



# CITY of EDMONTON

## BIODIVERSITY REPORT | 2008



ENHANCING URBAN NATURE THROUGH A GLOBAL NETWORK OF LOCAL GOVERNMENTS





The Local Action for Biodiversity (LAB) Project is a 3 year project which was initiated by the City of Cape Town, supported by the eThekweni Municipality (Durban), and developed in conjunction with ICLEI – Local Governments for Sustainability and partners. ICLEI is an international association of local governments and national and regional local government organisations that have made a commitment to sustainable development. LAB is a project within ICLEI's biodiversity programme, which aims to assist local governments in their efforts to conserve and sustainably manage biodiversity.

Local Action for Biodiversity involves a select number of cities worldwide and focuses on exploring the best ways for local governments to engage in urban biodiversity conservation, enhancement, utilisation and management. The Project aims to facilitate understanding, communication and support among decision-makers, citizens and other stakeholders regarding urban biodiversity issues and the need for local action. It emphasises integration of biodiversity considerations into planning and decision-making processes. Some of the specific goals of the Project include demonstrating best practice urban biodiversity management; provision of documentation and development of biodiversity management and implementation tools; sourcing funding from national and international agencies for biodiversity-related development projects; and increasing global awareness of the importance of biodiversity at the local level.

The Local Action for Biodiversity Project is hosted within the ICLEI Africa Secretariat at the City of Cape Town, South Africa and partners with ICLEI, IUCN, Countdown 2010, the South African National Biodiversity Institute (SANBI), and Roma Natura. For more information, please visit [www.iclei.org/lab](http://www.iclei.org/lab)



## ***Message from His Worship Mayor Stephen Mandel***



On behalf of City Council and the people of Edmonton, Alberta's Capital City, it's my great pleasure to introduce the City of Edmonton's first Biodiversity Report.

Our biodiversity is, without a doubt, one of Edmonton's most valuable assets, and we, on City Council, are most supportive of efforts to enhance and protect this keystone of our natural environment. Through the Local Action for Biodiversity project, we're committed to showcasing the many initiatives we're currently undertaking to conserve our biodiversity, and we're developing a Biodiversity Action Plan to take our conservation work even further in the coming years. We're eager to learn conservation strategies and techniques from urban centres around the world; such knowledge sharing benefits all parties.

The City of Edmonton is committed to preserving and enhancing ecological connectivity throughout the entire city. As we have outlined in our *Natural Connections* Strategic Plan, we aim to protect and effectively manage our natural systems and to engage the community in this effort through partnerships and education. The North Saskatchewan River Valley is an important ecological corridor, both within Edmonton and regionally. This wonderful valley is host to a high level of biodiversity. Outside the valley, the wetlands and forests on the city's tablelands are stepping stones for wildlife moving through developed areas. We're keenly aware that these lands provide critical ecological services, such as capturing run-off and improving air quality.

As Mayor, I'm proud to say that Edmonton is an environmentally progressive city. Many of the things our administration does to protect water quality, reduce waste and combat climate change also help to protect our local biodiversity. Thank you for taking the time to learn about Edmonton's biodiversity and the work we and the community are doing to protect it!

Yours truly,

A handwritten signature in black ink that reads "Stephen Mandel".

Stephen Mandel  
Mayor, City of Edmonton

# ACKNOWLEDGEMENTS

The following groups and individuals were invited to review and/or contribute to Edmonton's Biodiversity Report. The Office of Natural Areas is grateful for their support and input.

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# PREFACE

This document forms part of a set of biodiversity reports produced by participant cities of the Local Action for Biodiversity (LAB) Project. It represents a critical starting point: a status quo assessment of biodiversity and its management in each LAB city.

Each biodiversity report covers four key themes\*, namely:

- Ecology
- Governance
- Integration
- Participation

Each biodiversity report will be drawn upon to contribute significant and useful information for the compilation, by the LAB Project Team, of a Biodiversity Toolkit document. This document will contain best practice theory and examples, principles, strategies etc. for use by cities to better manage and integrate biodiversity into planning. The Toolkit will in turn contribute towards further steps in the LAB process.

The five steps in the LAB process are as follows:

Step 1: Development of a biodiversity report that documents the current state of biodiversity and its management within each city

Step 2: Ensuring long-term commitment by city leadership to sustainable biodiversity management through LAB cities formally signing a local government biodiversity declaration

Step 3: Development of a 10-year biodiversity action plan and framework that will include commitments to biodiversity implementation plans and integration within broader city plans

Step 4: LAB cities' formal acceptance of their 10-year biodiversity action plans and frameworks

Step 5: Implementation of five new on-the-ground biodiversity interventions by the end of the three-year project

These reports create a unique opportunity for profiling the importance of urban biodiversity, and innovation in its management, on a global scale. They are the foundation not only of the long-term plans that each city will develop to enhance, protect and develop their urban biodiversity, but also collectively form the basis for the development of LAB as a highly effective global urban biodiversity initiative.

LAB Project Team

May 2007

Cape Town

\*Some cities' Biodiversity Reports do not follow this specific order or these specific headings



# EXECUTIVE SUMMARY

The City of Edmonton in Alberta, Canada has a rich natural heritage. The North Saskatchewan River Valley and Ravines System, known locally as the “Ribbon of Green”, winds through the city’s centre and, at 7,400 hectares, forms the largest municipally owned urban park in North America. On the flat tablelands above the river valley, forests and wetlands remain on the landscape among developed areas, and still support a relative diversity of urban wildlife. Edmontonians make regular recreational use of the river valley and ravines and other smaller natural sites around the city. Edmonton’s ecological network is situated within a larger regional network that extends into neighbouring municipalities. As Edmonton and surrounding communities continue to develop, there is a growing recognition of the need for regional collaboration to protect and restore the region’s natural systems.

This report provides a review and assessment of Edmonton’s biodiversity and governance structures, and has two main parts. Part 1 describes Edmonton’s biodiversity, and provides an overview of historic and present day biodiversity threats. Part 2 describes the governance structure within the City of Edmonton regarding biodiversity goals, tools for biodiversity protection, and existing opportunities for public participation in local conservation efforts. Appendix A is an inventory of many of the conservation initiatives being undertaken by the City of Edmonton, conservation groups and community members to protect and enhance biodiversity.

Some of the keypoints of the report include:

## Ecology

Edmonton lies in the aspen parkland, a deciduous transition zone between the northern boreal forest and southern grasslands. Ten percent (10%) of the city’s land base consists of natural areas, including much of the North Saskatchewan River Valley and ravines system, which runs through the middle of the city, and wetlands and forests that dot the tablelands above the valley. While some species have been lost during the last 100 years of Edmonton’s development and many local natural habitats have been drastically altered, a diversity of native plants and wildlife species still thrive in the city’s ecological network of natural areas.

## Governance

The City of Edmonton is committed to the protection of Edmonton’s remaining natural areas as a connected ecological network, including the river valley, ravines, wetlands, and treestands. The Office of Natural Areas coordinates the City’s strategic efforts to protect the network, and the Parks, Planning and Policy Services, Drainage Services, Corporate Properties, Waste Management, and Recreation Facilities branches provide essential operational and planning services.

The City uses a range of conservation tools to protect natural areas and biodiversity, including plans and policies that set high level strategic direction, planning tools like the dedication of reserve lands that protect habitats from development, management approaches that support the natural function of the landscape, and land purchase and donation programs, such as the Edmonton and Area Land Trust, that help to secure unprotected natural areas.

While Edmonton faces significant challenges in natural areas protection, including a rapidly growing economy and population base, limited municipal funds, and restricted legislative authority, it has achieved some important successes through strong partnerships, the support of committed volunteers, and high prioritization of environmental issues by City Council and citizens.

# EXECUTIVE SUMMARY

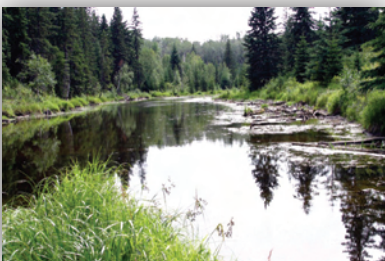
## Integration

Increasingly, City of Edmonton branches are collaborating on biodiversity-related committee work, policy and planning, environmental management and monitoring, and ecological design and reporting. The City has learned that if biodiversity protection is dealt with as a discrete activity, separate from the planning and management of parks, drainage, and transportation systems, natural areas and the biodiversity they support will be lost. Instead, biodiversity protection should be integrated across every aspect of urban planning and management, within the context of a strong policy and clear administrative directive.

## Participation

The conservation of Edmonton's biodiversity depends greatly upon public involvement and support for natural areas protection. The City of Edmonton engages citizens in the process of biodiversity protection through public consultation, representation on municipal advisory committees, involvement in the local governance process, and by providing a wide range of opportunities to access and enjoy Edmonton's natural areas. Edmonton's dedicated and active conservation community is involved in a multitude of City and community-led biodiversity initiatives, which provide invaluable benefits for Edmonton's local species and natural areas. Of the more than 50 biodiversity-related initiatives reviewed in Appendix A, approximately half are led by community groups or represent partnerships between citizens and the City of Edmonton, and the remainder are programs running within the City. Together, these initiatives work to protect biodiversity through a range of approaches including inventory, planning, monitoring, public education, restoration, and naturalization.

As Edmonton's population approaches one million people, conserving local natural systems and the biodiversity they support is becoming a growing priority for both City government and the citizens it represents, and Edmonton is proud to participate in the LAB project. Preparation of this report has given the City of Edmonton an opportunity to reflect on its conservation achievements to date, and to plan for improved biodiversity protection and management into the future. We look forward to sharing our success stories and the lessons we have learned, and to learning from our new conservation partners around the world.



"Natural system" and "natural area" refer to land or water sites that are dominated by native vegetation in naturally occurring patterns.



"River Valley" refers to the North Saskatchewan River Valley and Ravine System.



"Tablelands" refers to the uplands above the river valley which contain natural features like wetlands and treestands.



# LOCALITY MAP

MAP 1 LOCATION OF EDMONTON, ALBERTA, CANADA



# 1. BIODIVERSITY



For a city of nearly one million people, Edmonton has a surprising diversity of plant and wildlife species. The city's natural areas in the river valley and tablelands provide high quality habitat for native species, and semi-natural stepping stones and linkages throughout developed areas offer additional support for wildlife movement and ecological processes like pollination. Encounters with wild species in the city are not rare. The lonely howl of a coyote in the river valley, the call of migrating waterfowl, deer tracks in the snow, and the fragrance of native wildflowers all help to remind Edmontonians that their city exists within a natural context. Although Edmonton's biodiversity and natural habitats have decreased with time and continue to face significant challenges, the entire complex of Edmonton's natural areas form a functional ecological network that supports local plant and animal species and provides essential ecosystem services.

The City has adopted the same definition of *biodiversity* that is used within the international Convention on Biological Diversity and the Canadian Biodiversity Strategy:

"...the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. [Biodiversity] includes diversity within species, between species and of ecosystems."



Edmonton lies in Alberta's Parkland Natural Region, an area characterized by forested river valley and ravine slopes, deciduous woodlands, small lakes and wetlands, and remnant grassland, sand dune, and peatland habitats.



# 1. BIODIVERSITY

## I EDMONTON'S BIODIVERSITY IN CONTEXT

Edmonton's biodiversity is best understood by looking at the city at a variety of scales. Each level of analysis contributes to a better overall appreciation of the city's natural features, and its local and regional biodiversity. In this section, the Edmonton area is discussed in the context of its:

- A. Ecological Classification
- B. Watershed and Subwatersheds
- C. Habitat Types, and
- D. Ecological Network

### A. Edmonton's Ecological Classification

Edmonton's ecological classification varies according to geographic scale and the agency doing the classification.

The Continental Scale: the North American Great Plains Ecoregion

On a continental scale, Edmonton is part of North America's Great Plains Ecoregion, which stretches across the central part of North America from northern Canada to Mexico (Map 1). The Great Plains are characterized by mixed grasslands, low levels of precipitation, relatively flat topography, and wetlands, particularly in the northern part of the ecoregion. The climate can be extreme, including short, hot summers, long, cold winters, high winds, and intense frosts and droughts. Only in the more northern areas (northern Alberta and Northwest Territories) are the summers short and cool enough to support coniferous forest under the Great Plains precipitation regime. Closer to Edmonton, aspen forests mark the transition from grassland to the boreal forest. This deciduous transition zone is moving south due to the virtual elimination of natural prairie grassfires.

The soils of the northern Great Plains were originally very fertile, making this region highly productive for grain agriculture and cattle grazing. There are also extensive petroleum and coal deposits underneath the Great Plains. Because of the ecoregion's agricultural

suitability, mineral wealth, and increasing urban development, the Great Plains have been radically transformed. Today, this region has a disproportionately high number of rare and endangered species, and much of the native prairie vegetation has been lost.

The National Scale: Canada's Prairie Ecozone

Canada has defined its own classification hierarchy for ecosystems. There are fifteen terrestrial ecozones within this system, each representing unique mosaics of plants, wildlife, climate, landforms and human activity. Edmonton lies south of the Boreal Plains Ecozone, at the northern edge of the Prairie Ecozone, which was once covered with natural grassland and supported diverse and specialized communities and wildlife species, including plains grizzly, swift fox, and millions of bison. The Prairie Ecozone landscape is subdued, with low-lying valleys and flat, eastward reaching plains.

Today this area is often described as 'the Breadbasket of Canada' because it contains the majority of productive croplands, rangelands and pasture in Canada. As a result of this conversion to agricultural use, very little native prairie habitat is left; approximately 95% of its original extent has been converted to farmland. Although it is estimated that only 50% of Prairie wetlands remain, these wetlands provide critical habitat for 50% of North America's waterfowl, especially those using the North American flyway. Like the Great Plains, the Prairies have a disproportionate number of rare and endangered species, and native prairie is itself an endangered ecosystem.

While Edmonton is formally within the Prairie Ecozone, its proximity to the Boreal Plains Ecozone is important; indeed, much of the city's protected habitat is more representative of boreal forest than it is of prairie landscape.

# 1. BIODIVERSITY

## The Provincial Scale: Alberta's Parkland Natural Region

At the provincial scale, Edmonton is located within Alberta's Parkland Natural Region, which is a transition zone between Southern Alberta's semi-arid grasslands and Northern Alberta's boreal forest. This positioning results in Edmonton sharing climatic and vegetation characteristics with both boreal and grassland areas, and is critical to its overall biodiversity, as diverse plant communities create distinct habitats and wildlife assemblages. 20% of Alberta's rare plants occur in the Parkland Natural Region.

Native parkland is known for its rich soil, and is characterized by aspen and balsam poplar (*Populus tremuloides* and *Populus balsamifera*) and species-rich understory shrubs. Typical habitats, dictated by local conditions of geology, topography, soils and hydrology, include forested river valley and ravine slopes, riparian habitats, patches of mixedwood boreal forest, deciduous woodlands, small lakes and wetlands, and small areas of grassland, with some remnant sand dune, peatland and shrubland habitats.

Within the Parkland Natural Region, the most densely populated region of Alberta, Edmonton falls within the Central Parkland Subregion. Today Central Parkland habitat is scarce, with only about 5% of native vegetation remaining. The entire subregion has been heavily influenced by agriculture and urban development. Most remnant patches of Central Parkland native vegetation occur on rougher terrain that is considered unsuitable for agriculture. However, urban development now threatens these remnant patches as well.



EDMONTON'S RIVER VALLEY, 1907



EDMONTON'S RIVER VALLEY TODAY, OVERLOOKING THE DOWNTOWN



# 1. BIODIVERSITY

## B. Edmonton's Watershed and Subwatersheds

The North Saskatchewan River Valley, undoubtedly Edmonton's most remarkable natural feature, snakes through a large watershed that covers approximately 80,000km<sup>2</sup> – over 12% of Alberta. The headwaters of the North Saskatchewan River flow from the Rocky Mountains, across the Prairie Provinces, and enter the Arctic Ocean through Hudson's Bay.

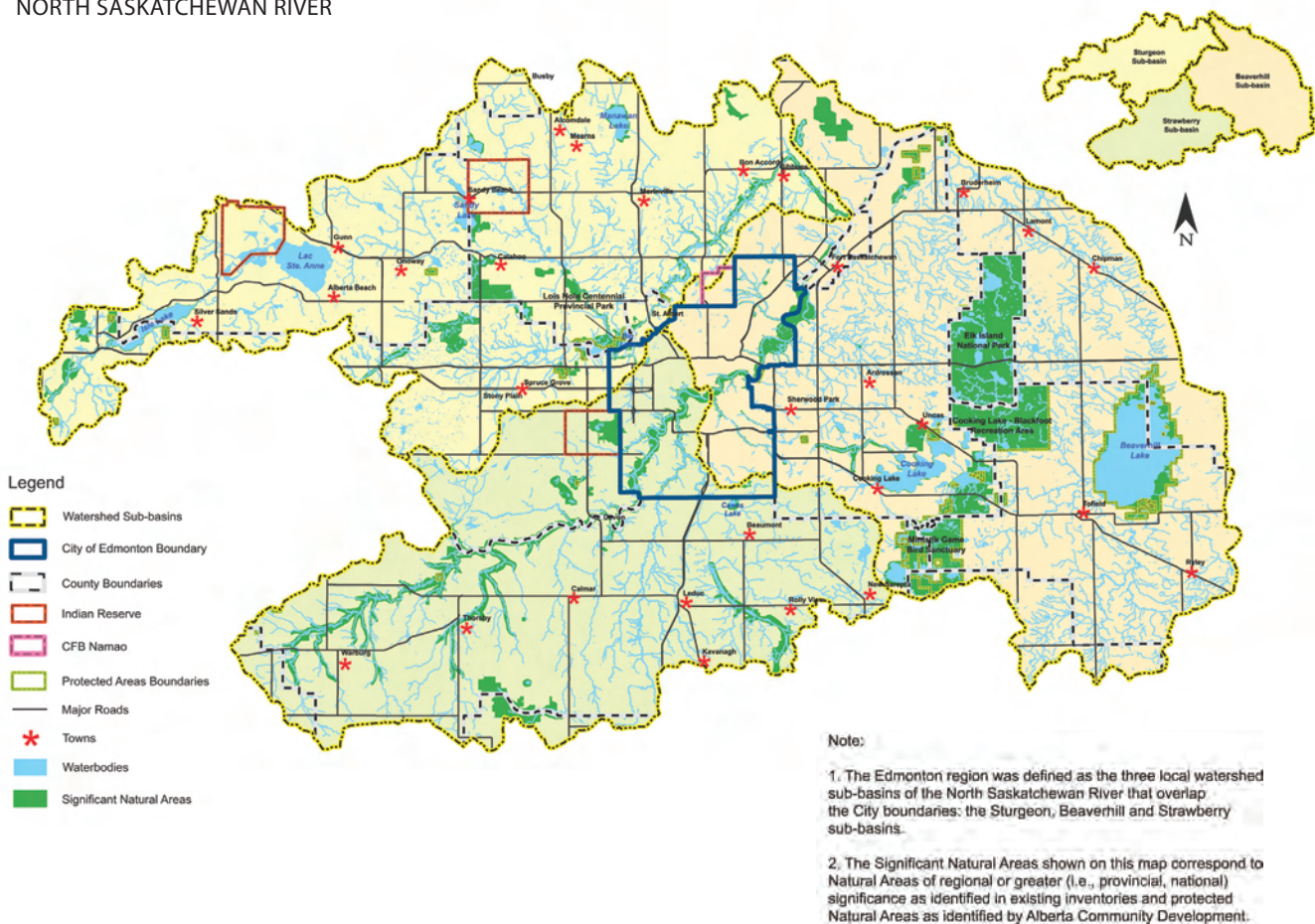
The majority of people living in the North Saskatchewan watershed live in Edmonton, the region's primary metropolis, or in smaller surrounding municipalities.

This large urban population, numbering over a million people, straddles three of the watershed's 18 sub-watersheds: the Strawberry, Beaverhill, and Sturgeon sub-watersheds (Map 2). Understanding Edmonton's biodiversity within this context demonstrates

the extent to which features outside its political boundaries influence and are in turn influenced by Edmonton's biodiversity. Strong partnerships between municipalities in the North Saskatchewan watershed are critical to protecting biodiversity on a regional scale.

The North Saskatchewan River is a major ecological corridor across Alberta. In Edmonton the river valley and its 14 major ravines form the backbone of the city's natural area system. Its natural areas are still considerably well-connected, and maintaining and improving this connectivity will be critical to protecting biodiversity over the long term. Riparian habitat is of special importance, since river ecosystems support high levels of biodiversity and usually provide the path of least resistance for wildlife.

MAP 2:  
EDMONTON'S LOCATION RELATIVE TO 3 SUBWATERSHEDS OF THE  
NORTH SASKATCHEWAN RIVER



# 1. BIODIVERSITY

## C. Edmonton's Habitat Types

Edmonton's natural landscape can be broadly divided into three major habitat types, each host to specific plant and animal species: Forest (river valley and tableland), Wetland and Riverine/Riparian. These habitat types can be further subdivided into a number of diverse communities; however, in this section, only general habitats are described.



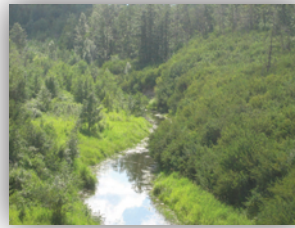
**Forests:** Edmonton's forests are typically dominated by aspen and balsam poplars, with dense, species-rich understories and some conifers such as white spruce.

River valley forests tend to have more continuous treestands, including relatively large amounts of white and black spruce, while tableland forests (above the river valley) generally occur as isolated fragments, and tend to contain vegetation more representative of the Parkland region, such as aspen and balsam poplar.



**Wetlands:** Marshes are the most common wetland type found in Edmonton, although the city also contains fens. Marshes are formed in depressions and are typically surrounded by

emergent plants including cattails, reeds and rushes. They may be bordered by willows and other shrubs.



**Riverine/Riparian:** Edmonton's riverine habitat consists of the riparian zones along the North Saskatchewan River, its tributary creeks and the slopes of both the river

valley and ravines. In some cases, the riparian zone is dominated by wetland habitat with grasses, sedges, and willows, but in other areas, the forest extends right to the water's edge. North-facing ravine slopes are characterized by white spruce and north-facing river banks are usually covered in thick mixedwood forests, including aspen, balsam poplar, white birch and white spruce. Some exposed south-facing slopes in the river valley system support a grassland flora typical of the Central Parkland subregion.

Within the city and adjacent areas there also remain small areas of peatland influenced by calcareous groundwater (groundwater that contains calcium carbonate), remnants of sand dune formations with potential for restoration, and patches of grassland where soil and groundwater conditions preclude tree growth.

# 1. BIODIVERSITY

## D. Edmonton's Ecological Network

The City of Edmonton has committed to an “Ecological Network” approach to biodiversity protection (see Figure 1). The approach envisions a network of core natural areas that are ecologically connected by natural and semi-natural linkages and – to the extent possible – surrounded by compatible land uses. Using this approach, the City is striving to secure Edmonton's river valley and tableland natural areas on private, City, and provincial lands as a single, protected natural system.

