landscape and Forest Heritage Conservation Policy, and the Urban Development and Natural Environment Master Plan. These documents help to guide municipal administrators in integrating the natural environment and biodiversity conservation strategies into municipal decision-making.

Some specific biodiversity objectives include:

- Developing new conservation tools adapted to the region's ecological structure;
- Maintaining an equal balance between urban development and land conservation (one protected hectare for each developed hectare);
- Developing ways to finance land conservation; and
- Integrating the value of land into future planning practices.

### The Need for Land Conservation Strategies

Land conservation became topical for Trois-Rivières staff and residents during public consultation sessions held to discuss the content of the City's Sustainable Development Policy. Discussions revealed that residents and community members considered several locations in the city as biodiversity hot spots, these included: nine exceptional forest ecosystems, six peat land ecosystems, river corridors, islands, marshes and woodlands. Stemming from this, a Sustainable Development Committee was established to harness pubic opinions and integrate biodiversity conservation knowledge into the City's urban planning efforts.

In this way, the public has directly contributed to the establishment of policies and the designation of sensitive areas to be incorporated into the formal Territories of Ecological Interest (TEI) designation. The designated areas were studied, along with a variety of different land types (including all identified biodiversity hot spots, developed land, ecological corridors and land with restoration potential) in total assessing 22% of the City's land area. To facilitate protection of larger ecosystems and sensitive areas that exceeded the City's jurisdiction, Council decided to integrate the Territories of Interest into the Regional County Municipality (RCM) Plan. The Plan recognizes the importance of biodiversity protection and the policies within will influence Trois-Rivières, but could also influence others within the Regional County Communities.

The Regional County Municipality is a political system used by the Province of Québec. Eighty-six county-like political and geographic units each forming a regional municipality. The role of the RCM includes managing and implementing land use plans, within which protecting biodiversity hotspots and managing surrounding development has become a priority. The City of Trois-Rivières is not formally part of a RCM as they have the jurisdictional authority to exercise their own by-laws and policies. The City voluntarily uses an RCM Plan within their municipal practices to protect the specified Territories of Interest, taking into account the scale of the project.

The City's integration of the Territories of Interest into the Regional County Municipality Plan requires that all land planning tools, such as developmental plans and zoning by-laws, must be adapted to the Plan's structure. The protection of sensitive areas in the RCM Plan pays special attention to wetland ecosystems and the establishment of a by-law with three separate initiatives to enhance natural environment conservation:

1. **Protection Measure**; applies to all known peat-lands and wetland ecosystems within the TEI, and is classified as a particular zone in the zoning-bylaw. Each potential development project within this zone must comply with additional restrictions on building implementation, environmental impacts and social acceptance. The developer is subject to present a comprehensive development program for approval by all landowners within the zone.
2. **Conservation Measure**; recognizes all landscapes within this zone as designated for natural conservation. This measure is voluntary, and stipulates that all land within this zone be purely allocated for conservation, to produce a landscape that is much like a natural reserve.
3. **Conciliation Measure**; implementation based on individual municipalities within the extended TEI territory. The City has the authority to mandate development to compliment natural environmental characteristics and projects require acceptance by the City.

The main challenge, once the modified planning tools were mandated, was ensuring developers learned and accepted the new constraints. The City spearheaded this process, but developers were not easily swayed as change meant additional expenses and regulations. Currently, some developers have formed partnerships with City staff in order to work with the system rather than against it.

## Accomplishments of Biodiversity Conservation

Many developers have found ways to work within the new policy leading to rehabilitation projects funded by developers as a way to compensate for any potential environmental impacts of their projects. Projects such as digging pond systems, reintroducing indigenous plants, or creating fish spawning areas, are all examples of projects initiated in the past two years on low ecologically valuable land in order to create new places for local species to find habitat and resources.

From the beginning, the City worked with community members through public consultations and used direct community input for the Sustainable Development Policy which allowed for more open and cooperative partnership between City staff, NGO's, Provincial Ministries, and members of the public.

"White Fringed Orchid (Platanathera blepheriglottis)" Flickr/ magnolia1000

*"Cypripedum reginae"* Flickr/magnolia1000

The Territories of Interest contain some of the rarest plant species in Trois-Rivières, among the rare species are two types of orchids, the white-fringed orchid (*Platanthera blephariglottis*) and the royal lady's-slipper (*Cypripedum reginae*), which have been observed in several bogs in the City.