The basic components of an ecological network include:

1. Core areas: Habitat patches of suitable size and quality to provide environmental conditions that support entire populations of animals and plants and associated ecological functions. Core areas can be classified as either regional biodiversity core areas or biodiversity core areas.



- Regional biodiversity core areas represent very large natural areas that may fall either within or adjacent to municipal limits and provide habitat at a regional scale.
- Biodiversity core areas represent large natural areas that lie entirely within City limits and provide habitat at a municipal scale.

There are three regional biodiversity core areas and ten biodiversity core areas in Edmonton.

2. Linkages : Arrangements of vegetated patches that enhance structural and/or functional connectivity (for species, communities, or ecological processes) between core areas. Linkages may be natural (i.e. natural areas, naturalized parks, naturalized stormwater management facilities) or semi-natural (i.e. active recreation parks, schoolyards, cemeteries, pipeline corridors, power line corridors, and railway right-of-ways). There are two main types of linkages: stepping stones and corridors.

- Stepping Stones: Non-linear vegetated patches that provide many resources for species but may not be of sufficient size or quality to provide for all habitat requirements or ecological functions. They are usually separated by a less hospitable matrix (see definition below).

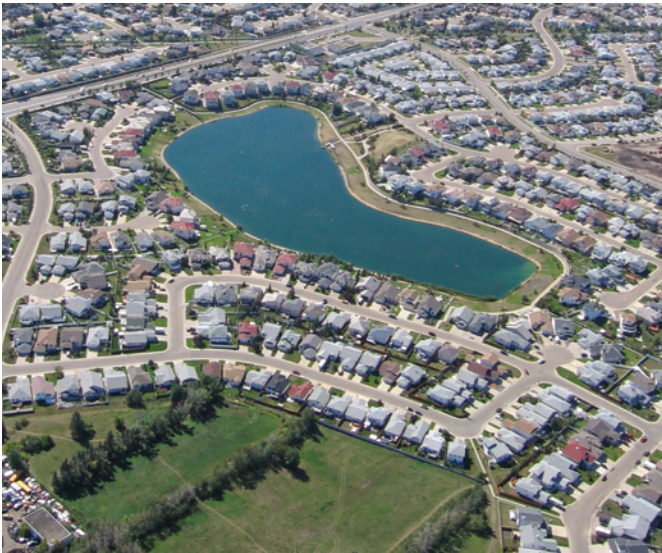


- Corridors: Linear vegetated patches that enhance movement along other habitat patches such as core areas or natural stepping stones. Corridors may be large or small scale. In the City of Edmonton the river valley is the most critical component for wildlife movement and ecological processes in Edmonton and the surrounding area and so has been identified as a regional biological corridor.



# 1. BIODIVERSITY

3. Matrix: All of the land not considered to be part of core areas or linkages. In Edmonton, the matrix is comprised of residential, commercial, and industrial development, and agricultural lands in the rural portions of the city.



Map 3 illustrates the locations of each of these components in Edmonton, in addition to the City of Edmonton's eight Ecological Planning Areas. These planning areas are not discrete ecological units but rather strategic areas for conservation planning. Each planning area contains at least one biodiversity or regional biodiversity core area and several natural and semi-natural linkages. The boundaries of these planning areas are non-statutory. Additional information about each planning area is available in Appendix B.

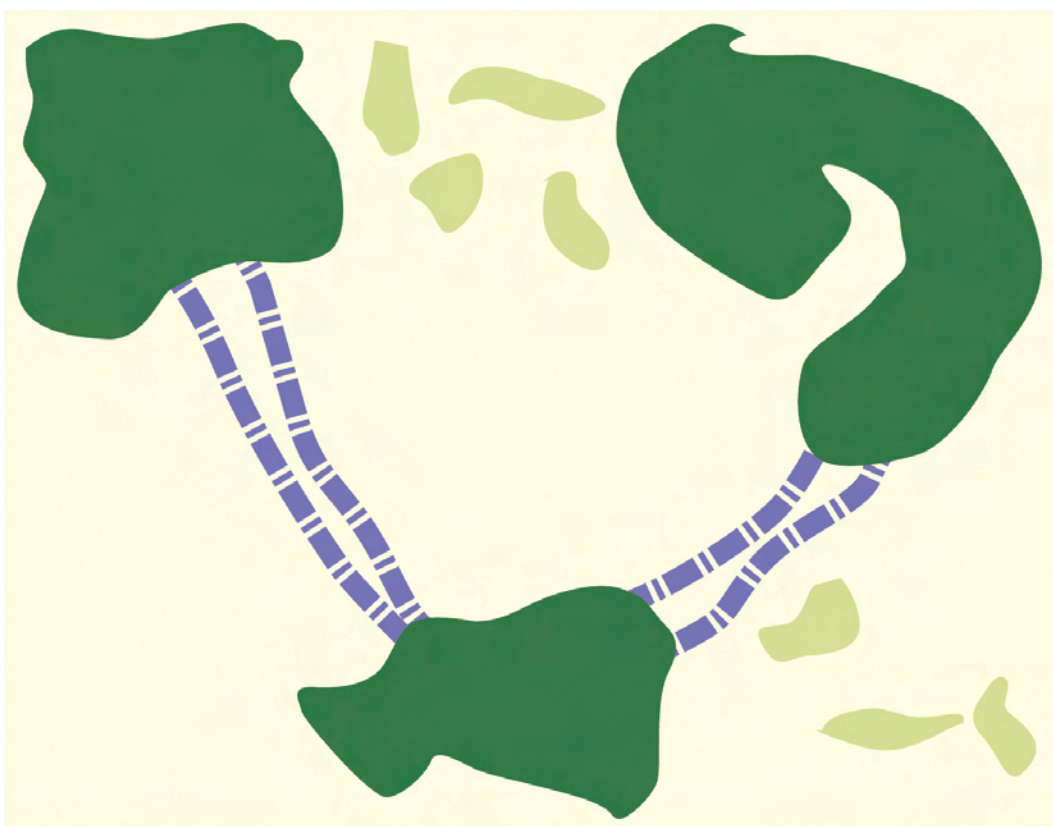


FIGURE 1: BASIC STRUCTURE OF AN ECOLOGICAL NETWORK



Core Area



Stepping Stone



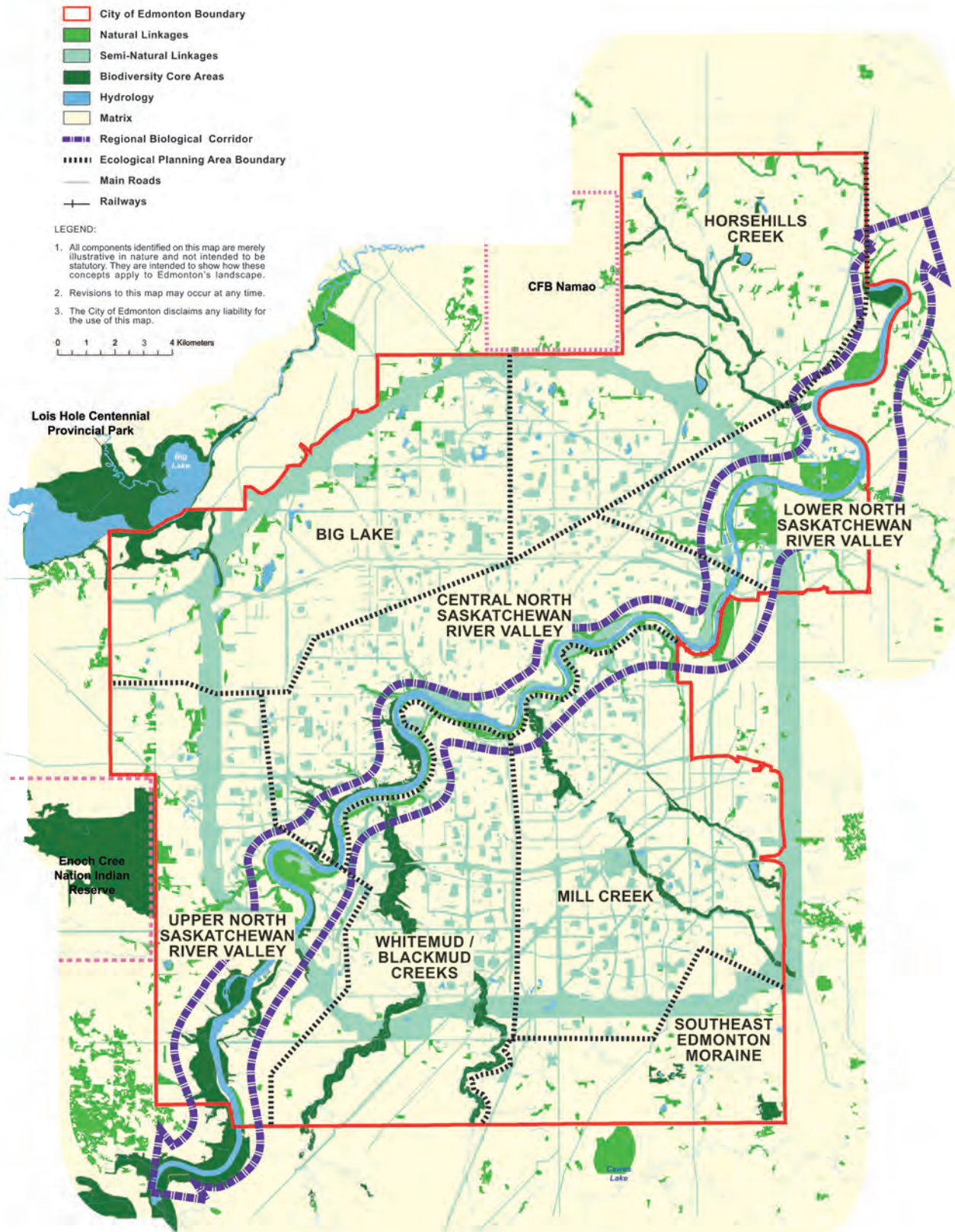
Corridor



Matrix

# 1. BIODIVERSITY

MAP3: EDMONTON'S ECOLOGICAL NETWORK & ECOLOGICAL PLANNING AREAS





# 1. BIODIVERSITY

## II. THE ECONOMIC IMPORTANCE OF EDMONTON'S NATURAL SYSTEMS

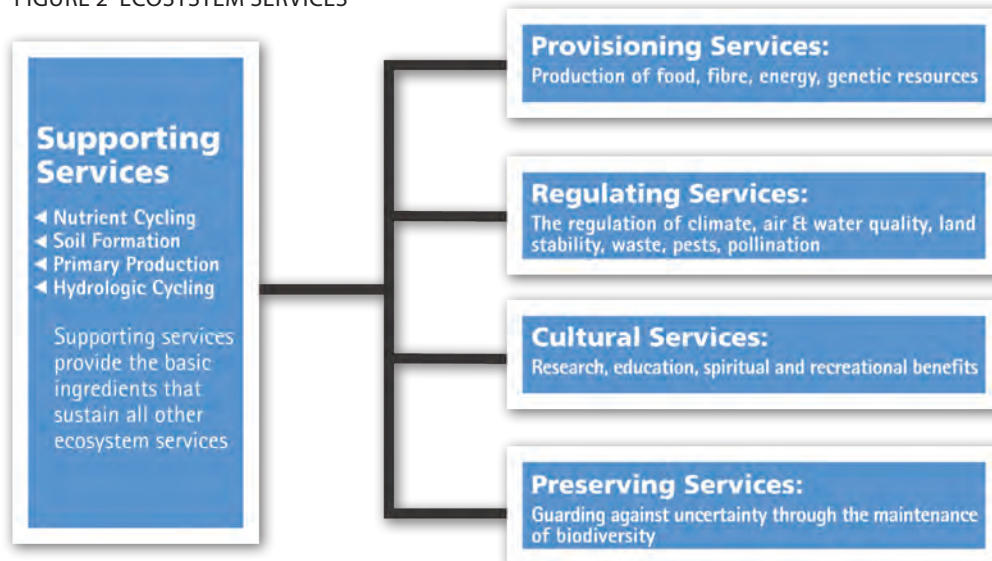
Edmonton's natural systems provide many services that support human activity, most of which are not considered in conventional accounting. Biodiversity lends resilience to ecosystems, allowing them both greater productivity and increased efficiency of productivity.

The economic benefits provided by natural areas can be summarized by five main types of "ecosystem services" in figure 2 (from Ecology and Society).

Sustaining natural systems means that these benefits will continue to be available to us for free. Natural areas intercept rainfall, reducing the need for expensive stormwater infrastructure. Wetlands filter pollutants out of water, making us less dependent on water treatment. Trees and other natural vegetation remove carbon dioxide and air pollutants, which helps to mitigate climate change and improves air quality.

Beyond these benefits that natural systems provide to our community, the City of Edmonton also supports the concept of the inherent value of biodiversity and the right of organisms to coexist with the human species.

FIGURE 2 ECOSYSTEM SERVICES



## III. HISTORIC THREATS AND INFLUENCES

Despite the great value of the city's biodiversity, Edmonton's natural habitats have gradually disappeared as the city has developed over time. The current condition of Edmonton's natural systems can be traced to historical factors that have shaped the local landscape, and present-day issues that continue to influence the land.

### Glacial Edmonton

Both the topography and biodiversity of Edmonton's present day landscape were heavily influenced by glaciation. As the glaciers retreated, Edmonton's landscape became littered with large areas of debris-covered stagnant ice between large meltwater lakes. Areas covered by this stagnant ice left moraine deposits, resulting in a hilly or "hummocky" terrain, including knobs, kettles and ridges.

The largest meltwater lake, Glacial Lake Edmonton, was formed by the temporary damming of meltwater by the glacier itself. Glacial Lake Edmonton was very widespread but not very deep and probably not in existence for more than 100 years. However, it, too, had a significant impact on Edmonton's landscape. Most of Edmonton was under Glacial Lake Edmonton, and the resulting silt and clay deposits

produced Edmonton's fertile lands. In fact, Edmonton contains the most productive agricultural lands in Alberta. As this lake drained, the present day course of the North Saskatchewan River was established about 6,600 years ago.



# 1. BIODIVERSITY

## The First People



Historically, Edmonton's landscape has always been in a state of change, through drought, floods, fire, and erosion. Aboriginal people used the river valley and tablelands for hunting and gathering for thousands of years, and shared the land with creatures such as bison, elk, grizzly bears and wolves.

## European Settlement and River Valley Development



During European settlement in the late 1700s, Edmonton became established as a fur trading post, leading to population growth and an increasingly greater dependence on natural resources. Early on, wood was in demand for both lumber and fuel, and the river valley forest was heavily harvested. By the early 1900s, the river valley was almost entirely cleared of trees. As settlement increased, land was needed for agriculture, resulting in more land being cleared for pasture and crops in the floodplain. Farmers cleared wide swaths of the tablelands, generally leaving only small woodlots for firewood supplies and windbreaks.

## Mineral Extraction



There is also a long history of mining in Edmonton including coal, gold, gravel and clay. Coal mining began in the river valley in the 1840s, primarily for local use including fuel for heating homes and the brick-making industry. The last coal mine in the city closed in 1970. Gold was first discovered in the North Saskatchewan River in the late 1880s, and the gold rush lasted until 1918. Gravel extraction has occurred in Edmonton throughout the last 100 years, and there are still several gravel pits in operation. Many former gravel pits have been reclaimed into parkland. Each of these industries had significant impacts on Edmonton's natural systems, although much of this impact has since been reversed through restoration efforts.

## The Birth of a City



Edmonton became an official city in 1905, with an area of 8.7 km<sup>2</sup>. As growth occurred in the 1920s, the flat bottomlands of the river valley became fully occupied and neighbourhood development began to spread to the tablelands above. Over time, with the decline in mining and the regulation of residential development, riverine ecosystems began to re-establish themselves, both through natural revegetation and widespread tree planting efforts. Edmonton developed very rapidly during the industrial period after World War II. One of the biggest industrial events in the Edmonton area was the 1947 discovery of oil in Leduc County south of Edmonton, which established Edmonton as a service centre for oil extraction operations in the surrounding region.

# 1. BIODIVERSITY

## IV. PRESENT-DAY THREATS AND INFLUENCES

Today, while biodiversity in the river valley remains under pressure, the primary threat to Edmonton's natural areas is on the tablelands. Over the past century, Edmonton's tablelands have been converted primarily for resource extraction, agriculture and urban development. Approximately 80% of wetlands in the tablelands have been lost to agriculture and urban expansion and only 5% of central parkland vegetation remains.

In the last several years, the Edmonton Metropolitan Area's population has grown dramatically (from 862,597 in 1996 to 1,081,300 in 2007), resulting in the rapid development of previously natural and agricultural landscapes. The region is expected to see 400,000 new residents in the next 25 years. With this increasing urbanization, there are five main threats to biodiversity in Edmonton's river valley and tablelands:

### 1. Habitat Destruction & Fragmentation: "Death by a Thousand Cuts"

Habitat destruction and fragmentation involve the loss or partial loss of natural areas to residential, commercial and industrial development, and associated infrastructure. This is the most significant threat to biodiversity in Edmonton, particularly in the tablelands, where land development decisions and the location of roads have resulted in the steady, piecemeal loss of natural areas. As a result, only isolated fragments of the original ecosystems remain as islands in an otherwise urban landscape. Such fragmentation prevents wildlife movement and seed dispersal and could potentially lead to species extirpation.



### 2. Habitat Degradation – Water Pollution, Recreation, Erosion & Sedimentation

Habitat degradation is the reduction in the quality of natural areas so that they are unable to sustain normal ecological processes. Such degradation in quality can result from many impacts – pollution, erosion and sedimentation of water bodies, encroachment of activities on adjacent lands, and heavy recreational use are just a few examples.

### 3. Invasive Species

Ecosystems depend on a tenuous balance involving a diversity of plants, animals and insects that have evolved in relationship to one another over thousands of years. Human impacts can upset this balance, reducing the resilience of ecosystems and making them more susceptible to invasion by non-native species. Human activities like trade, transportation, agriculture, and horticulture can facilitate the spread of invasive species into native ecosystems. Invasive species often have no natural predators and can spread quickly, choking out native species by dominating available resources.

### 4. Climate Change

Climate change will compound the other issues facing Edmonton's natural areas. Longer, hotter summers will strain already drought-stressed plants and trees that are not adapted to new climatic realities, and could lead to more wildfires. Increased intensity and frequency of summer storms will make the river valley and ravines vulnerable to erosion, and the river and its tributary creeks prone to sedimentation. Shorter, warmer winters could make Edmonton's trees prone to new insect-borne diseases such as the Mountain Pine Beetle.

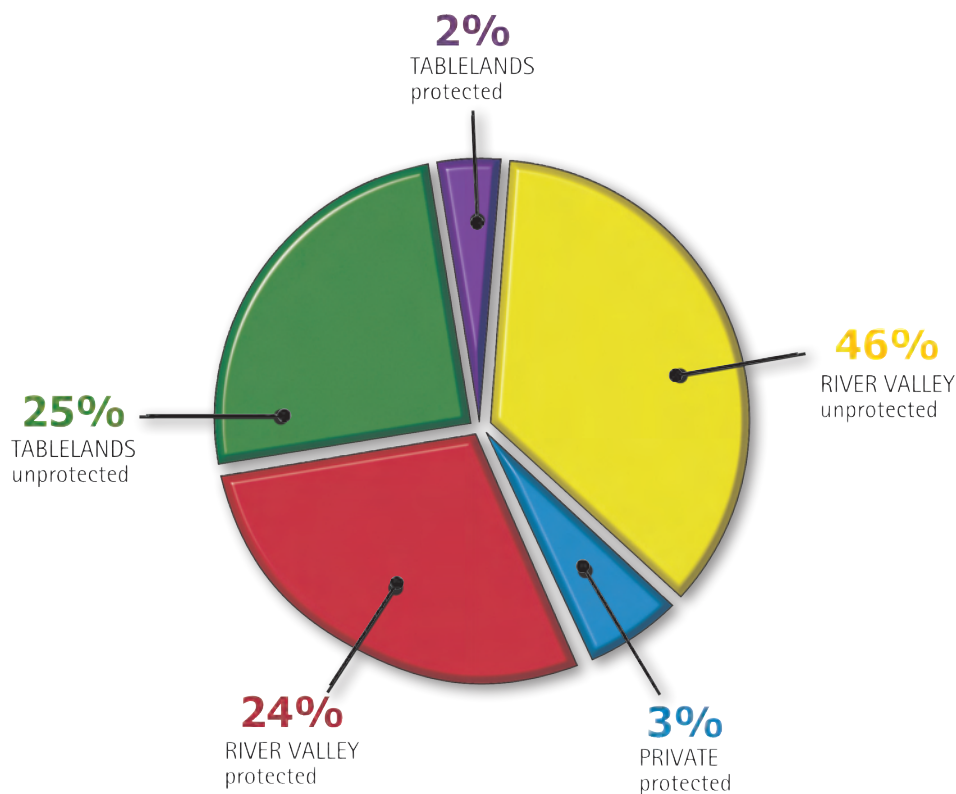
### 5. Extirpation

Extirpation (local extinction) of plants and animals is a direct result of the loss of available, appropriate habitat. The extirpation of one species within an ecosystem can negatively impact other species and reduce ecosystem resiliency as a whole. With Edmonton's natural areas being lost and degraded by the biodiversity threats outlined above, some species – particularly those sensitive to the disruption of their environments, or those whose populations are already stressed – could face extirpation in coming years, and it is believed that some have already been extirpated. As discussed later in this report, the federal and provincial governments have listed several local species of birds, mammals, fish, reptiles, and amphibians as sensitive, at-risk or threatened.

# 1. BIODIVERSITY

## V. IN A NUTSHELL... THE STATE OF EDMONTON'S PROTECTED NATURAL AREAS

The City of Edmonton recognizes the importance of monitoring its existing natural areas in order to gauge the success of its conservation efforts, and has recently taken measures to improve its monitoring activity. Building on earlier inventory work, the City's 2006 State of Natural Areas study assessed the status of natural areas in Edmonton's river valley and tablelands. Figure 3 illustrates the findings of this study. For more information about the size, ecological network element, ownership structure, and primary habitat type of Edmonton's protected natural areas, please refer to Appendix C.



### Key findings: The State Of Edmonton's Natural Areas Report (2006)

- The existing natural areas within Edmonton's municipal boundaries – protected and privately owned – constitute a functional ecological network.
- Ten percent of Edmonton's land base consists of natural areas, including 63 percent of the river valley and just three percent of the tablelands.
- Of the total land base of tableland natural areas identified in an inventory undertaken in 1993, 23 percent has since been lost to development; another 21 percent has come under some form of protection through either public or private means.
- The 56 percent of remaining tablelands natural area lands is unprotected, subject to increased development pressure, and therefore at a high risk of loss.
- 41 percent of river valley natural areas are protected with zoning for active and passive recreational uses, and another 2 percent are protected through other conservation initiatives, but natural areas in the river valley in the southwest and northeast remain under development pressure.

For every 2 ha of natural area in Edmonton's tablelands that were protected between 1995 and 2005... 3 ha were lost.



# 1. BIODIVERSITY



## VI. EDMONTON'S BIOLOGICAL DIVERSITY

Edmonton's location makes it a significant player in the protection of regional, national, and even continental biodiversity. Situated in the transition zone between grasslands and boreal forest, Edmonton provides a mixture of climactic and ecological conditions that can support diverse plants and animals from neighbouring regions. Its location within three migratory flyways (Pacific, Central, and Mississippi) means that many birds travel through the city during their spring and fall migration. Additionally, the wetlands in and around Edmonton provide important staging and breeding grounds for waterfowl and shorebirds.

Although an essential contributor to large scale biodiversity, Edmonton has a naturally low level of local biodiversity when compared to global biodiversity hotspots in countries like Brazil, New Zealand, and South Africa. This is due in large part to the region's relatively recent glaciation (approx. 10,000 years ago), which limited local diversity, particularly of tree species. In addition, Edmonton's northern latitude results in a cold, dry climate and short growing season in which only hardy, well-adapted plants and animals can thrive. With its relatively low diversity, the loss of any of the species that do flourish in Edmonton would result in a proportionately high loss of biodiversity, when compared to more biodiverse areas.

Historically, the city's landscape was dominated by aspen poplar and spruce forests, with balsam poplars, alders, and willows populating riparian areas. Animals such as bison, elk, grizzly bears and wolves roamed Edmonton's river valley and tablelands. Today, black bear and cougars very rarely move through the city, and coyotes and white-tailed deer are the only commonly-sighted large mammals. Although its diversity has decreased with time, Edmonton still contains plant and animal species representative of the Parkland Natural Region. While precise biodiversity statistics are not always available, academic institutions maintain listings of local species (see Appendix D). This section provides a snapshot of some of the most common, representative, and/or unique plant and animal species found in Edmonton.

In addition to the following profiles of plants and vertebrates, Edmonton also has a diversity of mosses, lichens, mushrooms, and insects that play essential roles in local ecosystems. A listing of some of these species is also included in Appendix D.



Edmonton contributes to regional, national, and even continental biodiversity due to its location in an ecological transition zone between boreal and grassland habitats, its situation within three major migratory bird pathways, and the important natural habitats found both within and around the city.

# 1. BIODIVERSITY

## PLANTS

Edmonton contains a diverse mixture of boreal and prairie plant species, with approximately 490 species of non-cultivated vascular plants. Some dominant and unique species include:

### Aspen Poplar (*Populus tremuloides*)



Also known as the Trembling Aspen for its leaves that tremble in the slightest breeze, this deciduous tree is one of the most common species found in Edmonton's

natural areas. The species colonizes disturbed areas quickly by producing a large number of airborne seeds, and sending out underground shoots and suckers. Aspen poplar's twigs, bark and leaves are an important food source for local birds and for mammals such as the beaver.

### White Spruce (*Picea glauca*)



A common tree in Northern Alberta's Boreal Forest, the White Spruce is also found in Edmonton's river valley forests and ravines, particularly on the moister north-facing banks. This coniferous

tree offers food and shelter for local wildlife. A White Spruce Forest is considered the most mature woodland type in the Edmonton region. Mature deciduous trees provide the shade and conditions that make it possible for White Spruce to become established.

### Prickly wild rose (*Rosa acicularis*)



This common prickly deciduous shrub has given Alberta the nickname "Wild Rose Country," and is a common sight during summertime walks in Edmonton's natural

areas. Between June and August the plant is covered with fragrant pink flowers that attract insects like bees and butterflies. The beautiful rose blossoms have made this plant Alberta's official provincial floral emblem.

### Saskatoon Serviceberry (*Amelanchier alnifolia*)



Saskatoons are prolific in Edmonton's moist forests and river valley. The deciduous plant grows as a shrub or small tree, and produces fragrant white

flowers in the spring and delicious purple berries in the early summer. Historically, saskatoon berries were the most common fruit eaten by First Nations people living in the Edmonton area, and are now sold as jams and pies in local farmer's markets.

### Prairie crocus (*Anemone patens*)



This purple flower blooms in the early spring, sometimes before the snow has melted. The Prairie crocus grows in dry, open areas, and is seldom seen in Edmonton. Its caustic

sap causes most animals to avoid it as a food source. Not a true crocus, the Prairie crocus actually belongs to the buttercup family.

### Yellow Lady's Slipper (*Cypripedium parviflorum*)



The Yellow Lady's Slipper is a stunning yellow orchid that is an uncommon but memorable sight in some of Edmonton's moist forests and wetland areas.

The flower is designed to trap insects inside the blossom on a clump of sticky pollen. The plant's roots require site-specific fungi to take nutrients from the soil.



# 1. BIODIVERSITY

## MAMMALS

Almost 50 species of mammals occur in Edmonton. Some common mammals include:

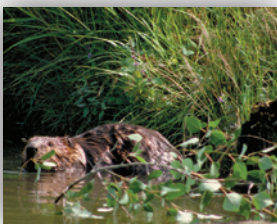
### White-tailed jack rabbit (*Lepus townsendii*)



Sightings of this nocturnal, grass-loving hare are increasingly common around Edmonton. "Jack rabbits" rely on their great speeds of up to 70 km per hour to escape predators, and thus naturally

favour grassland environments, like those in southern Alberta. The animal is thought to have expanded its range northward to Edmonton around the 1920s, and has been found to prefer open spaces with minimal vegetative cover such as light industrial zones and city parks.

### Beaver (*Castor canadensis*)



The lush coat of this rodent fuelled Canada's historic fur trade, and established Edmonton as an important fur trade post. Today, nearly-extinct beaver populations have recovered, and the

animal is Canada's national symbol. Beavers are sometimes called "ecosystem engineers," due to their ability to change local habitats by cutting down trees, digging canals, damming streams, and building lodges. They have been found to play an important role in maintaining water levels in drought years, a role which may become increasingly important as the effects of climate change intensify.

### Coyote (*Canis latrans*)



This member of the canid family has traditionally played a natural and beneficial role in the food chain by eating mice and other small rodents in Edmonton's river valley. Until recently, encounters

with the largely nocturnal hunter were rare. With increasing loss of habitat in recent years, however, coyote behaviour has changed. They have become increasingly common visitors to residential areas, where they search for garbage, fallen fruit, and pet food, and occasionally threaten pets.

### White-tailed deer (*Odocoileus virginianus*)



The white-tailed deer is named for its large white tail that it holds high when running from danger. The deer browse on trees and shrubs in the river valley and ravine system, and sometimes

snack on gardens and agricultural crops. The male white-tailed deer grows antlers each year, which are shed shortly before mating season. Like coyotes, deer are sometimes used as an indicator of ecosystem connectivity.

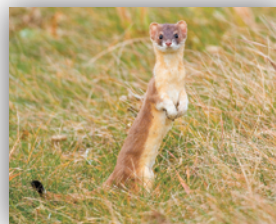
### Porcupine (*Erethizon dorsatum*)



This unforgettable yet elusive rodent is covered with barbed quills that protect it from most predators, including curious pet dogs. Porcupines are largely nocturnal, and spend most of their time in trees.

With a diet of leaves, bark, and twigs, porcupines can cause extensive damage to the crown of trees. In Edmonton, porcupines are relatively common, particularly in the river valley and ravine system.

### Long-tailed Weasel (*Mustela frenata*)



One of a handful of local mammals that are listed as "May be at Risk" on Alberta's General Status of Wildlife Species Report, the Long-tailed Weasel lives in parkland and prairie regions,

feeding on small mammals like mice and shrews. With a body length of up to 0.5 m, this predator can squeeze into rodent tunnels just 3 cm wide. In the winter, the weasel turns white to camouflage with the snow, except for the black tip of its tail.



# 1. BIODIVERSITY

## BIRDS

There are over 150 bird species occurring within Edmonton. The parkland natural region is particularly important to neo-tropical migrant songbirds for breeding and for migratory water birds as a staging area. Bird species include:

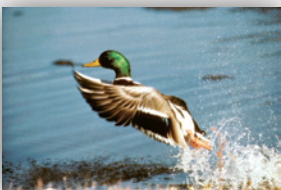
### Pileated Woodpecker (*Dryocopus pileatus*)



The Pileated Woodpecker is the largest remaining woodpecker in North America, and is occasionally seen and heard in Edmonton's river valley and ravines, boring holes into trees in search of insects. Birds nest as pairs and will create excavations in several

decaying trees throughout their territory. Alberta's General Status of Wildlife Species Report lists this bird as a sensitive species, due in part to the loss of mature and old growth trees throughout the province.

### Mallard (*Anas platyrhynchos*)



This duck is a common sight in Edmonton's urban parks and natural areas. A pair will nest near open water during the nesting season, and females can sometimes be seen leading

their young across busy streets to reach nearby ponds. Most Mallards fly south for the winter, although some stay to enjoy the open water that can be found at storm water outfalls along the North Saskatchewan River, particularly downstream of the downtown core.

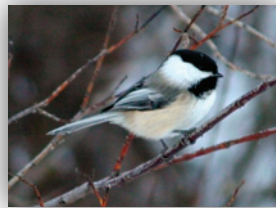
### American White Pelican (*Elecanus erythrorhynchos*)



Each summer, American White Pelicans arrive in Edmonton from Florida and Mexico to nest in colonies along quiet areas of the North Saskatchewan river. The

birds are vulnerable to any disturbance of their breeding sites, including changing water levels. If disturbed, they may abandon an entire nesting colony, including eggs and young chicks. These factors, along with disease, predation, and pesticide use, have contributed to the species' listing of 'Sensitive' in Alberta's General Status of Wildlife Species Report.

### Black-capped Chickadee (*Parus atricapillus*)



The chickadee is a much-loved and very common bird in Edmonton. It lives year-round in the city, and can remember where it hides seeds, insects and berries for

nearly a month at a time. On cold winter days, the tiny bird puffs up its feathers to conserve its warmth. The chickadee is a familiar sight throughout Edmonton's forested natural areas, as well as at backyard bird feeders and nest boxes.

### Black-billed Magpie (*Pica pica*)



Magpies are an opportunistic species, whose population numbers greatly declined with the loss of the bison, but today have become one of the most common urban

birds. Some Edmontonians consider the large bird to be a pest, since they scavenge garbage, eat small bird eggs, and have an abrasive call. Still, they are one of the most intelligent species of birds, and have adapted well to urban life. Magpies are found throughout Edmonton, and build their substantial nests with a combination of sticks, clay, grass, hair, and roots.

### Great Horned Owl (*Bubo virginianus*)



Alberta's provincial bird is a nocturnal creature, silently hunting for rodents, rabbits, and smaller birds throughout the ravines of the river valley. These owls normally adopt

the nest of another bird such as magpies or herons, and aggressively protect their young. Although not commonly observed, Alberta's Great Horned Owl populations are classified as secure.

# 1. BIODIVERSITY

## AMPHIBIANS, REPTILES AND FISH

Edmonton has five species of amphibians, two species of reptiles, and approximately 30 species of fish. Some species include:

### Tiger Salamander (*Ambystoma tigrinum*, var. *melanostictum*)



The only salamander found in Edmonton, the secretive Tiger Salamander spends most of its time hiding in the mud or under logs near small water bodies. The larvae are aquatic and live in permanent

or semi-permanent ponds for three to four months. Adults have a healthy appetite, and will augment their traditional diet of insects and worms with small fish, frogs, small mice, and even other salamanders. Population numbers for this species appear to be healthy and robust

### Boreal Chorus Frog (*Pseudacris maculata*)



The Boreal Chorus Frog is Alberta's smallest amphibian, and its distinctive breeding call is a sign that spring has arrived in Edmonton. The adult frog lives in wetlands and moist forests, and lays

eggs in small ponds and temporary pools. Although a member of the tree frog family, this frog rarely climbs higher than a small shrub.

### Canadian Toad (*Bufo hemiophrys*)



This toad was once common throughout the Parkland region, but has suffered population declines due to drought, habitat loss, and pesticide use. Today, it is listed as "May be at Risk" in

Alberta's General Status of Wildlife Species Report. The Canadian Toad prefers wetlands and moist ditches, and hibernates underground below the frost line.

### Plains Garter Snake (*Thamnophis radix*)



One of two snakes that live in Edmonton, the Plains Garter Snake can be found throughout Edmonton's river valley, particularly when sun-bathing on warm days. The snakes favour ponds,

streams, and wetlands where they hunt for frogs, fish, small mammals, and insects. In the winter, the snakes gather to hibernate together in underground dens. Urban development can destroy these dens, and may be responsible for the species' current listing of 'Sensitive' in Alberta's General Status of Wildlife Species Report.

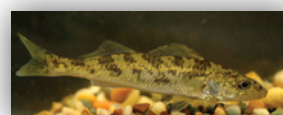
### Lake Sturgeon (*Acipenser fulvescens*)



The Lake Sturgeon is a prehistoric-looking bottom feeding fish, covered in armor-like plating. Although it once was a common species in the

North Saskatchewan River, its populations are at or below the critical level for sustainability. Lake Sturgeon can reach up to 2 metres in length, live an amazing 100 years, and will only spawn when they reach 15 years of age. Habitat degradation and over-fishing have led to the 'Sensitive' status of this species, and extensive management plans have been implemented to restore populations.

### Walleye (*Stizostedion vitreum*)



A popular game fish in the North Saskatchewan River, the Walleye can live in both rivers and lakes. The fish


travel long distances to their spawning grounds each year, so that a single fish may migrate thousands of kilometers over the course of its life. Walleye favour a diet of insects and other fish, but may also consume frogs, snails, and small mammals.

# 1. BIODIVERSITY

## VII. THE POPULATION STATUS OF EDMONTON'S WILDLIFE

While many of Edmonton's plant and animal species have secure populations, and many of these are secure throughout the Central Parkland, some species exist in very low numbers within the City. Populations of some sensitive species are tracked both provincially, through Alberta's General Status of Wildlife Species Report, and federally, through a parallel system in Canada's Species at Risk Act. Alberta's species ranking system uses slightly different language than the International Union for the Conservation of Nature, with species ranked on a spectrum from 'sensitive' to 'extinct'.

Table 1 lists the species of local birds, mammals, amphibians, reptiles and fish with populations that are currently listed as sensitive, may be at risk, or at risk in the 2005 Alberta General Status of Wildlife Species Report. Information about the status of local plants for the province as a whole can be found in Alberta's General Status of Wildlife Species Report 2005, or through the Alberta Natural Heritage Information Centre.

Alberta's General Status of Wildlife Species Report: species ranking system		International Union for the Conservation of Nature: species ranking system
<p><b>Extinct:</b> a species no longer believed to be present anywhere in the world</p> <p><b>Extirpated:</b> A species no longer thought to be present in Alberta</p> <p><b>At Risk:</b> Any species legally designated as "Endangered" or "Threatened" in Alberta.</p> <p><b>May be at Risk:</b> A species that "May Be at Risk" of extinction or extirpation, and is therefore a candidate for detailed risk assessment.</p> <p><b>Sensitive:</b> A species that is not at risk of extinction or extirpation but may require special attention or protection to prevent it from becoming at risk.</p>		<p><b>Extinct:</b> there is no reasonable doubt that the last individual has died</p> <p><b>Critically Endangered:</b> a species that is facing an extremely high risk of becoming extinct in the wild</p> <p><b>Endangered:</b> a species that is facing a very high risk of becoming extinct in the wild</p> <p><b>Vulnerable:</b> a species that is facing a high risk of becoming extinct in the wild</p> <p><b>LowerRisk / Near Threatened / Conservation Dependent:</b> a species that is close to qualifying for or is likely to qualify for a threatened category in the near future.</p>



# 1. BIODIVERSITY



THE PEREGRINE FALCON IS LISTED AS A THREATENED SPECIES. IN RECENT YEARS, BREEDING PAIRS HAVE NESTED ON SEVERAL BUILDINGS IN EDMONTON.

Species that are considered to be “at risk” or “may be at risk” according to the General Status report are analyzed more formally by Alberta’s

Endangered Species Conservation Committee, and if found to be endangered or threatened, they receive legal protection under the provincial Wildlife Act. Currently, one species in Edmonton, the Peregrine Falcon, is listed as Threatened and receives legal protection. The Lake Sturgeon is in the process of becoming listed as Threatened.

The monitoring of these at-risk populations is the responsibility of the provincial and federal governments, who also implement recovery strategies and management plans to strengthen flagging populations. Once a species is legally designated through the Endangered Species Conservation Committee, the provincial government must develop a species recovery strategy within one year for endangered species and within two years for threatened species. Following the recovery strategy, an action plan is developed to meet the objectives and goals of the recovery strategy. In some cases, the City of Edmonton may work in partnership with other levels of government, industry, and citizens in order to support species recovery strategies.

With an appreciation of both the importance and vulnerability of local biodiversity, the City of Edmonton is committed to protecting its remaining natural areas and enhancing its ecological network. Through strong community and government support, the conservation of Edmonton’s biodiversity has emerged as a civic priority. Edmonton’s biodiversity goals, management approach, and conservation initiatives will be outlined in the next section of this report.

TABLE 1: EDMONTON’S SPECIES AT RISK (2005 ALBERTA GENERAL STATUS OF WILDLIFE SPECIES REPORT)

Taxa	Species	Provincial Status
Birds	Peregrine Falcon	At risk
	American White Pelican	Sensitive
	Bald Eagle	
	Baltimore Oriole	
	Barn Swallow	
	Barred Owl	
	Bay-breasted Warbler	
	Black Tern	
	Black-backed Woodpecker	
	Blackburnian Warbler	
	Black-crowned Night-heron	
	Black-throated Green Warbler	
	Canada Warbler	
	Cape May Warbler	
	Eastern Phoebe	
	Forster’s Tern	
	Great Blue Heron	
	Green-winged Teal	
	Horned Grebe	
	Least Flycatcher	
	Lesser Scaup	
	Northern Harrier	
	Northern Pintail	
	Osprey	
	Pied-billed Grebe	
	Pileated Woodpecker	
	Purple Martin	
	Rusty Blackbird	
	Sandhill Crane	
	Sora	
	Swainson’s Hawk	
	Western Tanager	
Mammals	Long-tailed Weasel	May be at risk
	Northern Long-eared Bat	
	Badger	Sensitive
	Hoary Bat	
Amphibians	Canadian Toad	May be at risk
	Western (Boreal) Toad	Sensitive
Reptiles	Western Plains Garter Snake	Sensitive
	Red-sided Garter Snake	
Fish	Lake Sturgeon	At risk
	Spoonhead Sculpin	May be at risk
	Northern Red-belly Dace	Sensitive

## Lake Sturgeon Habitat Construction

Edmonton’s Drainage Services Branch helped to protect Lake Sturgeon living in the North Saskatchewan River through the construction of a replica fish spawning bed in 2005. Approximately 950 square meters of Lake Sturgeon spawning habitat were created along a stretch of the river thought to be attractive for spawning. Staff worked with researchers to create an optimal spawning habitat based on a similar design that successfully protected populations of Lake Sturgeon in Wisconsin (United States). It is hoped that these efforts help to strengthen the Lake Sturgeon’s at-risk population.

## 2. GOVERNANCE



Edmonton has had considerable success in some aspects of the protection of its natural areas. Large portions of the river valley and ravines system, North America's largest municipally owned urban park, have been protected in some form since 1915. Other partnerships and initiatives have resulted in the protection of a number of individual natural areas outside this system. However, the comprehensive protection of Edmonton's natural areas as a City-wide functioning ecological network did not become a significant priority until the early 1990s. The loss of some of Edmonton's key natural areas on the tablelands highlighted the need for a significant restructuring of the City's conservation governance structure in order to protect Edmonton's remaining natural systems, particularly those outside of the river valley. The governance structure outlined in the following sections is the result of these efforts.



## 2. GOVERNANCE

### I. A BRIEF HISTORY OF BIODIVERSITY MANAGEMENT IN EDMONTON

Conservation has been an important theme throughout Edmonton's establishment and growth. The following events and successes describe three eras of biodiversity protection and management in Edmonton.



#### Protecting the “Ribbon of Green”: Edmonton's North Saskatchewan River Valley & Ravines (1907 – 1996)

1907: Two years after Edmonton's establishment as a city, Montreal landscape architect Frederick C. Todd proposed the protection of the city's river valley. In a letter to City Council dated April 5, 1907, Todd describes the river valley's tributary ravines:

“Your city is particularly fortunate in having located on the East and West sides, deep ravines the slopes of which are embellished with particularly beautiful and interesting woods; and I am of the opinion that the future generations would look upon it almost as a crime if these ravines are allowed to become denuded of their woods or otherwise made unsuitable for public pleasure grounds, for there are no other lands such as these located within easy walking distance for the city...”

Several years later, the Province of Alberta established a policy for the protection of the North Saskatchewan River Valley and ravines for recreation purposes.

1933: The City of Edmonton developed a Zoning Bylaw to regulate land use by preserving river valley lands as parkland.

1970: The City of Edmonton adopted a Top of Bank policy to regulate development close to the river valley, and prescribe regulations for development permits and zoning certificates in areas adjacent to the river valley and ravines. As well, the Edmonton Parks Master Plan was created to define policies for the long-term purchase of river valley lands for parks and environmental protection.

1985: Edmonton City Council approved the North Saskatchewan River Valley Area Redevelopment Plan Bylaw, which established a major portion of the system as an environmental protection area and for use as an urban and natural park. The Plan required an environmental impact screening and assessment report for all proposed development on public land within the river valley and ravines.



## 2. GOVERNANCE

1992: The City of Edmonton completed a river valley and ravine system master plan entitled the Ribbon of Green, which provided the planning framework for open space development in the river valley into the year 2000.

1996: A group of volunteers representing the seven municipalities that hold land in the Alberta Capital Region North Saskatchewan River Valley came together to form the River Valley Alliance (RVA), with a shared vision to “protect, preserve and enhance the Capital Region’s river valley park system for year-round accessibility, and enjoyment of its citizens and visitors.” The RVA developed A Plan of Action for the Capital Region River Valley Park, which was endorsed by City Council in 2007, and provides a joint vision of protection and “enhancement” of the river valley. Although their focus is not limited to conservation, the RVA has been instrumental in broadening river valley planning to the regional scale.

### Conservation in the Tablelands (1993 – 2001)

1993: Edmonton undertook a comprehensive inventory of tableland natural areas, identifying over 300 natural areas and designating 85 of them as priorities for conservation.

1995: City Council adopted a conservation policy entitled “Conservation of Natural Sites in Edmonton’s Tablelands”. This policy required developers to complete natural site assessments, which City staff used to identify whether or not a natural area should be protected, and what portions should be protected if it was not possible to acquire the site in its entirety.