Community residents recognized the efforts made by the City to preserve the natural environment and biodiversity. As an example, the trust and relationships formed through the extensive public involvement, has inspired some citizens to volunteer their time (for example, to plant trees and clean river shores) while private land owners contributed their land to conservation efforts. The quality of the Sustainable Development Policy was locally and regionally recognized, the Policy was a finalist in the 2010 Ovation Municipal Contest, organized by the Union of Québec Municipalities (Union des Municipalités du Québec).

### Building Internal Capacity and Staff Knowledge

Much of the success of the planning tools is attributed to the collaborative work between various municipal departments. The work of the City's Urban Planning Services and Sustainable Development Division provided complementary perspectives and actions that benefited ecosystems and biodiversity conservation. Their joint experiences helped determine which tools could achieve the best results.

Cross-departmental initiatives are a key way to build internal capacity as collaborative approaches to solving large-scale problems allow for greater learning, increased access to resources, and complementary policies among multiple departments. These relationships, along with cross-departmental exchanges, have created the means for Trois-Rivières to do more biodiversity work as they continue to work internally and then move outward.

For more information, visit www.v3r.net


Restored pond in Trois-Rivières which provides habitat and resources for a variety of species.


Fish spawning areas are appropriately labelled as a means to educate visitors of the areas ecological importance.

# An Urban Forest: Valuable to Both Ecosystem and the Community


## ABSTRACT

Vast urban sprawl and development has threatened the urban forest within the City of Winnipeg. Through the work of key stakeholders and engaged residents, the City was able to protect the entire forest from harmful development activities. The work towards protecting the forest stands as an example of community leadership driving municipal action.


**MUNICIPAL PROFILE** **Name: City of Winnipeg, Manitoba** **Population: 663,451** **Area: 464 km²**

The City of Winnipeg is located on the eastern edge of the Canadian Prairies, in the valley of the Red River. The region, characterized as a low-lying flood plain with a flat topography, is connected by four major river systems – the Red River, the Assiniboine River, the La Salle River, and the Seine River – that provide water-rich landscapes for flourishing ecosystems and wildlife habitats. The Seine River is a major component of the City as it winds through the landscape before emptying into the Red River. It provides riparian and wetland habitats for many different species and vegetation along the river's edge.

The Bois-des-esprits (or Spirit Forest), is a 100-acre urban forest located within the Seine River and is the largest remaining riverbank forest in Winnipeg. It is characterized as a forest that remains 'virtually undisturbed'. Found in the southeast region of the City, this healthy forest is treasured by residents and provides a myriad of recreational and educational opportunities, such as cycling trails, canoeing, and cross-country skiing, all with wheelchair accessibility. The forest and all connecting waterways are the largest contiguous river bottom and upland forest environments in the City, providing a diverse range of habitats that support wildlife and fish species. Development was a large threat to the state of the forest, but the City and residents worked to protect this space by moving land ownership away from developers and into the hands of the City. It is now a municipally owned forest that will remain preserved and protected for future generations.

### Protecting the Urban Forest

The pocket of green space in Winnipeg is protected through the work of many engaged citizens, stakeholders, and partners, including the Province of Manitoba, the *Manitoba Model Forest* (a non-profit in the province), and a local NGO, *Save our Seine*.

In 2006, Council approved the acquisition of the remaining 14.91 acres of the forest not previously protected, thereby preserving the remaining river bottom forest. With the protected forest free of development, the City was able to work with many stakeholders to develop a Forest Management Planning Process to determine future directions and preservation strategies for the green space. The City developed an advisory group, a partnership between different municipal departments, which included Planning and Land Use; Parks and Open Spaces; *Save our Seine*; a community development group, *Ladco*; and the Province of Manitoba. Additional stakeholders included local resident and condominium associations, trail and paddling groups, environmental advocacy groups, and technical advisors. The Advisory group presented a wide range of perspectives and interests in the forest.

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A **river bottom forest** provides essential corridors for the movement and dispersal of wildlife in a region with large tracts of land used for development and agriculture. They are characterized by river bottom trees such as willow, sycamore, and silver maple.

Consultations among all mentioned groups showed that each acknowledged the need for sustained community involvement. The Bois-des-Esprits Forest Management Plan has the following objectives, shared by all parties:

- Protecting biodiversity, habitat and important physical and biological features;
- Developing trail and river access plans, with defined permitted and prohibited activities;
- Promoting environmental education, awareness and maintenance programs;
- Defining the interface between private and public lands; and
- Supporting active transportation and healthy communities.