1999: The City established the Natural Areas Reserve Fund, to be used for the purchase of natural areas on the tableland. Originally, \$250,000 was dedicated to the fund each year. In 2005, City Council increased the annual dedication to \$1,000,000.

2001: Several of Edmonton conservation organizations, together with the City of Edmonton’s Community Services department, developed a document entitled Conserving Edmonton’s Natural Areas: A Framework for Planning in an Urban Landscape. This landmark

document represented a crucial turning-point in the City’s approach to conservation.

### A New Direction: Office of Natural Areas Dedicated to Comprehensive Natural Areas Planning (2002 – 2005)

2002: Edmonton hired its first Conservation Coordinator to coordinate natural areas issues more strategically, thereby offering more centralized oversight over what had previously been less formal involvement by other departments.

2006: The Edmonton and Area Land Trust was created by the City of Edmonton through partnership with several conservation groups and the development community. The purpose of this body is to raise funds for land purchase, land management and conservation easements in order to protect natural systems on privately-held lands. The Land Trust also has an education and outreach function, as a means to advance ecologically-sound stewardship among landowners in the Edmonton area.

2007: Edmonton’s City Council unanimously approved a new Natural Area Systems Policy, and the City’s Senior Management endorsed Natural Connections, a companion Strategic Conservation Plan. The approach underpinning both documents placed more emphasis on the connectivity of natural systems, and promoted more proactive planning. Rather than simply protecting what remnant of natural area is left over after commercial, industrial or residential development has been planned, this new approach emphasizes the early identification of natural area systems within a plan area, and early consideration of how connections between individual natural areas might be incorporated into – and even restored through – development.



## 2. GOVERNANCE

### II. CITY MANAGEMENT FOR NATURAL AREA AND BIODIVERSITY CONSERVATION

Today, activities related to the protection and management of Edmonton's biodiversity are not limited to any one branch or department. Individual departments and branches are responsible for initiating best practices for biodiversity protection. The Office of Natural Areas coordinates the protection of natural areas corporately, and branches such as Parks, Planning and Policy Services, Drainage, Corporate Properties, Waste Management, and Recreation Facilities are directly and indirectly involved in conservation. The following sections describe the roles of the various branches in the conservation of biodiversity.

#### The Office of Natural Areas


The Office of Natural Areas was created in 2002 with the mandate of coordinating conservation efforts across the City. The Office is located in the Parks branch (and the Asset Management and Public Works department), and in recent years has grown to four staff. The reporting structure of the Office of Natural Areas is illustrated in Figure 4. Some of the main roles of the office are listed below:

The Office is responsible for corporate strategic initiatives such as city-wide conservation planning, and for overseeing the implementation of the City's Natural Area Systems Policy, and the Natural Connections Strategic Plan. The Natural Area Systems Policy states, in part, that the City "will balance ecological and environmental considerations with economic and social considerations in its decision making and demonstrate that it has done so."

- The Office of Natural Areas advises other departments on natural area issues, and coordinates other branches of the organization to ensure the right representatives are involved in conservation planning discussion and decision-making.
- The Office receives guidance and feedback from other City of Edmonton branches through the Natural Areas Policy Implementation Committee (NAPIC), which includes the branch managers responsible for each of the branches with some involvement in natural areas – Parks, Planning and Development, Drainage Services, Corporate Properties, and

Transportation. NAPIC meets once a month for an update of Office of Natural Areas projects, to discuss as a group any natural areas issues that may have arisen, and to set strategic direction.

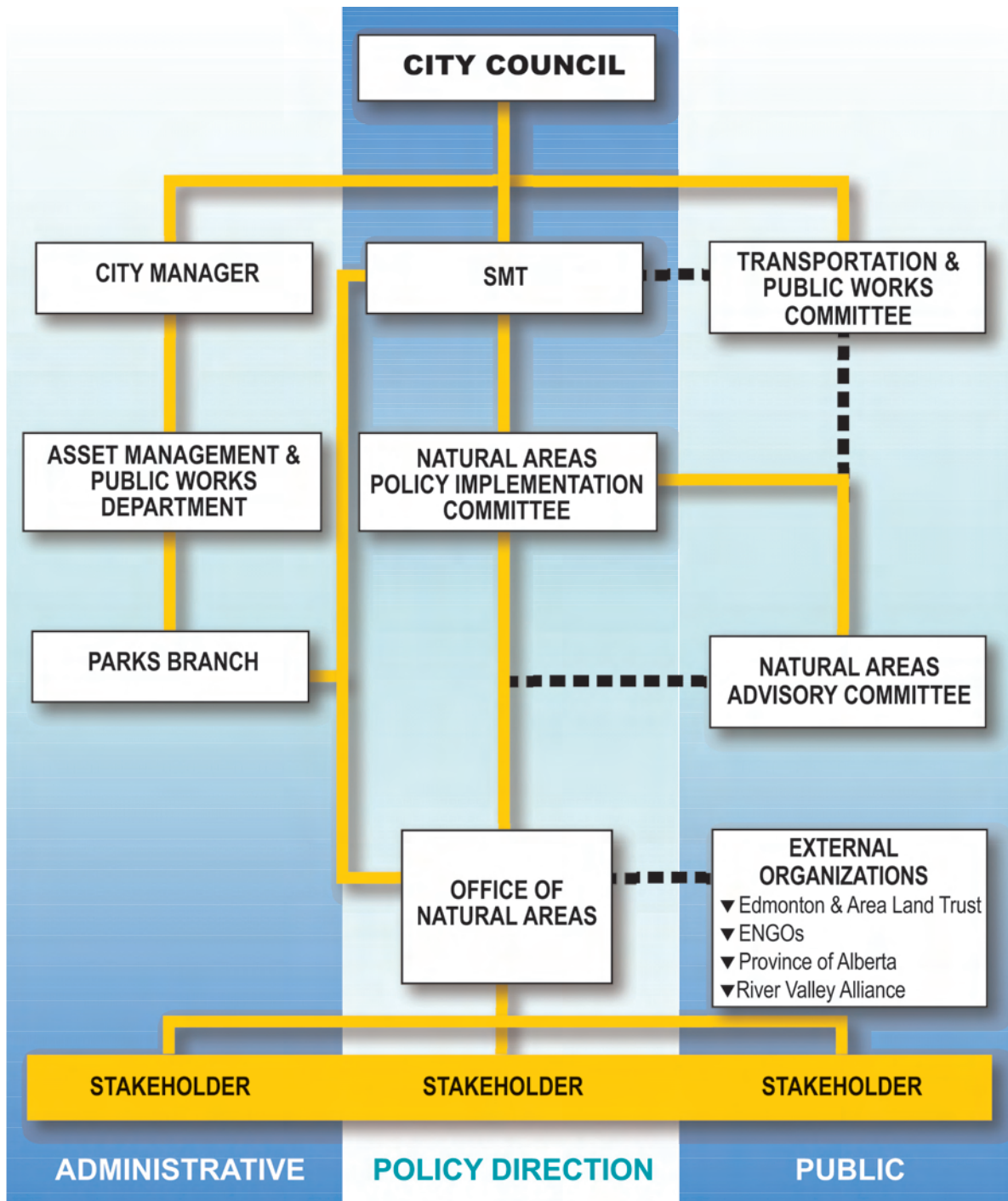
- The Natural Areas Coordinator meets monthly with the Senior Management Team to advise them on strategic issues.
- The Office endeavors to engage citizens as much as possible in many aspects of its work. One of the main avenues for citizen input is the Natural Areas Advisory Committee (NAAC), which meets monthly to advise the Natural Areas Policy Implementation Committee (NAPIC) on policy and operational matters relevant to natural areas conservation. This committee is discussed in further detail later in this report, in the section on Public Participation and Involvement.
- The Office works alongside other staff in the Parks Branch, Drainage Services Branch, Corporate Properties Branch, Office of the Environment, and Planning and Policy Services Branch to develop synergies in the areas of land purchase, natural areas management, and public education.
- The Office of Natural Areas was the Project Manager in the creation of the Edmonton and Area Land Trust.



Responsibilities for the protection and management of Edmonton's biodiversity are integrated across multiple City departments, branches, and offices.

## 2. GOVERNANCE

FIGURE 4: OFFICE OF NATURAL AREAS REPORTING STRUCTURE IN THE CITY OF EDMONTON





## 2. GOVERNANCE

### The Office of the Environment

Edmonton's Office of the Environment has the mandate of implementing and updating the City's Environmental Strategic Plan. The Office oversees environmental reporting, remediation of contaminated sites, carbon dioxide reduction and energy conservation. The Office administers Edmonton's Environmental Strategic Plan, called EcoVision, which guides all environmental initiatives undertaken by the City of Edmonton.

The Office of the Environment also coordinates the 10 City branches that have environmental management systems (called Enviro). These systems help the branches to manage environmental impacts associated with their operations and promote continual environmental improvement. Enviro promotes best environmental practices in the areas of waste management, pollution prevention, and the conservation of energy, water, and other resources in order to reduce the City of Edmonton's ecological footprint, and indirectly protects biodiversity. As of early 2008, four branches had certified their environmental management systems to the international environmental standard ISO 14001, and six were in earlier stages of implementation and certification.

This Office also coordinates and implements the CO<sub>2</sub>RE (CO<sub>2</sub> Reduction Edmonton) program, which is a City-led plan to reduce greenhouse gas emissions in Edmonton, in partnership with multiple community groups.

### Other City Branches

While the day-to-day activities of both the Office of Natural Areas and the Office of the Environment are focused on issues related to conservation and environmental sustainability, many other branches are also involved, if more indirectly. Table 2 outlines the mandates of other City of Edmonton branches that are actively involved with biodiversity protection and management. Refer to Appendix E for an organization chart illustrating the structure of the City of Edmonton offices, branches and departments that are involved in natural areas protection.



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TABLE 2: BIODIVERSITY PROTECTION ACROSS THE CITY OF EDMONTON

BRANCH & MANDATE	BIODIVERSITY PROTECTION FUNCTION
<b>Parks:</b> To develop, manage and preserve parks and open spaces	<ul style="list-style-type: none"> <li>Public education about the value of our natural systems, including what Edmontonians can do to contribute to urban biodiversity (e.g. through boulevard and yard "naturescaping")</li> <li><i>Partners in Parks</i> program, geared toward "encouraging Edmontonians' involvement in beautifying our community," including the stewardship of natural areas</li> <li>Responsible for the management of natural areas</li> <li><i>Naturalization Master Plan</i>: governs the naturalization of Edmonton's parks and roadways</li> <li>Reduction of pesticide use, both in City operations and through public awareness programs</li> <li><i>Urban Parks Management Plan</i>: guides the acquisition, development, maintenance, preservation and use of parkland in 2006-2016. It provides strategic direction for all river valley and ravine parkland as well as all school and park sites outside the river valley. This plan includes Natural Areas as a typology of park in the City of Edmonton.</li> </ul>
<b>Drainage Services:</b> To ensure the proper disposal of City domestic sewage, industrial wastewater and stormwater	<ul style="list-style-type: none"> <li><i>Water Quality Strategy</i>: emphasizes the naturalization of stormwater management facilities – improves the quality of water through natural filtration, increases urban wildlife habitat</li> <li>Two full-time positions dedicated to conservation from a drainage perspective, both senior engineering positions</li> <li>Commitment to the creation of constructed wetlands, which manage storm water <i>in situ</i> and can provide habitat and promote biodiversity.</li> <li>Creation of Area Master Plans and Neighbourhood Design Reports for watershed management.</li> </ul>
<b>Planning &amp; Policy Services:</b> To enforce building bylaws, develop long-range strategies for sustainable growth, provide planning advice and administer assessment and taxation services	<ul style="list-style-type: none"> <li>Environmental Planning unit: provides support and advice on planning approvals that involve environmental issues, including oversight of environmental reviews of natural areas in the city's river valley and ravines</li> <li>Development of City's Municipal Development Plan – includes "preservation and enhancement of the natural environment" as a priority area, was recently amended to further facilitate the protection of natural areas</li> </ul>
<b>Development Compliance:</b> Responsible for implementing bylaws and regulations representing community standards as set by City Council.	<ul style="list-style-type: none"> <li>Implementation of Edmonton's <i>Zoning Bylaw</i>, including the "A" <i>Metropolitan Recreation Zone</i> to preserve natural areas and parkland along the river, creeks, and ravine, the <i>North Saskatchewan River Valley and Ravines System Protection Overlay</i>, to protect the integrity of these areas, and the <i>NA (Natural Area) Zone</i> that protects natural areas by significantly limiting development rights.</li> </ul>
<b>Waste Management:</b> To collect and process waste and recyclables generated by single and multi-family households; providing waste disposal services for residential and business sectors at the Waste Management Centre	<ul style="list-style-type: none"> <li>Waste Management Centre of Excellence: North America's largest collection of sustainable waste processing and research facilities</li> <li>An engineered sanitary landfill has been converted to parkland, and a five-hectare wetland on site is maintained as natural habitat for waterfowl, deer and other local wildlife</li> <li>Coordinates the City's litter reduction program, Capital City Clean Up</li> <li>Operates Eco Stations, Recycling Depots and a Reuse Centre</li> <li>Non-recyclable waste is composted and used in landscaping, agriculture, erosion control, and forest recovery.</li> <li>Administers the Muttart Conservatory, Edmonton's premier horticultural attraction</li> </ul>
<b>Recreation Facilities:</b> To lead in the development and delivery of outstanding neighbourhood, recreation, social, cultural, fire and emergency medical services and facilities.	<ul style="list-style-type: none"> <li>Administers the Edmonton Valley Zoo, which has an increasingly strong conservation focus</li> <li>Administers the John Janzen Nature Centre, which offers programs, events, exhibits and information to encourage awareness and understanding of nature in an urban setting. The John Janzen Nature Centre was the first urban nature centre in Canada, and the first municipally-operated nature centre in North America.</li> </ul>
<b>Corporate Properties:</b> Stewardship of the City of Edmonton's lands and buildings through innovation, leadership and service.	<ul style="list-style-type: none"> <li>Negotiates purchase of land containing natural areas</li> <li>Develops strategies for land acquisition.</li> <li>Develops land with a focus on the City's priorities including sustainability and preservation.</li> </ul>



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### III. EDMONTON'S BIODIVERSITY GOALS

Biodiversity protection goals are included in several of Edmonton's highest-level corporate plans, including the City's Municipal Development Plan and Natural Connections Strategic Plan.

#### Municipal Development Plan

Edmonton's Municipal Development Plan, the City's highest-level strategic plan, includes the following two priority areas, within the context of land use planning and development:

- **Preservation and Enhancement of the Natural Environment**  
Preserve and enhance the river valley, natural areas and open space within the urban landscape; recognize these areas as critical aspects of successful planned growth of the City; and, link them to the extent possible.
- **Protection of the Natural Environment**  
Develop an integrated environmental protection strategy in partnership with the Province and neighbouring municipalities designed to improve air and river water quality, promote conservation, and ensure effective preservation and management of the City's green spaces.

#### Natural Connections Strategic Plan

In 2007, Edmonton's Office of Natural Areas completed an integrated strategic conservation plan called Natural Connections in order to formalize the City's commitment to biodiversity protection. The plan, which takes general direction from the City's Environmental Strategic Plan Ecovision (discussed in detail in section IV) is based on an ecological network approach that involves identifying key natural elements at an early stage in the planning process, and protecting a comprehensive system of core biodiversity areas, stepping stones and linkages. This holistic approach takes into consideration such issues as the connection of discrete natural areas,

naturalization within the matrix, management of invasive species, and the consideration of land uses adjacent to natural areas. At the plan's core lie three interconnected, mutually supportive goals:

#### 1. Secure a functioning ecological network.

The City of Edmonton will secure a protected and functional ecological network.

#### 2. Manage Edmonton's ecological network.

The City of Edmonton will manage Edmonton's ecological network effectively and will work collaboratively with other conservation agencies to do so.

#### 3. Engage Edmontonians.

The City of Edmonton will work with the community to support conservation goals, and will form partnerships with conservation leaders in the community.

Prior to developing these goals and the Plan's associated strategic directions (see section IV for details), the City of Edmonton undertook a comprehensive survey of 50 conservation plans from across the world. The purpose of that survey was to gain an understanding of how other cities have approached the protection of biodiversity in their jurisdictions, and what elements might successfully apply to the Edmonton context. In addition, the City made an effort to ensure that its conservation goals support the following international, federal, and provincial biodiversity initiatives:

#### International Biodiversity Initiatives:

- Convention on Wetlands of International Importance (Ramsar Convention 1971)
- Important Bird Areas Program (1985)
- Convention on Biological Diversity (1992)
- North American Waterfowl Management Plan (1986)
- Northern Prairie and Parkland Waterbird Conservation Plan (2004)



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### Federal Biodiversity Initiatives:

- Federal Policy on Wetland Conservation (1991)
- Canadian Landbird Conservation Program (1994)
- Canadian Biodiversity Strategy (1995)
- Canadian Shorebird Conservation Plan (2000)
- Wings over Water: Canada's Waterbird Conservation Plan (2003)



The City of Edmonton envisions a system of conserved natural areas, ecologically and effectively managed, connecting the river valley with tableland natural areas, restored green spaces and regional natural areas, and recognized and supported by community members as a valued asset.

### Provincial Biodiversity Initiatives:

- Alberta Species at Risk Program (2005)
- Alberta Biodiversity Monitoring Program (2007)

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## IV EDMONTON'S TOOLS FOR BIODIVERSITY PROTECTION

The Office of Natural Areas is currently developing a Biodiversity Action Plan to ensure that the policy direction of Natural Areas Systems Policy and each of the goals and strategies that are outlined in Natural Connections are put into action. In the meantime, there are many initiatives underway that aim to protect Edmonton's biodiversity. Because biodiversity is linked to such a wide range of environmental issues including climate change, air, soil and water pollution, habitat destruction, and urban sprawl, efforts made by City employees and citizens throughout Edmonton to address these issues also help to protect biodiversity. Many of these initiatives are outlined in Appendix A.

The following section will specifically focus on the tools currently employed by the City of Edmonton to protect local natural areas, and by extension, biodiversity. It should be noted that there are specific challenges associated with the application of each of these tools. These challenges are addressed later in this report, in Edmonton's Conservation Challenges section.

### A. Natural Systems Planning and Management Tools

#### Plan Edmonton

Plan Edmonton is the City's highest-level statutory plan, and guides Edmonton's physical, social and economic development. It was the first City plan to explicitly support the ecological network approach, although it did not use that terminology. A recent amendment strengthened its guidance for biodiversity protection in the city.

A new municipal development plan, Focus Edmonton, is currently being drafted to replace Plan Edmonton. This plan will integrate the direction provided by the new Natural Connections Strategic Plan and Natural Area Systems Policy (C-531), described in detail on the following page.

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### Environmental Strategic Plan and Environmental Policy

The City's foremost environmental planning document is the Environmental Strategic Plan (ESP), which includes ten strategies related to environmental conservation and management:

1. Clean Air
2. Climate Protection
3. Environmental Emergency Response
4. Natural Area Systems
5. Resource Conservation
6. Solid Waste Management
7. Sustainable Business Development
8. Sustainable Urban Planning and Development
9. Toxics Reduction
10. Water

The ESP's Natural Area Systems Strategy includes guidance on natural areas planning and acquisition, biodiversity protection, the formation of partnerships for conservation, and outreach and communication. The newly developed Natural Connections Strategic Plan supports the general direction provided by the ESP.

The City also has an Environmental Policy in place, which states in part that "the City of Edmonton will take a leadership role in protecting natural heritage and biodiversity within the municipality and region."

### Natural Area Systems Policy

Edmonton's Natural Area Systems Policy (see next page) requires developers to provide the City with ecological information in conjunction with development proposals and strategies. This information may include but is not limited to an identification and description of affected natural areas, an ecological network assessment, an inventory of biodiversity, a description of the proposed development and associated facilities and services, a description of the potential

impacts of the proposed development on the affected natural areas, and ecological design guidelines to be used by the planners of new neighbourhoods.

Developers are currently required to submit Natural Site Assessments (biophysical assessments) for any natural areas that fall within the plan area, and natural area management plans for any natural areas the City is able to protect. Circulation and comment on these documents often involves inter-departmental discussions and meetings. The Office of Natural Areas is currently revising the required natural area information requirements so that they better reflect the new ecological network approach articulated in the Natural Area Systems Policy.

Further ecological information comes from a new planning tool called an Ecological Design Report. The purpose of this type of report is to ensure that ecological design principles are integrated into the early stages of the design of a neighbourhood, in order to protect biodiversity and reduce the neighbourhood's ecological impact.

This design approach is often inter-disciplinary in nature, and may include topics such as innovative storm water management techniques, wildlife passages, building and roadway placement for conservation and connectivity of natural features, and opportunities for long term public education. The reports are written by the developer on a voluntary basis.

### Natural Connections Strategic Plan

The Natural Connections strategic plan links with the Natural Areas System Policy by articulating the principles, strategies and goals that guide the City in its conservation of an ecologically functional network of natural areas. Specifically, Natural Connections introduces the ecological network concept to the City's planning system and addresses the conservation of natural areas and linkages on both public and private land.

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### CITY OF EDMONTON NATURAL AREA SYSTEMS POLICY

#### Policy Statement:

Since Edmonton was settled more than 100 years ago, the natural environment has supported us and shaped our collective identity. Edmontonians are proud of the city's natural heritage. To safeguard our natural capital and the associated ecological services, the City of Edmonton is committed to conserving, protecting, and restoring our natural uplands, wetlands, water bodies, and riparian areas, as an integrated and connected system of natural areas throughout the city. Natural area systems provide essential habitat for plants and animals, support biodiversity, and maintain a high quality of life for current and future citizens by supplying critical ecological services, as well as opportunities for education, research, appreciative forms of recreation, and aesthetic and spiritual inspiration.

The City of Edmonton will balance ecological and environmental considerations with economic and social considerations in its decision making and demonstrate that it has done so.

The City of Edmonton recognizes that it can accomplish the work that is required to achieve conservation more efficiently and effectively by supporting and developing partnerships to achieve effective conservation results. Therefore, the City will lead by example – engaging the public in natural area issues, and encouraging businesses, residents, and the community to secure new natural area systems and steward what we have effectively.

The purpose of this policy is to:

- Enhance and sustain the quality of life for Edmontonians;
- Conserve, protect, and restore biodiversity throughout Edmonton recognizing the urban context that we work within;
- Ensure consistent, uniform and equitable conservation practices that are based on the best available science;
- Direct Administration to:
  - plan our city so that our ecological systems will function effectively at neighbourhood, city and regional scales,
  - conserve natural area systems in discharging their duties, and
  - require ecological information to support planning and development applications;
- Conserve, protect, and restore natural area systems through the physical planning and development process; according to the provisions of municipal, provincial and federal policy and legislation;
- Encourage voluntary conservation and corporate and private sponsorship of natural sites;
- Promote the awareness and participation of landowners, the general public and non-government organizations in conserving, preserving, and restoring natural sites; and
- Incorporate the local ecological knowledge of Edmonton's citizens and organizations into our decisions.



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At its heart lie seven strategic directions that will inform future planning decisions, management practices, and citizen engagement:

1. Expand Edmonton's ecological network through securement and restoration.
2. Increase the City's capacity for conservation planning.
3. Increase capacity for the management of natural areas.
4. Build a well-connected network of conservation partners.
5. Support a system of shared conservation education.
6. Enhance Edmonton's culture of innovation and excellence.
7. Increase the accessibility and integration of information.

Natural Connections also supports the River Valley Area Redevelopment Plan and Ribbon of Green Concept Plan, which address the protection of the North Saskatchewan River Valley and Ravine System as part of Edmonton's natural areas network, and establish the principles for future implementation plans and programs for parks development.

### Dedication of Municipal and Environmental Reserve

An important tool for biodiversity protection is the designation of Environmental and Municipal Reserve, a power granted to Alberta municipalities through the provincial Municipal Government Act (MGA). Upon subdivision, the owner of a parcel of land must provide to the City, without compensation, Municipal Reserve lands (MR) equal to 10 % of the total developable land area to be used as public park, public recreation area, schools or to separate lands used for other purposes. While 10% of the developable land area can be taken as MR, the City's Urban Parks Management Plan dictates that for the protection of natural areas smaller than two hectares, MR can be used to a maximum of 2% of that 10%.

Environmental Reserve can also be taken at this time, and includes gullies, swamps, ravines, coulees or natural drainage courses; unstable lands or lands subject to flooding; or narrow buffers for the purpose of pollution prevention or public access. Neither of these reserve designations is specifically intended for conservation purposes, although the City has successfully used them to protect lands within the river valley, ravines, and wetlands in the tablelands.

### B. Parks Planning and Management Tools

#### North Saskatchewan River Valley Area Redevelopment Plan (ARP)

The purpose of the River Valley ARP is to protect the North Saskatchewan River Valley and Ravine System as part of Edmonton's natural heritage and to establish the principles for future implementation plans and programs for parks development. Under the River Valley ARP, an environmental impact screening and assessment is required for all proposed public development and development on public land within the North Saskatchewan River Valley and Ravine System.

#### Ribbon of Green Concept Plan and Master Plan

The Ribbon of Green Concept Plan presents "a collective public vision for the river valley" and establishes the framework for the Master Plan. The Master Plan establishes policy guidelines for the "long-term development, use and care of the entire valley".



Edmonton's river valley, North America's largest municipally owned urban park, first received protection in 1915. Strategic conservation of tableland natural areas began in the 1990s, largely due to development pressure on the urban fringe.

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The plan also identifies preservation, conservation and extensive use management zones within the river valley. Preservation management zones are dedicated to the conservation of “natural resources”, and disturbance and management activity are kept to a minimum in order to leave native vegetation and wildlife habitat intact. Conservation management zones permit some human disturbance and more active management, including trail maintenance and passive recreation, with the primary focus still being the protection of native vegetation and wildlife habitat. Extensive use zones permit substantial facility development and high accessibility to people, including major parks and facilities. Daily maintenance and full safety and security services are provided, and active recreation is encouraged.

### Urban Parks Management Plan

The Urban Parks Management Plan (UPMP) outlines the City’s strategic direction for acquiring, maintaining, and preserving Edmonton’s parks, including those that contain natural areas. The plan identifies principles,

action steps, and site development/operational guidelines for Edmonton’s parks. The UPMP’s Parkland Classification includes natural areas as a specific type of park, and lists guidelines for their acquisition and maintenance; describes requirements regarding buffers, location, access, and configuration; and lists acceptable types of development such as trails, signage, and park furniture. Linked with the UPMP is a wildlife management strategy, which is currently under development.

### Natural Area Management Plans

Natural Area Management Plans are developed for natural areas in Edmonton that are to be conserved. These plans provide a baseline description of the natural area, in addition to site-specific management goals, objectives and strategies. They also identify roles and responsibilities for biodiversity management before, during and after development, including the protection of water resources, habitat quality, wildlife, vegetation, and naturally and culturally significant features.

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### C. Other Planning and Management Tools

#### Area Structure Plans and Neighbourhood Structure Plans

Area Structure Plans (ASPs) lay out an area's long-term development plan for a group of neighbourhoods. They generally apply to new developing suburban areas, and identify where residential, commercial, institutional and recreational development will be located, and how essential municipal services such as water, sewer systems, arterial and collector roads, schools, parks and fire protection will be provided.

Neighbourhood Structure Plans (NSPs) are detailed sub-plans within an Area Structure Plan (ASP). The NSP specifies in greater detail the general pattern for subdivisions by designating land uses by type, size, and location, the transportation network (including local roads), location and size of neighbourhood facilities and staging of development.

Terms of Reference for ASPs and NSPs provide developers and land owners with a detailed listing of submission requirements for both ASPs and NSPs. Both sets of Terms of Reference were recently updated to include – among other additions – more comprehensive ecological information. Along with maps showing “grey infrastructure” networks, including sewer and road networks, an ecological network map is now required, so that this “green infrastructure” can be considered alongside other demands.

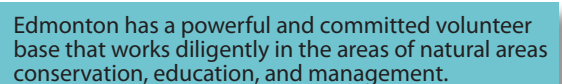
#### Top of Bank Policy

Since 1985, the City of Edmonton has had a citywide policy governing development within a narrow strip of upland along the crest of the city's river valley and ravines. According to the policy, the City has used top-of-the-bank roadways, public walkways and development setbacks to separate urban development from the “top of bank”.

Certain aspects of this policy were not workable, so the City is adopting a new approach that will, among other things, include such considerations as development impact, risk management, accessibility and environmental management. Perhaps most relevant to the protection of biodiversity, the new policy will also likely take into account the movement of wildlife along the top of the bank of the river valley through the establishment of appropriate setbacks. The revised policy will be enforced by the City of Edmonton's Development Compliance branch.

#### A Plan of Action for the Capital Region River Valley Park

The River Valley Alliance (RVA) represents seven municipalities in the Alberta Capital Region North Saskatchewan River Valley. The RVA's goal is “to preserve, protect and enhance the river valley, to create one of the largest river valley parks in the world, and to create a legacy for generations to come.” The proposed park will stretch across 88 kilometres and will cover in excess of 18,000 acres. To achieve this vision, the RVA developed A Plan of Action for the Capital Region River Valley Park, which was endorsed by City Council in 2007, and provides a joint vision of protection and enhancement of the river valley. The plan includes trail alignments, location of walkways and pedestrian bridges, new park areas and other amenities to maximize the preservation of the natural features of the valley and to protect areas of environmental sensitivity.



Edmonton has a powerful and committed volunteer base that works diligently in the areas of natural areas conservation, education, and management.



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### D. Land Purchase

Land purchase can be a valuable tool and is sometimes the only method available to protect natural areas from development, and to maintain a functional ecological network. The City of Edmonton has two funds dedicated to the purchase of natural areas. The Natural Areas Reserve Fund can be used to purchase natural areas in Edmonton's tablelands, and the Parkland Purchase Reserve Fund can be used to purchase land in the river valley and ravines system. While purchase is the preferred means of protecting natural areas, as it ensures that they are secured in the long-term, this approach is often challenging. The value of land in Edmonton is rising steadily, and the pressure to develop land is very strong. Those citizens who own lands that contain natural areas are often reluctant to sell them for the purpose of protection, being aware of the potential revenue from development, which can serve as important retirement income and insurance for farmers, in particular.

### E. Public Donations

#### Incentive Programs

In cases where natural areas are privately-held, not subject to subdivision, and the City cannot afford to purchase them, there is one option that remains: encouraging the landowner to dedicate the land to conservation, either as a donation or conservation easement. Two main incentive programs promote land donation. Both Environment Canada's EcoGifts program and the City of Edmonton's Ecological Conservation Assistance Program (ECAP) provide incentives to landowners who establish a conservation easement or make a donation of their natural areas. Refer to Appendix A for more information on ECAP.

#### Edmonton and Area Land Trust

The City of Edmonton is one of six partners in a new Edmonton and Area Land Trust (EALT). The other partners are the Edmonton

Community Foundation, the Edmonton Nature Club, the Urban Development Institute, the Land Stewardship Centre of Canada, and the Legacy Lands Stewardship Society. The EALT is a not-for-profit charitable conservation agency that was established by the City of Edmonton in 2006, through organizational support and funding of \$3 million. It uses a range of tools to protect natural areas, including donations of land and money, land purchase, and the use of conservation easement agreements.

Conservation easements, which result from the voluntary dedication of private land to a qualified land trust agency or organization such as the EALT, play an extremely important role in the conservation of urban natural areas.

### F. Monitoring and Reporting

The City has a comprehensive environmental management system in place, called Enviro. This management system is based on the international standard ISO 14001 and provides the City with a systematic method of managing and improving its environmental performance. Achieving and maintaining ISO 14001 registration demonstrates that the City is doing everything possible to effectively fulfill its environmental responsibilities.

Within the Enviro management framework, the City has a number of monitoring activities underway. The Office of Natural Areas currently monitors and formally reports the following indicators:

- Total area and number of natural areas (private and public lands)
- Total area and number of natural areas protected on the tablelands.

These numbers are currently reported to City Council and Edmontonians through both Enviro and the Civic and Corporate Wellness Measures reporting process. In addition, through the implementation of the Natural Connections Strategic Plan, the City is now working towards reporting

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on a range of other ecological indicators, including monitoring on the success of the following desired outcomes:

- Maximize protection and restoration of natural areas: number/percent of natural areas protected/lost through the development planning process, number/percent of natural areas protected in each of eight identified strategic planning areas, number/percent of core and stepping stone natural areas protected, area of land restored to a natural state
- Increasing connectivity within the network: nearest neighbour index, other measurements of structural and functional connectivity
- Increasing quality of natural areas due to effective management: percent of natural areas under effective management, level of biodiversity (based on annual species counts) at individual natural areas
- Increasing community knowledge and active stewardship: number of Edmontonians actively involved in stewardship, level of community awareness (as measured in annual surveys)
- Increasing achievement of conservation through partnerships: number of new partnerships dedicated to conservation

While formal programs have not yet been established for each of these monitoring activities, the City will be working to capture this information as the implementation plan for Natural Connections is completed and initiated.

In addition to the City's monitoring programs, both the federal and provincial governments track population numbers of local at-risk plant and animal species. Additionally, a number of non-profit and educational organizations conduct monitoring programs for a range of local species.

COMMUNITY VOLUNTEERS PLAY AN IMPORTANT ROLE IN THE NATURALIZATION OF EDMONTON'S ROADSIDES.

### V. EDMONTON'S CONSERVATION SUCCESSES

Edmonton has used these tools for biodiversity protection to achieve some important successes, as described in the following case studies and throughout Appendix A. These successes can be attributed to a number of factors:

#### Successful Partnerships and Committed Volunteers

The city's committed volunteer base works diligently in the areas of natural areas conservation, education and management. The City has worked with and depended a great deal upon the active involvement of organizations including (but not limited to):

- The Edmonton Nature Club (education, interpretive walks/talks, support of research, wildlife/plant inventory, etc.)
- The Edmonton Naturalization Group (protection of local native plant species, naturalization/restoration, care of a demonstration native bed, care for some local parks, etc.)
- The Environmental Law Centre (resource centre for environmental and natural resource law)
- The Sierra Club (advocates for more ecologically sensitive neighbourhoods)
- The Wildlife Rehabilitation Society of Edmonton (care for injured, oiled and orphaned birds and small mammals)



## 2. GOVERNANCE

The members of the Natural Areas Advisory Committee play an essential role by providing citizen input into the protection and management of natural areas. Additionally, the City has formed partnerships with several conservation, community-building and development groups in order to create the Edmonton and Area Land Trust.

### High Priority of Environmental Issues

Both Edmonton's City Council and citizens have recognized the importance of proactively addressing environmental issues. The environment is increasingly seen as a priority for Edmontonians, and members of the conservation community have actively lobbied their councillors to bring about change in this area. Council has responded with policy decisions that are increasingly supportive of conservation.

### Integration across City Branches

Edmonton has also seen increasingly better communication and decision-making about natural areas among City of Edmonton branches, including Parks, Drainage, Corporate Properties, Planning and Development, and Transportation. With biodiversity conservation becoming "the norm," much of Edmonton's success in biodiversity protection is due to the fact that environmentally responsible operations have become routine practice for many City departments. Part of this collaborative approach is the shared recognition of the need to move beyond simply acquiring natural areas to maintaining their future ecological viability through the establishment of a functional ecological network. City staff acknowledge the importance of a consistent approach and common mandate for natural areas protection.

### CONSERVATION SUCCESS CASE STUDY #1: WILDLIFE PASSAGES



A NATURALIZED CORRIDOR UNDER A MAJOR HIGHWAY PROVIDES A PASSAGE FOR WILDLIFE AND MAINTAINS ECOLOGICAL CONNECTIVITY. IT FEATURES A VEGETATED UNDERPASS, NATURAL LIGHTING, AND AN INTEGRATED PEDESTRIAN PATHWAY.



Bridges, roadways, and other transportation corridors can pose significant barriers to wildlife movement throughout urban areas. In order to maintain ecological connectivity, new wildlife passages have been constructed in places where transportation corridors cross some of Edmonton's natural areas. During the construction of a major ring road (Anthony Henday Drive), the City worked with the Government of Alberta to ensure that naturalized wildlife passages were created in several locations where the freeway crosses the river valley, as well as several local creeks. To date, these passages have been designed to accommodate the movement of local wildlife, with a focus on medium to large mammals like deer, coyote, and fox, and are therefore likely to enhance the movement of smaller wildlife as well.



## 2. GOVERNANCE

### CONSERVATION SUCCESS CASE STUDY #2: NATURESCAPES PROGRAM



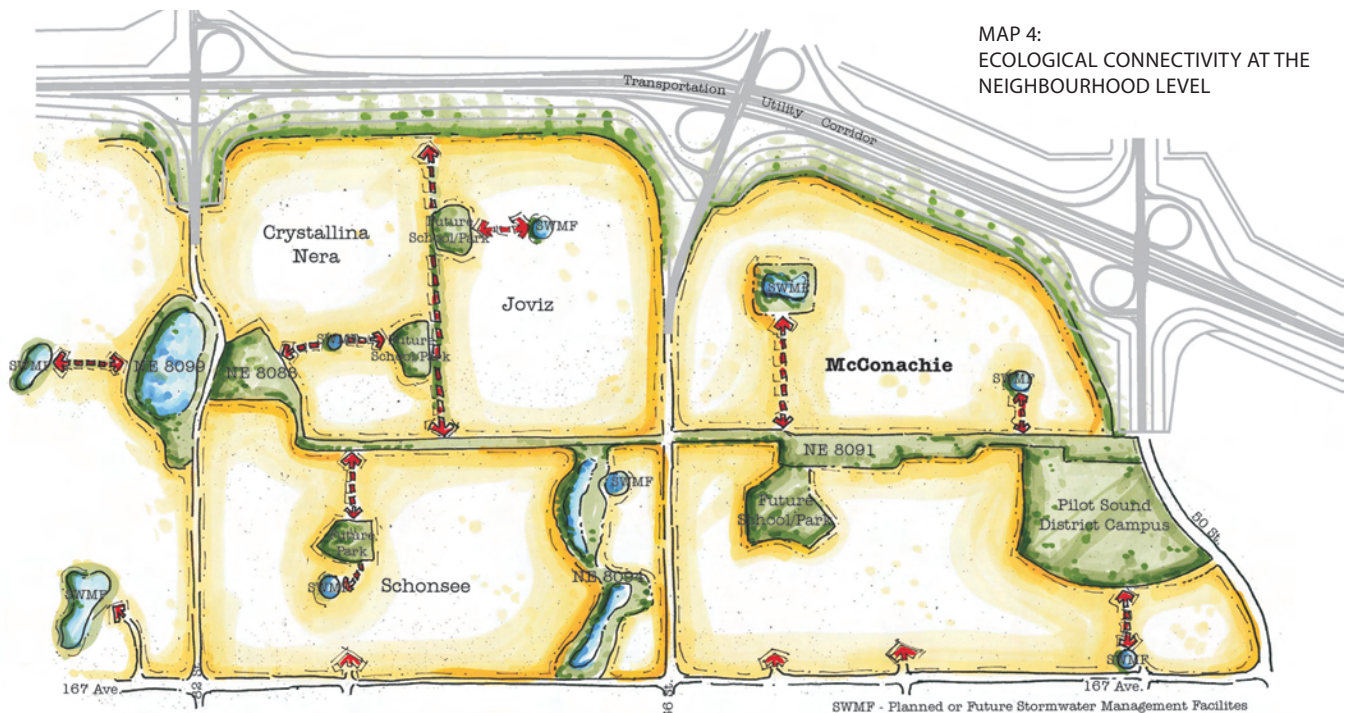
THROUGH THE NATURESCAPES PROGRAM, CHILDREN ARE INVOLVED IN SCHOOLYARD NATURALIZATION.

Edmonton's Naturescapes Program was established to support the naturalization of the city's yards and schoolyards. The intention of the project is to provide habitat for a diversity of animal and plant species through the planting of native and ornamental plants, in order to sustain a healthy environment. Projects arise for a variety of reasons, and may involve the conservation of woodland habitat, the planting of flower or vegetable gardens, or designing and constructing habitats for many kinds of animals and plants in outdoor classrooms. The program is administered by the City's Parks branch and Community Services department, and supported by a number of conservation and community groups.

83,000 people are expected to move to Edmonton by 2010, making it imperative that natural areas and biodiversity are protected as the city expands.

### CONSERVATION SUCCESS CASE STUDY #3: LOCAL ECOLOGICAL CONNECTIVITY

Edmonton is working towards achieving ecological connectivity at a range of scales, including at the regional, municipal, and community levels (map 4). To promote connectivity at the local level, conceptual maps have been developed for some new neighbourhoods that identify potential ecological linkages between natural areas, semi-natural parkland, utility rights-of-way and stormwater facilities. The maps are used to focus discussion about natural areas in meetings with planners, developers and



MAP 4:  
ECOLOGICAL CONNECTIVITY AT THE  
NEIGHBOURHOOD LEVEL

## 2. GOVERNANCE

consultants, and help to encourage a larger-scale view of natural areas protection in Edmonton. The use of a conceptual diagram early in the planning process of a new neighbourhood in Northeast Edmonton led to the commitment of City Council, City administration and the developers to create an ecological corridor to link multiple protected natural areas, including a wetland, woodlot, and stormwater management facilities. Neighbourhood-level connectivity supports municipal and regional efforts to conserve Edmonton's natural systems.

### CONSERVATION SUCCESS CASE STUDY #4: BIG LAKE NEIGHBOURHOOD: REGIONAL PARTNERSHIPS AND ECOLOGICAL DESIGN

Edmonton has also seen considerable success in protecting biodiversity by partnering with community groups and adjacent municipalities. Several partner projects and programs extending beyond City of Edmonton's boundaries have enabled effective protection of regional natural systems, such as the recent partnership to protect Big Lake, a regionally significant bird area and the site of a new neighbourhood development. The City partnered with the Province and adjacent municipalities that also border the large lake to see the creation of Lois Hole Centennial Provincial Park, the first provincial park created in many years, and resulted in the protection of a provincially significant biodiversity hot spot.

Such regional partnerships have been successful for several reasons. They enable individual groups to be more effective biodiversity stewards by pooling resources and expertise. They also facilitate the protection of natural systems according to ecological, rather than political, boundaries. The approach makes for flexible, comprehensive and collaborative management solutions.

To ensure that ecological design principles are applied during the development of the Big Lake Neighbourhood, the City requested that the developer submit an ecological design report.



BIG LAKE IS A PROVINCIALY SIGNIFICANT BIODIVERSITY HOTSPOT.

This report identified the environmental design elements that should be incorporated into the neighbourhood to minimize ecological impacts associated with development. Some of the design recommendations included innovative stormwater management techniques (bioswales, naturalized stormwater management facilities), reverse housing (a concept in which houses front onto shared green spaces, with lane access to the rear of the house), wildlife corridors, wildlife friendly lighting, and public education. The report quantified the benefits associated with the proposed design elements, and enabled the identification of alternative development approaches. The end result was a highly successful planning process, and a neighbourhood plan that was supported by a majority of stakeholders, and approved unanimously by City Council.



## 2. GOVERNANCE

### VI. EDMONTON'S CONSERVATION CHALLENGES

Despite Edmonton's successes, there remain important challenges that threaten the City's remaining biodiversity and natural areas.

#### 1. Restricted legislative authority

As discussed previously, the Municipal Government Act provides limited authority to Albertan municipalities to protect natural areas. Municipalities can dedicate 10% of the net developable area as Municipal Reserve for municipal purposes such as schools, playing fields and other parks. Edmonton can dedicate up to 2% of this land for natural areas when new neighbourhoods are being planned. Cities can also dedicate lands as Environmental Reserve in the subdivision process to protect hazard lands such steep slopes, flood plains and some wetlands. Beyond these limited tools, Albertan municipalities are quite restricted in their ability to protect ecologically significant land. For example, the City cannot compel a landowner to protect a forest if it is on private land.

The City has taken action to improve this situation by working with the Alberta Urban Municipalities Association (AUMA), a body that represents Alberta's 247 urban municipalities. In 2007, the City proposed a resolution that the AUMA request that the Government of Alberta amend the Municipal Government Act (MGA) to give municipalities broader authority to protect natural areas within municipal boundaries. For instance, such authority might include expanding the definition of Environmental Reserve in the MGA to include natural systems. The resolution was passed by large majority of AUMA members, and the Government of Alberta is considering its response.

#### 2. Land development pressure and associated increase in land value

Alberta's booming economy has presented many challenges to conservation in Edmonton. The city's population has increased steadily since the 1990s, and another 83,000 new residents are expected to arrive by 2010. A total of 400,000 are anticipated to move to the region in the next 25

years. This huge population influx has resulted in rapid urban development in the last two decades, with a preference for sprawling residential development and transportation infrastructure.

While clear foresight saw the river valley and ravines protected in the early part of the last century, the protection of smaller natural areas in Edmonton's tablelands has been a greater challenge in the face of competing pressures for land by private interests. Land development has led to the fragmentation and loss of many of the wetlands and forested stands in Edmonton's tablelands for the reasons outlined above.

#### 3. Limited municipal funds

The rate of growth in the Edmonton area has resulted in a rapid increase in the value of land. This has made it increasingly expensive for the City to purchase natural areas for the purpose of protection and doubly important that land be purchased rapidly, before the cost becomes even more prohibitive. As well, landowners who are aware of the continued increase in land value are unwilling to sell land at all. While the City does have the option of expropriating land for purposes that benefit the general public, this can be a risky and costly endeavour and is not an option that the City has exercised for acquisition of natural areas.