Prior to the Bois-des-Esprits Forest Management Planning Process, there had been continuous conflicts between environmental groups supporting the protection of the forest and developers with interests in land ownership. Developers began to construct on the forest's edge, while the community worked to prevent any further loss of the valuable land. Ultimately, as a result of the long-term vision of the groups involved, negotiations evolved into a collaborative process with input from a large number of stakeholders involved in maintaining the integrity of the forest. The City was clear as to their intent to protect the forest and this made it clear that preserving ecologically and socially valuable spaces was a core business of the City of Winnipeg.

### Ensuring a Healthy Forest

Following the development of the planning process, the City created policies that identified environmentally significant landscapes and measures to protect their functions. In 2007, the City produced the Ecologically Significant Natural Lands (ESNL) Strategy – a policy-based tool that identified vulnerable landscapes, promoted better quality of life for all who live or visit the City, and supported a healthy environment that is rich in biodiversity. The Strategy identified specific areas of concern that included managing urban forestry, mitigating riverbank erosion, managing wastewater, and identifying ecologically significant natural lands. The document classified certain areas as fragile if they contained any of the following:

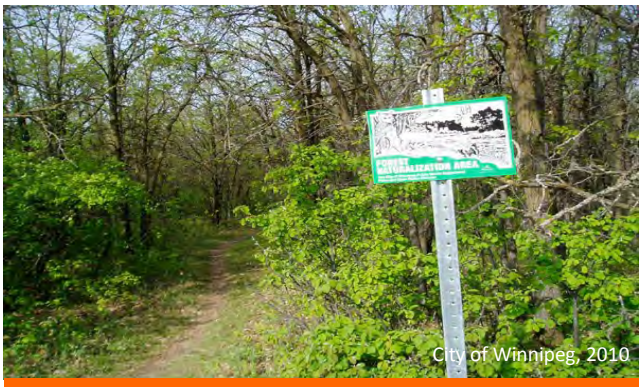
- Land and/or water representing the natural ecology of the region;
- Significant wildlife communities of cultural historic significance;
- Natural area connectivity between wildlife and humans; and
- Riparian ecosystems or riverbanks, such as flood zones or unstable banks.

The City used findings from the ESNL Strategy to determine viable forest entry points, or gateways into the Park, for public users. These entry points highlighted important natural features that residents would find meaningful, while steering them away from areas that were fragile and/or unstable. It was important to identify significant areas as the research for the ESNL Strategy found that the majority of the forest consisted of valuable ecosystems that had been labelled *Grade A* habitats: areas undisturbed by human activities with maximum sensitivity to disturbance. For example, oak forest stands are a dominant feature of Bois-des-Esprits and are extremely sensitive to site disturbances, such as compaction of forest material beneath the tree canopy.

The policies and research conducted by the City has produced information that is crucial for ensuring the forest is properly maintained. Currently, the City and *Save our Seine* run numerous events that promote education on the benefits of the urban forest by organizing guided walks and information sessions. As a result of the City's and the community's commitment to protecting the biodiversity rich public space, the community is able to enjoy this space knowing that it will remain a natural feature for years to come.

For more information, visit www.winnipeg.ca


City of Winnipeg, 2010


City of Winnipeg, 2010

The City worked to restore waterways and put informational signs throughout the forest to educate visitors of the spaces ecological value.

# Transforming a Town into a Community Arboretum


## ABSTRACT

The Town of Wolfville and local higher education institution, Nova Scotia Community College, formed an innovative partnership to join municipal ecological protection efforts with active education. The Town and College are working towards building the entire Town of Wolfville as an Arboretum.


**MUNICIPAL PROFILE** **Name: Town of Wolfville, Nova Scotia** **Population: 3,772** **Area: 6.45 km²**

The Town of Wolfville is a small community in the north-west region of Nova Scotia situated along the shores of the Minas Basin of the Bay of Fundy. The tides of the Bay of Fundy are considered some of the highest in the world; dykes built in the seventeenth century separate the Town from the shores.

Acadia University and Nova Scotia Community College make Wolfville a student town, as the population changes from 3,772 to over 7,000 during the academic year. These educational institutions have great influence on the social and economic fabric of the Town, bringing in new perspectives and industries.

The Town and Nova Scotia Community College (NSCC) formed a unique partnership, working towards establishing the entire Town as an arboretum. Together, their goals are geared towards scientific study, educating residents and students, enhancing quality of life, and promoting large-scale sustainable practices in the pursuit of protecting the rare forest ecosystems.

The Town is marketing the project through a "Town as the arboretum" model. Implementing this concept has been a project-in-the-making since 2007, through a series of formal and informal discussions between faculty from NSCC's Horticulture Program and Town staff. In October 2007 an MOU was signed to formally adopt the undertaking, and the project is currently in the second year of a 25-year plan. Though new, the project has already seen progress in the establishment of strong commitments and support from community members and college students.

> "Wolfville is the Arboretum, within which the Towns people live, a unique perspective which we continue to foster
>
> - David Slabotsky, Parks Foreman, Town of Wolfville


Town of Wolfville, 2010

For many years there has been a mutual relationship between the Town and the Horticulture Program at NSCC, Kingstec Campus; past projects include: initiation and planting of the Town's street planters and hanging baskets; design and development of green spaces within the Town; design, development and planting of Willow Park (a local public space); and mentorship and employment for students by the Town's Parks and Recreation department.

## Background of the Arboretum Plan

The Town is located within the Acadian Forest System, which is nestled within the Temperate Forest Biome. The forest system is one of the rarest regions of the biome, identified by the co-existence of many different tree species. Many of the trees live an average of 150 years, with undisturbed old growth trees living 400 or more years. The forests in the Town have high value, the abundance of trees improves air quality, reduces stormwater, provides cooler summers, and reduces wind speed. Establishing the Town as an Arboretum will protect future trees and preserve this rare ecosystem.

The Town will become an extended laboratory for the faculty and students of NSCC, with joint projects between both groups. NSCC offers programs in Horticulture and Landscape Technology, and seeks projects that will challenge students to use their surroundings, as there is great hands-on potential in the arboretum and Town area. Students from the program provide a source of help and expertise, as the arboretum plan will require students to plan, propagate, and grow trees. The Town is working to incorporate the local school system into future initiatives.

Working alongside educational institutions has benefited both partners as an arboretum provides the opportunity for Town staff, residents and students to both improve and maintain the local diversity within the environment, while learning more about the rare forest ecosystem within the Town.