The challenge described above is further compounded by the recent trend of the provincial and federal governments downloading services to municipalities, leaving municipalities responsible for more than they were a couple of decades ago, with no commensurate increase in their revenue-raising abilities. Alberta municipalities' revenue-raising tools are limited to the property tax, a regressive form of taxation (meaning that revenues do not increase along with economic growth). Municipalities receive only 6% of every tax dollar, with the balance going to the provincial and federal levels of government.

This trend has resulted in a general shortage of municipal funds to undertake many required projects such as infrastructure renewal and



## 2. GOVERNANCE

expansion of rapid transit. Although natural areas provide important ecological goods and services, there is not yet a consensus understanding among municipal staff or the general public of the economic and ecological value of these services. As a result, it can be a political challenge to dedicate the requisite large sums of money to the purchase of natural areas when faced with other equally pressing challenges.

#### 4. Limited regional collaboration to protect natural systems

A further challenge Edmonton has faced is the absence of regional governance to bring a common vision to its regional partners, namely adjacent municipalities. While Alberta did have structured regional oversight of its growth for a time, the province's Regional Planning Boards were abolished in 1995 in an effort to reduce provincial deficits and debt. As a result, the last decade saw a decline in regional collaboration and formal coordination of planning efforts, including conservation planning.

Nonetheless, some community efforts have been hugely successful at conserving biodiversity across political boundaries. The Beaver Hills Initiative, a coordinated effort by a regional multi-stakeholder group to protect the Beaver Hills/Cooking Lake Moraine and surrounding areas to the east of the City is an excellent example. Also, the Big Lake Management Committee comprised of the Province, Edmonton, St. Albert, Sturgeon County, and Parkland County surrounding Big Lake was initiated by the Province to focus on the protection of Big Lake. This association resulted in the protection of Big Lake as Lois Hole Centennial Provincial Park.

These successes cannot fully replace formal regional planning governance between municipalities. In 2007, the Alberta Government began to address this issue by mandating the 25 municipalities in the Edmonton area to develop a regional plan. While this plan will not include information about conservation, it could provide the structure for future conservation planning

on a regional scale. As urban areas continue to expand in Edmonton's "boom economy", natural areas must be understood and planned for as connected systems that are not limited or divided by political boundaries. Regional conservation planning will play a crucial role in approaching the management of our natural systems holistically, proactively and collaboratively.

#### 5. Limited public awareness of the value of natural systems

Edmonton has a strong and active conservation community, as well as an academic community that is highly skilled and dedicated to understanding and protecting our local ecosystems. However, in spite of the awareness and commitment of many Edmontonians, there is still a limited understanding amongst a large portion of the Edmonton population about the true value of Edmonton's natural systems.

There is often an overestimation among the general public of the amount of natural area that is protected in Edmonton. The city's river valley and ravine system appears to be a large swath of protected area running through Edmonton's core; in fact, many segments of this system are privately owned and therefore outside the City's jurisdiction, although receiving limited protection by appropriate zoning in some cases. The same may be said for many of the natural areas scattered over the City's tablelands, where natural areas are often privately-owned and already slated for development according to statutory plans.

Clearly the City has an important role to play in raising general awareness among Edmontonians of the value of natural areas. This will include providing more opportunities for public involvement in the active stewardship of natural areas, as well as improved education and involvement of Edmonton's youth and children. In an increasingly urbanized environment, there remains an important opportunity for learning. Only with widespread awareness and shared commitment to conservation will there be the political will to find solutions in spite of the challenges the city faces.

## 2. GOVERNANCE

### VII. INTEGRATION OF BIODIVERSITY MANAGEMENT INTO CITY GOVERNANCE

To address some of the challenges described previously, the City of Edmonton is increasingly working to integrate biodiversity management into the day-to-day business of City governance, through a range of strategies discussed in earlier sections such as:

- Cross-department committees: (e.g. Natural Areas Policy Implementation Committee)
- New policy: (e.g. Natural Area Systems Policy)
- New city plans: (e.g. Focus Edmonton)
- Integrating environmental initiatives City-wide: (e.g. EcoVision Edmonton)
- Implementing new standards (e.g. Envisio Environmental Management Systems)
- Developing new administrative approaches (e.g. Ecological Design Reporting, Wildlife Passage Guidelines)

Together, these and other integration efforts have resulted in some important lessons:

**First**, biodiversity governance must be integrated at a strategic, corporate-wide level, with each department considering biodiversity in its decision-making, as early in the process as possible. Biodiversity planning and management occurring from a “satellite” office, apart from the planning process, or as an afterthought to more conventional planning approaches, has proven to be much less successful in Edmonton. Such an after-the-fact approach inevitably results in a fragmented ecological network, loss of important habitat, and degradation of biodiversity.

**Second**, strong policy and clear administrative direction, including well-defined roles and responsibilities for the various aspects of conservation planning and management, are equally critical. Without a conservation process that is understood by all, crucial biodiversity management activities can be overlooked or under-funded. In addition, open communication on both management and staff levels is critical.

**Third**, trans-department or trans-disciplinary working groups have also proven effective in bringing all interests to the table. One issue that Edmonton has had to overcome is the split between planning and management functions within the City. Until recently, planners were making decisions about natural areas that operations/management staff were unable to follow through on due to lack of resources or expertise. Bringing operational staff representation to the table has helped to resolve that disconnect and has resulted in better outcomes.

**Fourth**, inviting public input and participation strengthens City efforts to integrate biodiversity management into its daily operations and decision making. To date, citizens have offered valued input on Edmonton’s policies and plans to conserve biodiversity, and they inspire City staff to continually look for new, innovative ways to integrate biodiversity protection across City branches.

In short, Edmonton has learned that if biodiversity protection is to be successful, it must be viewed not as a discrete activity, but one that permeates every aspect of urban planning and management. It is dependent upon integrated drainage, parks planning and transportation decisions. If biodiversity protection is dealt with in a vacuum or in silos, or if these other activities are planned and managed without consideration for biodiversity, we will continue to degrade and lose our natural systems and the ecological processes they support.





## 2. GOVERNANCE

### VIII. PUBLIC PARTICIPATION AND INVOLVEMENT

One of the most significant lessons that the City of Edmonton has come to understand is the value of engaging the public in biodiversity protection and management. With public support and awareness of biodiversity issues, the City can most effectively move forward in its efforts to conserve Edmonton's remaining natural systems. Public participation and involvement as regards conservation in Edmonton occurs in a number of important ways:

#### Local Ecological Knowledge

Engaging Edmonton's citizens in the protection of biodiversity has proven to be extremely valuable and important. Their contribution is not only necessary to ensure that plans and policies are publicly supported, but citizens often provide important insight and history on biodiversity issues that might otherwise have been overlooked by the City. In some cases, citizens know Edmonton's natural areas more intimately than some City staff, having lived in Edmonton for decades and watched the urban landscape transform over their lifetimes. This "local ecological knowledge" is invaluable, and the City of Edmonton is looking at new ways it can be incorporated into decision-making.

#### Public Consultation

Public involvement processes associated with City plans and policy also offer an opportunity for community members to become involved in biodiversity decision-making. The Office of Natural Areas carried out an extensive public engagement process as part of the development of the Natural Connections strategic plan, including 1500 participants who attended a series of open houses, facilitated workshops, community mapping, and online surveys. Planning and Development carried out a similar process associated with the development of a new Municipal Development Plan for Edmonton, which will set strategic conservation direction for City management and staff.

In 2006, Council approved a policy requiring Public Involvement Plans for all major City projects and plans (Policy C513). An accompanying handbook, "Involving Edmonton," provides further guidance for City staff in the creation of public involvement plans.





## 2. GOVERNANCE

### Natural Areas Advisory Committee

The Edmonton public has ongoing representation in City biodiversity decision-making by a Natural Areas Advisory Committee (NAAC), which includes seven citizens-at-large, plus representatives of the University of Alberta, the local Urban Development Institute, the provincial government and local environmental non-government organizations. NAAC is a committee of Administration, and meets monthly to advise City staff on a range of natural area issues. The focus of this group is at the policy level, and they do not become involved with issues around individual development projects. The Committee was instrumental, for example, in the initiation and development of the Natural Connections strategic plan, and in the formation of the Edmonton and Area Land Trust. This committee model has proven to be very successful and of great support to City staff.

### Environmental Advisory Committee

A similar model to NAAC, Edmonton's Environmental Advisory Committee was established in 1996 to provide a vehicle for the flow of strategic advice and expertise between the community and the City of Edmonton. Thirteen members of the public, including representatives from provincial and federal government agencies and academic institutions, meet regularly to support the implementation of the Environmental Strategic Plan, and to provide a public perspective on how particular environmental issues impact the community. The committee primarily focuses on the 10 environmental topics that form the Environmental Strategic Plan, including some that are directly related to biodiversity conservation (i.e. Natural Areas Systems) and others that have an indirect link (i.e. Clean Air, Solid Waste Management, Toxics Reduction).

### Public Involvement in the Local Governance Process

The public is also given the opportunity to participate in biodiversity decision-making through the public hearing process with Council and its

committees. As applications for neighbourhoods, plans, new policies, and initiatives are considered by Council, any member of the public can attend public hearings and make their opinions known to City Council. They may also call City planners, City Councillors or Office of Natural Areas staff directly to voice their opinions. The Office of Natural Areas has information on the City's website that is regularly updated with progress reports on key projects. The site includes contact information for the Office and invites comments and questions.

### Accessing Edmonton's Natural Areas

There are many opportunities for Edmontonians to enjoy the City's natural areas and local biodiversity. The river valley can be accessed from a large number of Edmonton's neighbourhoods. It includes an extensive, well-maintained trail network, use of which is free. Many local festivals also take place on some of the flats within the river valley, giving Edmontonians an additional opportunity for community-building in a natural setting. The vast majority of Edmonton's neighbourhoods include maintained neighbourhood parks. Many of these spaces are more manicured and less wild, but they do provide some measure of exposure to biodiversity and are host to some native plant and wildlife species. Edmonton also has a wide range of programs and initiatives that work to raise biodiversity awareness among Edmontonians, which are highlighted in Appendix A.



## 2. GOVERNANCE



### CONCLUSION

Edmonton is proud of its natural heritage, and is committed to protecting the city's biodiversity into the future. Many Edmontonians have worked over the decades to conserve local natural areas, and have left an important natural legacy. In more recent years, the City has taken important steps to set strategic goals for the protection of its ecological network, integrate biodiversity protection across City departments, and engage citizens in decision making about local natural areas. It has also begun to work more with neighbouring municipalities to protect biodiversity on a regional scale. While factors such as habitat destruction, fragmentation and degradation, species extinction, invasive species and global climate change threaten Edmonton's biodiversity, the City has plans, programs and projects in place to address these threats.

As an Albertan municipality, the City faces jurisdictional limitations in the protection of its natural areas, and a number of socio-economic pressures make the conservation of Edmonton's biodiversity especially challenging. These growth pressures include rising land values, a strong push to develop outlying areas for residential, commercial and industrial uses, and a large sector of the population that does not immediately recognize the value of natural areas and the processes they support. However, persistence, creativity and the forging of community partnerships have resulted in innovative conservation solutions, and biodiversity protection is gradually becoming a shared priority for many Edmontonians.

Edmonton has learned important lessons about the successful integration of biodiversity management into city governance, and internal and external communication on biodiversity issues has greatly improved in recent years. The establishment of the Office of Natural Areas to coordinate strategic conservation planning in Edmonton, the creation of management-level and public committees to formalize communication about biodiversity protection, and the shift in focus from site by site protection of discrete natural areas to the proactive conservation of natural systems have been the result of these lessons learned.

Edmontonians value nature and the natural habitats of their city. The majority of citizens recreate in the City's parks and river valley and ravines, and a smaller but highly dedicated portion of the community is actively involved in biodiversity protection and management. Edmontonians recognize the incredible value the city's natural systems hold – for the wildlife and ecological processes they support, for the health and quality of life they offer, and for the opportunity to find peace and quiet in a busy urban community.

# 3. GLOSSARY

## GLOSSARY AND ACRONYMS

Biodiversity:	The variability among living organisms - within species, between species, and in ecosystems.
Connectivity:	The degree to which a landscape facilitates or impedes movement among resource patches. It may be provided by corridors, stepping stones and/or compatible adjacent land uses.
Corridor:	A linear vegetated patch that enhances movement along other habitat patches such as core areas or natural stepping stones.
Core Area:	A habitat patch of suitable size and quality so as to provide environmental conditions that support entire populations of animals and plants and associated ecological functions.
Ecological Network:	A coherent system of natural and/or semi-natural landscape elements that is configured and managed with the objective of maintaining or restoring ecological functions as a means to conserve biodiversity.
Ecological Planning Area:	Strategic conservation planning areas, each including at least one biodiversity core area and several natural ecological linkages.
ER (Environmental Reserve):	A land designation granted to the City of Edmonton through the Municipal Government Act. The Environmental Reserve designation may apply to gullies, swamps, ravines, coulees or natural drainage courses; unstable lands or lands subject to flooding; or narrow buffers for the purpose of pollution prevention or public access.
Extirpation:	The local extinction of native plant and animal species.
Linkage:	An arrangement of vegetated patches that enhances connectivity between core areas.
Matrix:	All of the land not considered to be part of core areas or linkages.
MR (Municipal Reserve):	A land designation granted to the City of Edmonton through the Municipal Government Act. Upon subdivision, the owner of a parcel of land must provide to the City, without compensation, Municipal Reserve lands (equal to 10 percent of the total developable land area) to be used as public park, public recreation area, schools or to separate lands used for other purposes.
Natural Area:	An area of land or water that is dominated by native vegetation in naturally occurring patterns. Such areas could include grasslands, forests, wetlands, peatlands or riparian areas. Areas such as groomed parks, sports fields and schoolyards are not considered natural areas.
Riverine Habitat:	The riparian zones along the North Saskatchewan River, its tributary creeks and the slopes of both the river valley and ravines.
Stepping Stones:	Non-linear vegetated patches that provide many resources for species but may not be of sufficient size or quality to provide for all habitat requirements or ecological functions. They are usually separated by a less hospitable matrix or linked by corridors.
Tablelands:	All areas upland of the river valley. Natural areas in the tablelands include wetlands, treestands, and grasslands.
Treestand:	A woodlot or forested area consisting primarily of native vegetation.



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## PERSONAL COMMUNICATION

Marg Reine, Edmonton Nature Club

Patsy Cotterill, Edmonton Nature Club

Markus Thormann, Alberta Mycological Society

Greg Pohl, Alberta Bugsters

Robin Leech, Alberta Bugsters

Scott Digweed, Alberta Bugsters

## INTERNET RESOURCES

Alberta Sustainable Resource Development: Species at Risk  
[www.srd.gov.ab.ca/fishwildlife/speciesatrisk/default.aspx](http://www.srd.gov.ab.ca/fishwildlife/speciesatrisk/default.aspx)

Canadian Biodiversity Website (McGill University)  
<http://canadianbiodiversity.mcgill.ca/english/>

Commission for Environmental Cooperation  
[www.cec.org/](http://www.cec.org/)

Ducks Unlimited  
[www.ducks.ca](http://www.ducks.ca)

Ecology and Society  
[www.ecologyandsociety.org](http://www.ecologyandsociety.org)

Government of Canada Publications: Canada's Infrastructure Debt – Addressing the Infrastructure Shortfall.  
<http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/PRB-e/PRB0353-e.pdf>

National Centre for Biotechnology Information  
[www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)

Parks Canada (Government of Canada)  
[www.pc.gc.ca/apprendre-learn/prof](http://www.pc.gc.ca/apprendre-learn/prof)

University of Alberta E.H. Strickland Entomological Museum  
[www.entomology.ualberta.ca](http://www.entomology.ualberta.ca)

# 5. APPENDICES

## APPENDIX A: EDMONTON'S BIODIVERSITY PROGRAMS AND INITIATIVES

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# 5. APPENDICES

## INTRODUCTION

**T**his inventory highlights the initiatives currently underway in Edmonton that support the city's biodiversity. Although it is not an exhaustive list, the inventory profiles many of the initiatives that are being undertaken by both the City of Edmonton as well as community members. In many cases, the initiatives involve a partnership of multiple groups and organizations.

**T**he inventory is divided into three parts according to Edmonton's strategic goals for natural areas protection: *Securement* of a functioning ecological network, *Management* of our ecological network, and *Engagement* of Edmontonians in the conservation of the network. Information within the inventory is deliberately brief, and further information can be obtained through the listed links.

**A** review of the inventory leads to several important conclusions. First, the inventory indicates that while Edmonton's conservation goals were formalized only recently, they are supported by a great many existing initiatives. Furthermore, much of the good work being done in Edmonton is initiated or supported by a dedicated conservation community. However, in spite of the many good plans, policies and programs in place, Edmonton continues to lose natural areas at an alarming rate. Ideally, the listed initiatives will provide a good base for future work that must go even further in the protection of Edmonton's natural areas and biodiversity.

Please note that when available, a website address has been provided for further information. Edmonton's Office of Natural Areas can also be contacted for more information at: [naturalareas@edmonton.ca](mailto:naturalareas@edmonton.ca)

# 5. APPENDICES

## A. SECURING EDMONTON'S NATURAL SYSTEMS & BIODIVERSITY

### 1. ECOLOGICAL INVENTORY INITIATIVES

#### STATE OF NATURAL AREAS REPORT

Lead: Office of Natural Areas

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Type of project: Inventory of the location and configuration of Edmonton's natural areas.

Project Goals: To provide a solid foundation of natural systems information and analysis with which to improve future decision making. The deliverables from this project are to be used directly in a wide variety of settings, including administration meetings and public events, during subsequent conservation planning components and beyond.

3 main objectives:

Objective 1: Conservation Mapping using Existing Data Sources

Objective 2: Landscape Linkages/Connectivity Analysis

Objective 3: Natural Areas Systems Analysis

Timeframe: January – August 2006

Methods used: Existing datasets developed through earlier inventories (1985, 1993) used to develop a GIS with layers of information about Edmonton's natural areas information; interpretation of air photographs used to determine area of natural areas existing on ground; mapping of results

Roles/Partners: Office of Natural Areas (project coordination); environmental consulting firm (report completion)

More information: [www.edmonton.ca/naturalareas](http://www.edmonton.ca/naturalareas)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Extirpation

#### STATE OF THE NORTH SASKATCHEWAN WATERSHED REPORT, 2005

Lead: North Saskatchewan Watershed Alliance

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Type of project: Review of the health of the North Saskatchewan watershed

Project Goals:

- To complete a comprehensive review of health of the North Saskatchewan watershed
- To provide a foundation for collaborative watershed management

Timeframe: Completed 2005

Methods used: 15 criteria used in assessment of watershed

Roles/Partners: North Saskatchewan Watershed Alliance, Environmental and recreation organizations, First Nations groups, oil and gas companies, agriculture, health authorities, local residents and key government offices.

Additional information: <http://www.nswa.ab.ca/>

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

# 5. APPENDICES

## 2. PLANNING INITIATIVES

### NATURAL CONNECTIONS: INTEGRATED NATURAL AREAS CONSERVATION PLAN

Lead: Office of Natural Areas

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Type of project: Outcome-based plan geared towards integrating planning and protection measures for natural areas within Edmonton boundaries, and ensuring that protection efforts consider natural areas network as a whole.

Project Goals: This Plan reaffirms Edmonton's commitment to the protection of a functional ecological network, and the engagement of the community in achieving the following goals:

1. SECURE a Functioning Ecological Network
2. MANAGE Edmonton's Ecological Network
3. ENGAGE Edmontonians

Timeframe and start/end dates:

- Public consultation process – November 2006
- Plan endorsed by senior managers – June 2007

Methods used:

- State of Natural Areas Report used to identify an ecological network for Edmonton.
- Survey completed of 50 conservation plans from around the world to gain an understanding of what is being done elsewhere.
- Public consultation used to identify public conservation values, natural areas of value to Edmontonians. Over 1500 citizens and representatives of environmental NGOs were involved in the preparation of the plan.

Roles/Partners: The plan was coordinated and written by Office of Natural Areas staff, with input from internal conservation-oriented departments, the public and the Natural Areas Advisory Committee (representing key community stakeholders).

More information: [www.edmonton.ca/naturalareas](http://www.edmonton.ca/naturalareas)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Extirpation



# 5. APPENDICES

## NATURAL AREAS SYSTEMS CONSERVATION POLICY (C-531)

Lead: Office of Natural Areas

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Type of project: City Policy and companion Administrative Directive (to be developed 2007-08).

Project Goals: To consider all natural areas in Edmonton as an integrated network, and ensure that equal consideration is given to ecological, economic, and social issues in decision-making. Requires the development of Natural Site Assessments (biophysical assessment of existing natural features and potential impact of proposed development) for all natural areas associated with proposed development and Natural Area Management Plans (establish management objectives/strategies and roles/responsibilities) for any natural areas the City is able to protect.

Timeframe: Policy approved by City Council in July 2007.

Methods used: New Policy developed internally, supported by all departments and the Natural Areas Advisory Committee, taken to public consultation spring 2007. Over 1500 citizens and representatives of environmental NGOs were involved in the preparation of the plan.

Roles/Partners: Internal departments, Natural Areas Advisory Committee, general public

More information: [www.edmonton.ca/naturalareas](http://www.edmonton.ca/naturalareas)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Extirpation

## PLAN EDMONTON: MUNICIPAL DEVELOPMENT PLAN

Lead: Planning & Development Department

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Type of project: High level strategic planning document that guides all plans, bylaws, and policies in the City of Edmonton. Currently being updated (FocusEdmonton).

Project Goals: The Municipal Development Plan (MDP) ensures that the following priorities are considered in Edmonton's land-use planning and development:

- Preservation and Enhancement of the Natural Environment  
Preserve and enhance the river valley, natural areas and open space within the urban landscape; recognize these areas as critical aspects of successful planned growth of the City; and, link them to the extent possible.
- Protection of the Natural Environment  
Develop an integrated environmental protection strategy in partnership with the Province and neighbouring municipalities designed to improve air and river water quality, promote conservation, and ensure effective preservation and management of the City's green spaces.

The MDP is currently being updated. The new version (called 'Focus Edmonton') will integrate the goals, objectives, and strategies from the Office of Natural Areas' Natural Connections strategic plan.

Timeframe: Ongoing

Methods used: MDP and bylaw development includes internal development/circulation, public involvement, intended to guide planning activity in Edmonton.

# 5. APPENDICES

Roles/Partners: All City departments' plans and policies must conform to the MDP.

More Information: Municipal Development Plan: <http://www.edmonton.ca>

Focus Edmonton: <http://www.focusedmonton.ca/home.html>

All other municipal plans and bylaws must complement the (MDP), including:

- Zoning Bylaw (Bylaw 12800): Contains the rules and regulations for the development of land in the City of Edmonton, including:

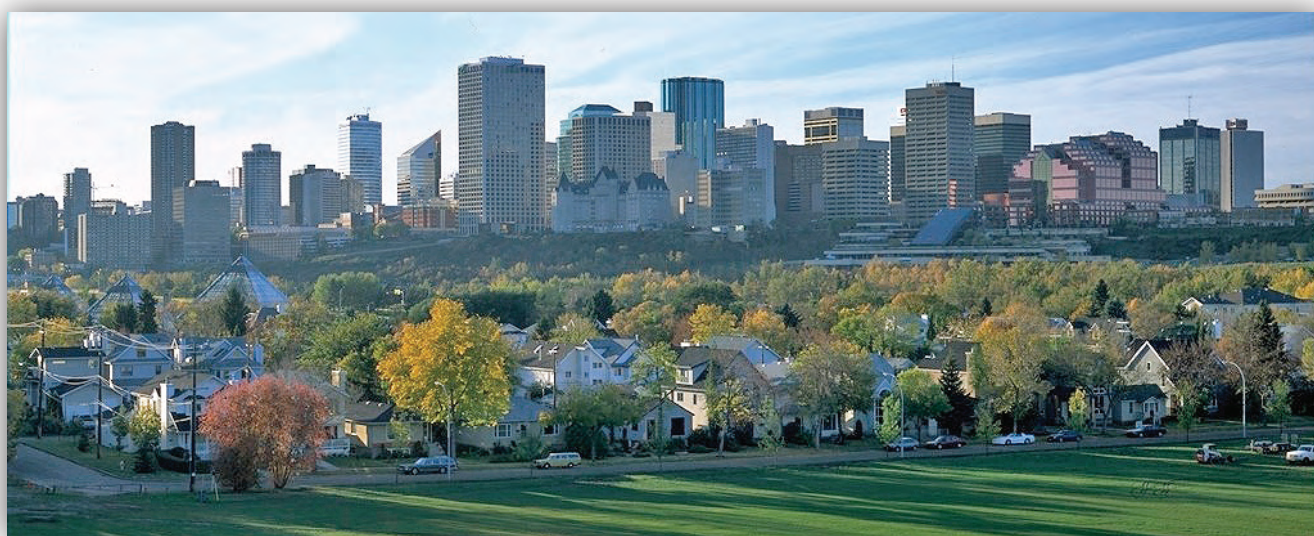
A Metropolitan Recreation Zone: Preserves natural areas and parkland along the river, creeks, ravines and other designated areas for active and passive recreational uses and environment protection, and:

North Saskatchewan River Valley and Ravines System Protection Overlay: Provides a development setback from the North Saskatchewan River Valley and Ravine System.

- River Valley Area Redevelopment Plan (Bylaw 7188): Protects the North Saskatchewan River Valley and Ravine System as part of Edmonton's valuable open space heritage and to establish the principles for future implementation plans and programs for parks development and the retention of the designated residential areas of Rosedale and Cloverdale.
- Parkland Bylaw (Bylaw 2202): To regulate the conduct and activities of people on parkland in order to promote the safe, enjoyable and reasonable use of such property and to protect and preserve natural ecosystems for the benefit of all citizens of the City.
- Community Standards Bylaw (Bylaw #14600): To regulate the conduct and maintenance of private property, in part by designating particular plants within the municipality as restricted, noxious or nuisance weeds.
- Dutch Elm Disease Bylaw (11468): To eliminate or decrease the number of pests likely to be destructive or dangerous to trees, shrubs, vegetable or plant life, or other property.

All City of Edmonton bylaws can be found at: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation, Climate Change



# 5. APPENDICES

## PLAN OF ACTION FOR THE CAPITAL REGIONAL RIVER VALLEY PARK

Lead: River Valley Alliance

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Type of project: Regional plan for the North Saskatchewan River Valley

Project Goals: To plan a world-class metropolitan river front park that would extend from the Town of Devon in the West, through the Counties of Leduc and Parkland, through the City of Edmonton, through the Counties of Sturgeon and Strathcona, and to the City of Fort Saskatchewan in the East

Timeframe: 1997 – 2007

Methods used:

- Public consultation (over 1,500 people); consultation with stakeholder municipalities
- A team of professionals researched the environmental, hydrological, geological and human elements that reflect the living landscape of the river valley. Building upon a concept plan completed by the RVA in 1998 and updated in 2004, the team redesigned trail alignments, location of walkways and pedestrian bridges, new park areas and other amenities to maximize the preservation of the natural features of the valley and to protect areas of environmental sensitivity.

Roles/Partners: River Valley Alliance, a non profit municipal corporation comprised of seven municipal shareholders holding lands in the Capital Region North Saskatchewan River Valley.

Additional information: <http://www.rivervalley.ab.ca>

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

## 3. ACQUISITION INITIATIVES

### EDMONTON AND AREA LAND TRUST

Lead: Responsibility shared amongst listed partners

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Type of project: A partnership of the City of Edmonton, Edmonton Community Foundation, Urban Development Institute, Edmonton Nature Club, Legacy Lands Conservation Society, Land Stewardship Centre of Canada

Project Goals: To establish an organization at arms-length of the City of Edmonton that promotes the protection of privately-held natural areas through their dedication or donation to the Trust.

Timeframe: Trust established 2006.

Methods used: Public consultation to evaluate support for a local land trust, development of a business plan

Roles/Partners: Edmonton Community Foundation, Edmonton Nature Club, Urban Development Institute, Land Stewardship Centre of Canada, Legacy Lands Stewardship Society, City of Edmonton

Additional information: [www.edmonton.ca/naturalareas](http://www.edmonton.ca/naturalareas)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation



# 5. APPENDICES

## NATURAL AREA ACQUISITION PROGRAM

Lead: Parks Branch

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Type of project: Fund for the acquisition of natural areas in the river valley and tablelands

Project Goals: Through the administration of two funds (one dedicated to river valley parkland acquisition (Parkland Purchase Reserve), one to tableland natural areas (Natural Area Reserve Fund)), several million dollars are allocated annually to fund the purchase and protection of parkland and tableland natural areas.

Timeframe: Established by City Council 1999

Methods used: Council approval

Roles/Partners: Funds administered by Parks Branch/Office of Natural Areas

Additional information: [www.edmonton.ca/naturalareas](http://www.edmonton.ca/naturalareas)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation

## ECOLOGICAL CONSERVATION ASSISTANCE PROGRAM (ECAP)

Lead: Parks Branch

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Type of project: Incentive project in support of conservation of natural areas.

Project Goals: To financially reward and assist landowners in protecting and conserving privately-held natural areas. The program provides financial assistance to landowners wanting to make an ecological gift to the City of Edmonton.

Timeframe: Implementation initiated 2005

Methods used: For conservation easements, the City will provide a one-time grant of \$5,000 per hectare up to a maximum of 50 hectares or \$250,000

Roles/Partners: Planning and Development, Asset Management and Public Works Department, private landowners

More information: [www.edmonton.ca/naturalareas](http://www.edmonton.ca/naturalareas)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation

# 5. APPENDICES

## B. MANAGING EDMONTON'S NATURAL SYSTEMS & BIODIVERSITY

### 1. INTEGRATED MANAGEMENT PLANS, POLICIES & RESEARCH ENVIRONMENTAL POLICY (C-512)

Lead: Office of the Environment

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Type of project: City Policy and companion Administrative Directive

Project Goals: To set in place a policy guiding the City's protection of the environment.

- Policy statement: "The City of Edmonton will exercise environmental stewardship of its operations, products and services, based on its commitment to: (a) prevent pollution, (b) continually improve its environmental performance by setting and reviewing environmental objectives and targets, and (c) meet or exceed applicable environmental legal requirements and other requirements to which it subscribes."
- The policy includes the following guidance principle – "Protection of the Natural Environment: The City of Edmonton will take a leadership role in protecting natural heritage and biodiversity within the municipality and region."

Timeframe: Environmental Policy approved 2006

Methods used: Internal/external consultation

Roles/Partners: Office of the Environment and other City branches and departments

Additional information: All City of Edmonton policies can be found at: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Climate Change

Other environmentally-related City of Edmonton policies include:

- Corporate Tree Management Policy (C-456): To protect the trees on Municipal property by planting, protecting, and maintaining trees, and coordinating all City tree planting programs including boulevards, roadway landscaping, park and facility developments and the Beautification Program.
- Sustainable Building Policy (C-532): Ensures that City-owned new facilities and major renovations are designed and constructed to an environmentally sustainable standard that benefits all Edmonton residents, now and in the future.
- Parkland and North Saskatchewan River Valley Utility Installation Policy (C-307): To minimize damage to parkland and the river valley incurred through the installation of utilities. All costs to restore river valley and parkland damaged by utility or other agencies to be borne by responsible agencies.

# 5. APPENDICES

## ECOVISION: ENVIRONMENTAL STRATEGIC PLAN

Lead: Office of the Environment

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Type of project: Environmental Strategic Plan

Project Goals: To provide direction for the City in 10 key areas of environmental concern (clean air, climate protection, environmental emergency response, natural area systems, resource conservation, solid waste management, sustainable business development, sustainable urban planning, toxics reduction and water)

A sample of some of the many environmental initiatives captured in the strategic plan include:

- Stormwater Quality Strategy: Outlines the City's commitment to protection of water quality and naturalization of stormwater management facilities.
- Greenhouse Gas Emissions Reduction Plan for City Operations: Aims to reduce greenhouse gas emissions from City Operations by 16% from 1990 levels by 2010.
- Improved Snow Storage Facilities: Infrastructure improvements to reduce the harmful effects of releasing large amounts of potentially contaminated meltwater into the North Saskatchewan River in one major event in the spring, through the construction of large facilities for the temporary storage of snow cleared from streets.

Many of the initiatives described in the EcoVision strategic plan are implemented through Enviso, the City's Environmental Management System. Enviso establishes a management framework for the City to comply with relevant environmental legislation and regulations, prevent pollution and continually improve its environmental performance, according to the international environmental standard ISO 14001. The City is in the process of implementing this system across all of its operational branches.

Timeframe: Approved 1999; updated 2005

Methods used: Inventory, public/internal consultation, plan development

Roles/Partners: Office of Environment and other City branches and departments

More information: Environmental Strategic Plan: [www.edmonton.ca](http://www.edmonton.ca)

Enviso: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Climate Change



# 5. APPENDICES

## EDMONTON'S URBAN PARKS MANAGEMENT PLAN (2006 – 2016)

Lead: Parks Branch

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Type of project: Management/Strategic plan for Edmonton's parks

Project Goals: To guide the acquisition, development, maintenance, preservation and use of parkland in 2006-2016, and provide strategic direction for all river valley and ravine parkland as well as all school and park sites outside the river valley.

Timeframe: Approved 2006

Methods used: Public consultation, internal consultation, plan development

Roles/Partners: Parks Branch

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

## INTEGRATED WATERSHED MANAGEMENT PLAN

Lead: North Saskatchewan Watershed Alliance

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Type of project: A management plan to address surface water, groundwater and existing and proposed land use, social, cultural and economic issues. Land use issues affecting water will be identified and sub-basin recommendations made.

Project Goals: To provide a framework for protecting, maintaining and restoring a healthy, natural watershed system where economic and social needs are in balance with the ecological needs of the watershed. This includes the protection of the aquatic environment and its associated necessary flow needs.

Timeframe: Development underway in 2008

Methods used: The plan will be prepared in consultation with North Saskatchewan Watershed Alliance members and stakeholders and will ensure that stakeholders are provided the opportunity to form and participate in the planning process through Regional Advisory Committees. The plan will incorporate existing regional strategies and related plans.

Roles/Partners: North Saskatchewan Watershed Alliance; community partners

More information: <http://www.nswa.ab.ca/>

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Extirpation

# 5. APPENDICES

## INTER-MUNICIPAL COOPERATION FOR STORMWATER MANAGEMENT: BIG LAKE TASK FORCE

Lead: Responsibility shared amongst listed partners

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Type of project: Task force made up of one representative from each of the participating municipalities in the basin.

Project Goals: To develop a Stormwater Management Plan for the Big Lake Drainage Basin Area that addressed existing and future drainage patterns and flooding concerns arising from increasing development within the Basin.

Timeframe: Spring 2002 – Spring 2005

Methods used: The project had two important components: a Hydrological Study, which emphasized the importance of the basin's floodplains for their environmental/ecological benefits and practical stormwater implications, and a Big Lake Basin Study Report.

Roles/Partners: The City of Edmonton, Parkland County, the Town of Stony Plain, the City of Spruce Grove, Sturgeon County, the City of St. Albert and Lac Ste. Anne County. Representatives from Alberta Environment and Alberta Transportation were also on the task force. Consultants were hired to complete a number of tasks, which included: background research, a literature review, community consultation, analyses, Task Force coordination and preparation of the final report.

Additional information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

## BIG LAKE MANAGEMENT PLAN COMMITTEE

Lead: Responsibility shared amongst listed partners

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Type of project: Partnership committee

Project Goals: To protect Big Lake, an Edmonton biodiversity core area.

Timeframe and start/end dates: 2002 – 2005

Methods used: Alberta Parks and Protected Areas developed a partnership committee with City of Edmonton, City of St. Albert, Sturgeon County and Parkland County to work together to conserve and protect Big Lake. May 2002 saw the release of the Big Lake Natural Area Management Plan Phase I Report. In April 2005, Lois Hole Centennial Provincial Park became the 69th provincial park in Alberta. The park contains the former Big Lake Natural Area and an additional 302 hectares of Crown land, for a total of 1421 hectares. The lake makes up about 59 per cent of the park's total area.

Roles/Partners: As listed above

Additional information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

# 5. APPENDICES

## ALBERTA LOW-IMPACT DEVELOPMENT PARTNERSHIP SOCIETY

Lead: Responsibility shared amongst listed partners

**Project Goals:** To protect and maintain the integrity of the natural environment while promoting the growth, prosperity and quality of life of Alberta's communities. Implementation of low impact development practices will lead to healthier, more sustainable watersheds.

**Timeframe:** Ongoing

**Methods used:** Promotion of use of low-impact development approaches, such as conservation landscaping and integrated stormwater management.

**Roles/Partners:** There are many partners in the society, including several Alberta municipalities, watershed organizations, Alberta Environment, and environmental engineering companies. Drainage Services is the primary partner representing the City of Edmonton.

**Additional information:** <http://www.alidp.org>

**Biodiversity Threat(s) addressed:** Habitat loss, Habitat Degradation, Invasive Species, Photo 52



LOW IMPACT DEVELOPMENT USES CONSTRUCTED WETLANDS IN NEW COMMUNITIES AS ONE STRATEGY TO CAPTURE AND TREAT RUN-OFF.



# 5. APPENDICES

## 2. POLLUTION PREVENTION AND RESOURCE CONSERVATION CARBON DIOXIDE REDUCTION EDMONTON (CO2RE)

Lead: Office of Environment

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**Type of project:** A community-wide plan to reduce greenhouse gas emissions in Edmonton. It was created by a coalition of more than 20 local companies, non-profit organizations, institutions and government agencies. While the City of Edmonton played a lead role in bringing these diverse groups together, the plan was developed by the community – for the community.

**Project Goals:**

By 2010 – reduce greenhouse gas emissions in Edmonton by up to 6%

By 2020 – reduce greenhouse gas emissions in Edmonton by up to 20%

**Timeframe:** Initiated in 1999, launched successfully in residential sector in October 2004

**Methods used:** A cross-section of more than 30 people representing residential, business, industrial and institutional sectors worked with the City for more than two years to develop a single, coordinated plan. The group, known as the Carbon Dioxide Reduction Edmonton (CO2RE) team, consulted extensively with many local groups and organizations to develop a consensus on the best approach and strategies. Specific strategies to achieve these goals were developed for four sectors: industrial, commercial/institutional, residential and community leadership. Focus has remained in the residential sector. Key programs include public education, energy efficiency upgrade rebates and a free membership program offering energy efficiency tips and special promotional offers to save energy, money and reduce greenhouse gas emissions.

**Roles/Partners:** Office of the Environment, CO2RE Team, other City branches and departments, CO2RE Community Business Partners.

**Additional information:** [www.co2re.ca](http://www.co2re.ca)

**Biodiversity Threat(s) addressed:** Climate Change

# 5. APPENDICES

## EDMONTON'S WASTE MANAGEMENT CENTRE

Lead: Waste Management Branch

Type of project: North America's largest collection of modern, sustainable waste processing and research facilities. Facilities include the Materials Recovery Facility where Edmonton's recyclables are sorted and baled, the Edmonton Composting Facility, the Clover Bar Landfill, a leachate treatment plant, a landfill gas recovery system, biosolids lagoons, a dry waste landfill and an asphalt recycling operation. The site also incorporates wetlands and a natural revegetation program at the landfill.

Project Goals: To reduce waste, process what waste we do generate in a sustainable way, to educate the Edmonton public about our alternative approach to waste management and how they can contribute.

Timeframe: Ongoing

Methods used:

- Propagation and planting of native seedlings and grasses as areas of the active landfill are completed. The use of native plants means considerably less maintenance will be required in the future and allows for a natural blend with the surrounding river valley ecosystem. By planting seedlings and seeds while the landfill is still in operation, areas of the landfill will already be mature parkland when the landfill closes.
- Comprehensive recycling programs and composting of residential organic solid waste
- Landfill gas recovery
- Development of wetland area as wildlife refuge/corridor
- Educational Native Plant Garden

Roles/Partners: Parks, Waste Management Branch, Drainage Services, volunteers

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Climate Change



THE EDMONTON WASTE MANAGEMENT CENTRE IS NORTH AMERICA'S LARGEST COLLECTION OF MODERN, SUSTAINABLE WASTE PROCESSING AND RESEARCH FACILITIES.

# 5. APPENDICES

## EDMONTON NET-ZERO HOUSE

Lead: Riverdale NetZero Team

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Type of project: Edmonton Alberta's first Net Zero Energy home combines ultra energy efficient design with renewable energy strategies to produce more energy than it consumes over the course of a year.

Project Goals: To prove that it is possible to build houses that foster a very high quality of life while drastically reducing greenhouse gas production and environmental impact.

Timeframe: Construction began April 2007, with occupancy planned for 2008

Methods used: Solar heating/energy, regional/recycled building materials, low water use, low to zero greenhouse gas emissions

Roles/Partners: A team of architects, engineers, alternative energy experts, and others. The Office of Environment and Development Compliance branches represent the City of Edmonton.

Additional information: <http://www.riverdalenetzero.ca/>

Biodiversity Threat(s) addressed: Climate Change

## GOLDBAR WASTEWATER TREATMENT PLANT UPGRADES

Lead: Drainage Services Branch

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Type of project: Of the water extracted from the North Saskatchewan River for use by the City of Edmonton and surrounding areas, 90% of this is put back into the river after treatment at the Gold Bar WWTP. The City has made three major developments that have greatly improved the quality of plant effluent discharged into the North Saskatchewan River.

Project Goals: To protect the NSR watershed through upgrades at Wastewater Treatment Plant.

Timeframe: Upgrades began 2002.

Methods used: Biological Nutrient Removal (BNR) (microorganisms are used to remove phosphorus from wastewater and to break down ammonia-nitrogen into harmless elements), Membrane Filtration (Membrane filters are made up of a series of membranes which resemble drinking straws and are so minute that nothing but water can pass through them) and Enhanced Primary Treatment (EPT) (a mechanical and chemical process that aids in the settling process as a means of removing solids from water).

Roles/Partners: Drainage Services

Additional information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation



# 5. APPENDICES

## 3. RESTORATION, NATURALIZATION, AND WILDLIFE PROTECTION NATURAL AREA MANAGEMENT PLANS

Lead: Parks Branch

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**Type of project:** The City's Conservation Policy mandates that Management Plans be developed for natural areas in Edmonton that are to be conserved. Management plans provide a baseline description of the site, as well as site-specific management goals, objectives and strategies. They also identify the parties responsible for management activities, including the protection of water resources, habitat quality, wildlife, vegetation, and naturally and culturally significant features.

**Project Goals:** To provide a baseline description of the site, as well as site-specific management goals, objectives and strategies. These plans also identify the parties responsible for management activities.

**Timeframe:** 1995 (ongoing). As of 2006, Natural Area Management Plans were created or in development for nine natural areas in Edmonton.

**Methods used:** Relevant City departments meet to determine allocation of responsibilities; Natural Area Policy Implementation Committee signs off on final document.

**Roles/Partners:** Planning & Development coordinates the development of management plans; Office of Natural Areas, Parks, Drainage provide recommendations; responsibilities for implementation are shared between relevant departments (Parks, Drainage, Transportation, Waste Management, etc.) The Parks branch provides the final approval for these plans.

**Additional information:** <http://www.edmonton.ca/naturalareas>

**Biodiversity Threat(s) addressed:** Habitat loss, Habitat Degradation, Invasive Species, Extirpation

# 5. APPENDICES

## ROADWAYS AND PARKS NATURALIZATION MASTER PLAN

Lead: Parks Branch

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Type of project: Naturalization of City property

**Project Goals:** To implement naturalization as an alternative landscape management technique in Edmonton's parks and roadway verges, for environmental, economic and quality of life benefits. Natural processes of growth and change are less restricted and the landscape is allowed to become more natural rather than ornamental.

**Timeframe:** Master Plan completed 1994. Implementation is ongoing.

**Methods used:**

- Active planting of native plant species along roadways and buffers.
- Planning of overall naturalization locations on public land throughout Edmonton.
- Passive naturalization by decreasing maintenance of naturalized locations.
- Involving community groups to participate in planting native species.
- Public education and appreciation of naturalized areas.

**Roles/Partners:** Parks Branch

**Biodiversity Threat(s) addressed:** Habitat Degradation, Invasive Species



COMMUNITY VOLUNTEERS PLAY AN IMPORTANT ROLE IN THE NATURALIZATION OF EDMONTON'S ROADSIDES.

## NATURALIZATION OF STORMWATER MANAGEMENT FACILITIES/CONSTRUCTED WETLANDS

Lead: Drainage Services Branch

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Type of project: Naturalization of stormwater management facilities

**Project Goals:** To use ecological restoration principles to develop naturalized wetland facilities and enhance the natural treatment of stormwater prior to discharge into creeks and into the North Saskatchewan River. To date, the City has constructed three wetlands and continues to plan for more in the future. Under the City's guidance, private developers have built an additional eight constructed wetlands to provide for stormwater management in new residential areas.

**Timeframe:** Began late 1990s

**Methods used:** Planting of native species, re-contouring slopes, etc.

**Roles/Partners:** Drainage Services; City's engineers, along with a variety of consultants specializing in landscape architecture and biology.

**Additional information:** [www.edmonton.ca](http://www.edmonton.ca)

**Biodiversity Threat(s) addressed:** Habitat loss, Habitat Degradation

# 5. APPENDICES

## NATIVE PERENNIAL TRIALS AND PROPAGATION

Lead: Edmonton Naturalization Group / Parks Branch

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Type of project: Biodiversity protection through naturalization.