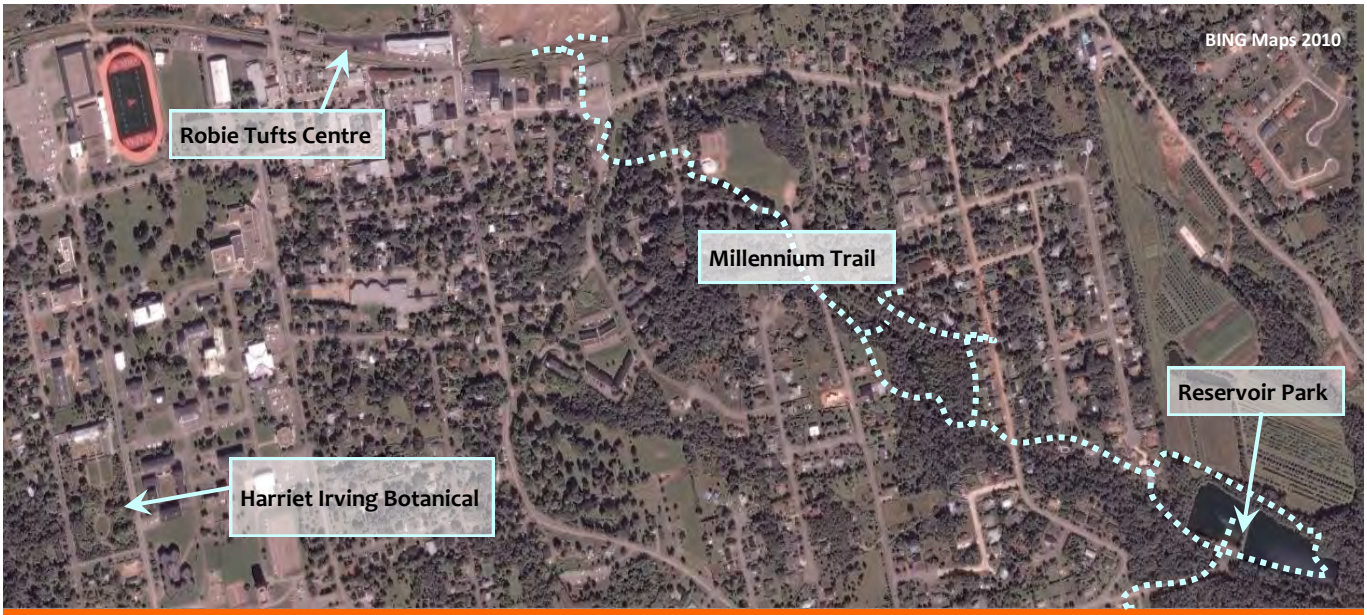
## Merging Science and Conservation

The *Trees of Significance* project integrates the learning opportunities of the arboretum with technology. This project will produce a database of flora, including details on each tree species, their locations, and photographs. A second component of the initiative is to utilize GIS sampling techniques to determine areas of concern and high sensitivity. This technique will help to identify habitat diversity, condition of wildlife corridors, and sites of erosion.

## Ecosystem Based Design

The staring site of the arboretum was selected to protect the greatest forest area, increase wildlife corridors, and enhance local biodiversity. The designated natural space will connect the Reservoir Park and Millennium Trail System. Connecting these systems has great potential for hosting a wide selection of trees and shrubs as it will link two established environmental centers: the Robie Tufts Centre and the Harriet Irving Botanical Garden. All of these centers hold extreme importance to the community as they promote ecosystem awareness, information on local natural history, and bird watching opportunities.

As the project is still in its infancy, the Town is currently conducting studies to assess watersheds, waterways, ecological corridors, and riparian zones. The arboretum will also require a re-evaluation of the existing trail system to determine its impact and traffic flows. These details allow for the Town and NSCC to create trails




Millennium Trail, Reservoir Park, Robie Tufts Centre and the Harriet Irving Botanical Garden , will all be connected by the arboretum to create an ecosystem designed to be a corridor for species and a learning tool for students and residents.

away from highly sensitive ecosystems, and create connectivity among different ecosystems for species to move freely. Considerations of the ecological, and also social and recreational gains of the arboretum, all influence the design of the forest. It is also important for the Town to know which groups are using the space and how their experiences can be enhanced with the establishment of an arboretum.

### Connecting a Town through Community Learning

The initial reaction to the project from residents and businesses has been positive, as all will benefit from the arboretum: residents will get the benefit of trees being planted on their property and businesses will receive increased customer traffic from tourists coming to experience the trees and Town. Both resident and local businesses have been active in seeing the arboretum through as they participate in tree planting activities throughout the year.

At the end of the 25-year arboretum plan, the Town's tree density will dramatically increase, giving it a feeling of a town located within a forest. By making this dramatic change in the ecological diversity of the Town, the Arboretum will establish a connection to the surrounding landscape as residents will feel they are part of something unique and special. Residents will connect to an ecosystem they can see, understand, and live within, knowing it is a protected space with multiple long-term gains.

For more information, visit www.wolfville.ca


Horticultural students from NSCC participating in one of the many tree planting projects.

# About ICLEI

ICLEI Canada's office, 401 Richmond Street, Toronto, Ontario

ICLEI – Local Governments for Sustainability, is an association of local governments worldwide which have made a commitment to sustainability. ICLEI's mission is to build and serve a worldwide movement of local governments to achieve tangible improvements in global sustainability through cumulative local actions.

To act on this mission, ICLEI is represented in all regions of the world. The Canada Office is located in Toronto, Ontario and works with local governments from coast to coast to coast. Having a regional presence in Canada enables us to bring sustainability issues of global significance to the local level. Working through a variety of campaigns and programs, ICLEI engages communities across Canada on issues ranging from climate protection to water conservation to procurement and biodiversity management.

ICLEI—Canada produced the Biodiversity Engagement Strategy, with support from Environment Canada, in early 2010 to provide an overview of how local governments and associated stakeholders across the country are engaging on biodiversity and implementing specific biodiversity actions. Based on the findings from the review, suggestions were put forth to enhance municipal action and increase capacity for further community and stakeholder engagement on biodiversity.

This case study series is meant to serve as a tool to showcase the best practices on urban biodiversity management being undertaken across the country. The case studies presented should assist in stimulating further biodiversity management actions, build capacity among local governments, and assist in creating a network of municipalities exchanging information and sharing lessons learned.

If you would like more information on ICLEI and our biodiversity work please contact the Canada Office by email: biodiversity-canada@iclei.org or phone +1-647/728-4308.

Produced by ICLEI—Local Governments for Sustainability, Canada Office with the support of Environment Canada: Environmental Stewardship Branch

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