Project Goals: Volunteers raise native plants at the City of Edmonton's Oldman Creek Nursery and maintain a demonstration native bed at the John Janzen Nature Centre. Volunteers also care for certain parts of City of Edmonton parks as Partners in Parks. Native plant species are propagated and sold to Edmontonians for use in gardening and landscaping. Trials are conducted on native plants for naturalization plantings. Criteria for consideration include floral display, competition with weeds, timeline for establishment, overall biomass, erosion control, and longevity.

Timeframe: Ongoing.

Methods used: Trialing of native plant species for growth in Edmonton. Propagation and selling of native plants.

Roles/Partners: Edmonton Naturalization Group, Strathcona County, Alberta Naturalization Network Society, Bedrock Seeds, City of Edmonton Parks Branch

Biodiversity Threats Addressed: Habitat loss, Invasive species, Extirpation.

## CREATION OF LAKE STURGEON SPAWNING HABITAT ON NORTH SASKATCHEWAN RIVER

Lead: Drainage Services Branch

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Type of project: Protection of a fish population through habitat creation

Project Goals: To construct a replica fish spawning bed that successfully supported Lake Sturgeon populations in rivers in Wisconsin. This project was located on a stretch of the North Saskatchewan River within the City's Dawson Park and upon completion, converted approximately 950 square meters of river bottom to Lake Sturgeon spawning habitat.

Timeframe: Work completed 2005

Methods used: Consultation with local experts, review of known natural spawning areas along the NSR, review of a similar project completed in Wisconsin, application of principles to Edmonton context

Roles/Partners: Drainage Services, Alberta Sustainable Resource Development, Fisheries and Oceans Canada

Biodiversity Threat(s) addressed: Habitat Degradation, Extirpation



# 5. APPENDICES

## WILDLIFE PASSAGES

Lead: Province of Alberta

Type of project: Habitat protection through the construction of roadways and bridges that accommodate wildlife movement.

Project Goals: Edmonton's wildlife passages are being protected through the construction of naturalized wildlife passages. During the recent construction of the provincially-owned Anthony Henday Highway, a naturalized passage was maintained under a bridge to permit the movement of wildlife from one side of the highway to the other, along the Whitemud Creek (a primary wildlife corridor).

Timeframe: Anthony Henday project completed in 2005

Methods used: Design/construction of overpass.

Roles/Partners: Government of Alberta, Transportation, Planning

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation Photo 55



THE ANTHONY HENDAY WILDLIFE PASSAGE FEATURES A VEGETATED BRIDGE UNDERPASS, NATURAL LIGHTING, AND AN INTEGRATED PEDESTRIAN PATHWAY.

## NATURESCAPES PROGRAMS

Lead: Parks Branch

Type of project: Naturalization of yards, schoolyards

Project Goals

- Planting native and ornamental plants
- Providing habitat for a diversity of animal and plant species

Timeframe: Ongoing.

Methods used: There are a variety of ways for Naturescapes projects to get started. Projects may arise from issues relating to a particular space, a classroom wanting a butterfly garden or a community group wanting to establish a community garden. A resource manual is available to guide groups that are interested in naturalization.

Roles/Partners: Parks, school/community partners

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

## 5. APPENDICES

### WILDLIFE REHABILITATION SOCIETY EDMONTON

Lead: Wildlife Rehabilitation Society of Edmonton

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Type of project: WRSE cares for over 1,000 wildlife patients annually. Of these patients, 85% are birds (songbirds, waterfowl, raptors) and 15% are mammals (fox, deer fawns, porcupines, muskrats, hares, squirrels, coyotes, woodchucks, etc.)

Project Goals: To provide compassionate care for injured and orphaned wildlife and educate the public on the importance of wildlife in their community.

Timeframe: Ongoing

Methods used: Caring for injured birds and mammals; public education

Roles/Partners: Wildlife Rehabilitation Centre (NGO)

Additional information: <http://www.wildlife-edm.ca/>

Biodiversity Threat(s) addressed: Extirpation

### MAPLE RIDGE WETLAND RESTORATION – PUBLIC/PRIVATE PARTNERSHIP

Lead: Drainage Services, with donation from PCL Engineering & Construction

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Type of project: Wetland restoration

Project Goals: To restore a small wetland in Edmonton's SE industrial area in order to provide habitat for local wildlife species, recreation area for local residents, etc. using donation from local developer

Timeframe: Restoration scheduled to begin 2007

Methods used: Removal of fill, re-contouring of slope to natural grade, planting of native species, public education and interpretation, media involvement

Roles/Partners: Drainage Services, Office of Natural Areas, Parks

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation Photo 56



THE MAPLE RIDGE WETLAND WAS RESTORED THROUGH A PUBLIC-PRIVATE PARTNERSHIP.

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## 4. BIODIVERSITY MONITORING

### WETLAND ECOLOGY STUDY

Lead: Drainage Services / Parks Branch

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Type of project: Wetland Research

Project Goals: To assess how well constructed stormwater wetlands are fulfilling biological wetland functions.

Timeframe: 3 year project, launched in 2007

Methods used: Assessment of vegetation communities, wildlife habitat, wildlife populations, ecological linkages and connectivity

Roles/Partners: Drainage Services, Office of Natural Areas, Parks, with work being done by a local environmental consultant.

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species, Extirpation

## UNIVERSITY OF ALBERTA URBAN ECOLOGICAL RESEARCH

Lead: University of Alberta

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Type of project: Ecological Research on a range of topics, including frogs, wetlands, and the movement of deer and birds within the city.

Project Goals: To better understand various aspects of Edmonton's urban ecology.

Timeframe: Ongoing

Methods used: Various methods, including population surveys and tracking

Roles/Partners: University of Alberta researchers plan and implement the research projects. Staff from Parks, Office of Natural Areas, and Drainage Services provide some logistical, data, and public engagement support, if required.

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation



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## CHRISTMAS BIRD COUNT

Lead: Federation of Alberta Naturalists (Edmonton Nature Club)

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Type of project: Annual inventory of birds in Edmonton area

Project Goals: To assess the diversity of bird species and total number of birds in the Edmonton area.

Timeframe: Annual, one day event between December 14 and January 5

Methods used: Observation of birds and identification of bird calls to count the number of birds/bird species within a 12 km radius. Recording and compilation of results.

Roles/Partners: Federation of Alberta Naturalists and Volunteers, Alberta Sustainable Resource Development

Additional Information: <http://fanweb.ca>

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation

## ALBERTA VOLUNTEER AMPHIBIAN MONITORING PROGRAM

Lead: Alberta Conservation Association

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Type of project: Inventory and monitoring of amphibians in the Edmonton area, as well as provincially.

Project Goals: To increase public awareness of amphibians and the conservation challenges they face, and to better understand their distribution and general status in Alberta.

Timeframe: Ongoing

Methods used: Volunteer participants report sightings of amphibians wherever they are encountered. Participants are sent a package of materials, including a field guide and a CD of amphibian calls.

Roles/Partners: Alberta Conservation Association

Additional information: [www.srd.gov.ab.ca](http://www.srd.gov.ab.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation

# 5. APPENDICES

## FUNGAL DATABASE

Lead: Alberta Mycological Society

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Type of project: Database of fungal diversity in Alberta

Project Goals: Consolidation of fungal information in Alberta, combining lists from publications, museums, universities, government, and private collections. This project will assist the forest industry, government departments, and professional and amateur mycologists in the assessment of fungal biodiversity across Alberta.

Timeframe: Ongoing

Methods used: Consolidation and maintenance of information on database

Roles/Partners: Alberta Mycological Society, Alberta Conservation Association

Additional information: [www.wildmushrooms.ws](http://www.wildmushrooms.ws)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation

## EXOTIC FOREST PEST SURVEY

Lead: Parks

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Type of project: A cooperative, regional monitoring program for the early detection of invasive insects and diseases, especially those that threaten the urban forest.

Project Goals: To avert the establishment of invasive tree pests in order to minimize pesticide use and reduce tree loss in the urban forest, thereby maintaining habitat and biodiversity.

Timeframe: Ongoing

Methods used: Cooperative trapping and identification system, and information exchange. For critical pest infestations, the Critical Pest Infestation Plan is enacted, drawing on a Federal, Provincial, and Municipal support network.

Roles/Partners: Stop DED (Dutch Elm Disease), major Alberta municipalities, Alberta Sustainable Resource Development, Canadian Food Inspection Agency.

Additional information: [www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca)

Biodiversity Threat(s) addressed: Invasive Species, Habitat loss, Extirpation

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## C. ENGAGING EDMONTONIANS IN BIODIVERSITY PROTECTION:

### 1. EDUCATIONAL OPPORTUNITIES AND RESOURCES

#### JOHN JANZEN NATURE CENTRE PROGRAMMING

Lead: Community Services Department

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Type of project: Public education program

Project Goals: To inspire the community to love and protect natural areas (including programs for both children and adults about Edmonton's wildlife species and habitat, composting, birdwatching, etc.). The John Janzen Nature Centre was the first urban nature centre in Canada, and the first municipally-operated nature centre in North America. It offers programs for both children and adults about Edmonton's wildlife species and habitat, composting, and bird watching. Approximately 400,000 people visit the Centre annually to view live wildlife exhibits, a honeybee hive, a prairie pond, backyard composting education centre, and a network of nature walks. The Centre is currently adding a \$1.5 million expansion called the Discovery Room to allow visitors and school groups to learn about nature through a variety of interactive displays.

Program/project examples:

- Native Perennial Demonstration Bed: involves the growth and display of flowers native to Alberta that can be used in gardens and the demonstration of the ecological importance and benefit of using native plant species in gardens, and encourages homeowners to use native plants in their gardens. The bed was established and is maintained by the Edmonton Naturalization Group.
- Fall Frenzy: a program to introduce children to the change in season, allowing them to search for signs of fall, make birdfeeders, examine a beehive and make crafts
- Nightly Neighbours: a program that introduces children to the native nocturnal wildlife that resides in Edmonton's river valley
- Composting lessons and facility tour: for adults, a visit to the Centre's Backyard Composting Education Centre and a free "How to Compost" lesson
- Wild Rose Ramblers: a group of nature walkers that meets weekly to explore Edmonton's nature trails

Timeframe: Opened in 1976. Ongoing programming and displays.

Methods used: Courses, workshops, school programs, displays

Roles/Partners: Community Services Department (administers the Centre).

Additional information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat Degradation, Invasive Species



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## EDMONTON NATURALIZATION GROUP PROGRAMS

Lead: Edmonton Naturalization Group

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Type of project: Naturalization and native plant propagation

Project Goals: To grow native plants and promote their use in gardening and landscaping to a wider public, and to enrich the flora in the city's parks and natural areas.

Timeframe: Ongoing

Methods used: Removal of invasive species from local ravines (Thistle Patrol); maintenance of a demonstration bed at John Janzen Nature Centre to show local gardeners how to grow native wildflowers and grasses; opportunity for community members to be "foster parent" to a Western wood lily; growth of over 150 species of native wildflowers, grasses and sedges at Old Man Creek Nursery; transplant of native plants from development sites to other areas (e.g. Little Mountain transplant); researching growth of native species under various conditions in trial beds; and other education and stewardship programs.

Roles/Partners: Edmonton Naturalization Group; Parks (Partners in Parks Program)

Additional information: [www.eng.fanweb.ca](http://www.eng.fanweb.ca)

Biodiversity Threat(s) addressed: Habitat Degradation, Invasive Species, Extirpation

## ARBOUR DAY URBAN FORESTRY PROGRAM

Lead: Parks Branch

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Type of project: Public education program

Project Goals: To enhance Edmonton's urban forests, raise awareness about the value of trees in our urban landscape.

Timeframe: Ongoing since mid-1950s

Methods used:

- All Grade 1 students receive an evergreen seedling to plant
- Visits to Grade 1 classes to discuss Edmonton's urban forests
- Celebration event at local parks with several classes of Grade One students

Roles/Partners: Parks (urban forestry)

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat Degradation, Climate Change

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## EDMONTON VALLEY ZOO PROGRAMMING

Lead: Community Services Department

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Type of project: Species protection and public education program

Project Goals: The purpose of the Edmonton Valley Zoo is to build enduring relationships between Edmontonians and the living world through live animal displays, interpretation and conservation practices, with an emphasis on cold climate habitats.

Programs:

Species Survival Program: initiated in 1992, this program was taken up by the Valley Zoo to implement cooperative, coordinated breeding programs for captive endangered species throughout the world. It is not intended to be a substitute for preserving animals in nature but is a strategy for creating healthy, self-sustaining, captive populations that can be reintroduced into restored or secured habitats. Protected species include Grevy's Zebra, Siberian Tiger, Snow Leopard, and the Red Panda.

2008 Year of the Frog: an international program to raise awareness about the plight of wild frogs. The zoo is participating in species breeding and safekeeping initiatives.

In the Danger Zone: teaches families about threatened and endangered species, what brought them to that place, how the Zoo is involved in solving the problem, and what children and their parents can do to help

Backyard Animals: about what creatures can be found in Edmontonians' own backyards

Canadian Critters: about what Canadian wildlife species are in decline due to loss of habitat, and what Edmontonians can do to help

Loonie for Lemurs: gives Zoo visitors the option of donating \$1 of their admission fee to the protection of lemur's native habitat.

The Valley Zoo also runs a number of species-specific programs (Primarily Primates, Extreme Birds, Leaping Lemurs, Slithery Snakes), etc.

Timeframe: Established in 1959, Ongoing

Methods used: Education programs and displays

Roles/Partners: Community Services

Additional information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Extirpation

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## MUNICIPAL RESOURCE GUIDE

Lead: North Saskatchewan Watershed Alliance

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Type of project: A guide for municipal decision-makers with information on how to protect North Saskatchewan Watershed.

Project Goals: To provide municipal decision-makers with information about the value of healthy watersheds, insight on how municipal decisions affect the watershed, information legislation that applies to watershed health, tools for watershed management, and best practice options.

Timeframe: 2005-2006

Methods used: The project was led by a Steering Committee representing municipalities (urban and rural) and North Saskatchewan Watershed Alliance staff who worked closely with municipalities. Input from municipalities in the watershed was sought in the development of the guide through workshops and municipal outreach initiatives.

Roles/Partners: North Saskatchewan Watershed Alliance; City departments

More information: [www.nswa.ab.ca](http://www.nswa.ab.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species

## ROYAL ALBERTA MUSEUM – WILD ALBERTA GALLERY

Lead: Royal Alberta Museum (Province of Alberta)

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Type of project: Natural history exhibits and public education

Project Goals: To encourage visitors to see the wild through different eyes.

Timeframe: Ongoing

Methods used: Research, exhibit design

Roles/Partners: Many different organizations were brought in for their specific expertise when they did the initial planning for the Wild Alberta Gallery, including:

- Federation of Alberta Naturalists
- Alberta Conservation Association
- Friends of the Royal Alberta Museum
- University of Alberta
- Alberta Native Plant Council
- Alberta Sport, Recreation Parks and Wildlife Foundation
- Ducks Unlimited
- Foothills Model Forest

Additional information [www.royalalbertamuseum.ca](http://www.royalalbertamuseum.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation



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## PEREGRINE PROJECT

Lead: University of Alberta

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Type of project: Part of a broader reintroduction program, this is a public education program in support of protecting the threatened Peregrine Falcon

Project Goals: In order to raise awareness about threatened wildlife living in Edmonton, students and staff at the University of Alberta have filmed a pair of Peregrine Falcons that nest on a campus building over the past few years, and publicly broadcast these images through a webcam. The public learns about Peregrine biology as the eggs are laid and hatched, chicks are fed, the young birds fledge, and the family migrates for the winter. The pair of birds are one of 45 pairs nesting across Alberta.

Timeframe: Ongoing

Methods used: Three webcams capture bird activity and broadcast images on the internet.

Roles/Partners: University of Alberta, Environmental Coordination Office of Students, Alberta Fish and Wildlife

Additional information: [www.falconcam.med.ualberta.ca](http://www.falconcam.med.ualberta.ca)

Biodiversity Threat(s) addressed: Habitat loss, Extirpation

## GOOD GROWING NEIGHBOURS: INTEGRATED PEST MANAGEMENT PROGRAM

Lead: Parks Branch

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Type of project: Internal commitment to reducing pesticides, and public education program

Project Goals: To implement alternatives to/reduce pesticide use through:

- designating herbicide-free parks across the city
- implementing no-spray buffer zones around daycares and playgrounds
- treating school parks when school is out
- creating pesticide exemption programs
- evaluating efficacy of pesticides vs. biological alternatives
- only spraying temporary water bodies (not permanent and naturally occurring bodies)
- elimination of standing water to reduce need for spraying for mosquitoes (which depend on standing water to reproduce)
- targeting mosquitoes at larval stage so no need to spray later

Public/Staff Education:

- Public extension program – free clinic for identification of insects brought in by members of the public, to determine whether spraying required (reduces use of pesticides by public)
- “Bug Zoo” at Royal Alberta Museum – raises awareness about Edmonton’s insect diversity
- Website
- Presentations to school groups

Timeframe: Ongoing

Methods used: Raising awareness about the benefits of not applying pesticides in urban environment. Educating internal staff to identify invasive species during maintenance/upkeep.

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Roles/Partners: Parks Branch

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Invasive Species

## MUTTART CONSERVATORY PROGRAMMING

Lead: Community Services Department

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Type of project: Public education

Project Goals: To educate the public (including school groups) about global plant biodiversity through a unique horticultural display garden that brings together a collection of plants from a diverse range of climatic conditions. The objectives of the Muttart include educational programming and conservation/research, including a partnership with the University of Alberta for specifically-oriented research. Educational programming focuses on ecosystem and biodiversity studies, and plant adaptations.

Timeframe: Ongoing

Methods used: Tours, school programs

Roles/Partners: Community Services Department

More information: [www.muttartconservatory.ca](http://www.muttartconservatory.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Extirpation

## LIVING BY WATER: URBAN STORMWATER LAKE EDUCATION PROJECT

Lead: Federation of Alberta Naturalists

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Type of project: Development of an educational booklet, stormwater community resident visits/home assessments, education

Project Goals: To increase public awareness about the impacts of human activity on local stormwater lakes, and the benefits of protecting the health of these lakes

Timeframe: 2005 – present (ongoing) – booklet complete early 2007

Methods used: Research, booklet production, home assessments and recommendation, education

Roles/Partners: Office of Natural Areas, Drainage Services, North Saskatchewan Watershed Alliance, Federation of Alberta Naturalists

Additional information: [www.fanweb.ca](http://www.fanweb.ca)

Biodiversity Threat(s) addressed: Habitat Degradation

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## 2. STEWARDSHIP AND VOLUNTEER OPPORTUNITIES

### PARTNERS IN PARKS PROGRAM

Lead: Parks Branch

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Type of project: Stewardship Program

Project Goals: To promote and encourage Edmontonians' involvement in beautifying our community.

Timeframe: Ongoing.

Methods used: Through the Partners in Parks program, the City encourages community involvement in beautification. The contributions of partners provide for an enhanced level of service: annuals are planted, areas naturalized, weeds eliminated and litter removed from public green areas.

Roles/Partners: The Edmonton Horticultural Society and the City of Edmonton

More information: [www.eng.fanweb.ca](http://www.eng.fanweb.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Invasive Species

### MASTER COMPOSTER/RECYCLER PROGRAM

Lead: Waste Management Branch

---

Type of project: Public involvement/education program

Project Goals: To tap into the enthusiasm of environmentally concerned citizens and train them in recycling and composting.

Timeframe: Introduced as part of the City's 1991 Waste Management Master Plan in an effort to prolong the life of the City's Clover Bar Landfill

Methods used: After receiving an intensive 40-hour training session over three weeks, graduates promote composting and other waste reduction methods in their communities.

Roles/Partners: Waste Management Branch

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Climate Change

30 MASTER COMPOSTER VOLUNTEERS ARE TRAINED EACH YEAR, AND BECOME AMBASSADORS FOR RECYCLING AND COMPOSTING IN EDMONTON.





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## YELLOW FISH ROAD PROGRAM

Lead: Drainage Services Branch

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Type of project: Public education program

Project Goals: To educate the public about Edmonton's storm sewer system, encouraging people not to dump oil, pesticides, turpentine, paint and other unwanted substances containing harmful chemicals into the storm sewer system.

Timeframe: Started 1993 (ongoing)

Methods used: City of Edmonton's Drainage Branch, Trout Unlimited Canada and community volunteers, such as Girl Guides, join forces to mark hundreds of storm drains with yellow fish symbols. In addition, volunteers distribute information to remind people of the dangers of pouring pollutants into the storm drain system.

Roles/Partners: Drainage Branch (Asset Management & Public Works), Trout Unlimited, volunteers

More information: [www.edmonton.ca](http://www.edmonton.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

## CITY FARM PROGRAM

Lead: City Farm

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Type of project: Through City Farm's activities participants discover about growing food, animal care and the importance of the natural world.

Project Goals

- To develop an urban farm that creates healthy learning and play opportunities for the Greater Edmonton community.
- To connect urban children and their families in the greater Edmonton area with the natural world while allowing them an insight into the rural lifestyle.

Timeframe: Established 2005

Methods used: Farming, environmental education, school programming, open farm gate, harvest festivals

Roles/Partners: Alberta Agriculture Food & Rural Development, City of Edmonton Community Services, Legacy Land Conservation, Personal Community Support Association, Riverbend Gardens and Voices of the Soil.

Additional information: [www.city-farm.org/](http://www.city-farm.org/)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation, Climate Change

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## JUNIOR BIRD CLUB

Lead: Wildbird General Store

---

Type of project: Education for children/youth

Project Goals: To encourage young people from the ages of 7 to 14 to learn more about birds and to team up families with experienced birders for fun and educational birding events.

Timeframe: Ongoing

Methods used: Indoor classes, field trips

Roles/Partners: Run by passionate volunteers, administered by owners of the Wildbird General Store.

Additional information: [www.wildbirdgeneralstore.ca](http://www.wildbirdgeneralstore.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

## ROOTS & SHOOTS PROGRAM

Lead: Society for the Homeschool Network of Edmonton

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Type of project: Education for children/youth

Project Goals: SHiNE (Society for the Homeschool Network of Edmonton) runs Edmonton's chapter of the Jane Goodall Institute's global, environmental and humanitarian program for youth. Roots & Shoots members plan and participate in activities and service projects that promote care and concern for animals, the environment, and the human community.

Timeframe: Ongoing

Methods used: Indoor classes, field trips (e.g. worm composting, walk/run to raise funds for wildlife rehabilitation, etc.)

2007 Highlight: an Earth Day Fair for which kids made displays to educate people about an environmental cause, then made/grew things to sell to make money for their causes (e.g. one child grew seedlings and sold them to raise money for the Big Lake Environment Support Society, a local group established for the management of Big Lake)

Roles/Partners: SHiNE

Additional information: [www.shine-hs.com](http://www.shine-hs.com)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation Photo 58

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## RIVERWATCH PROGRAM

Lead: Alberta RiverWatch

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Type of project: Education for youth

Project Goals: To teach students about the ecology and health of the North Saskatchewan River Valley through a 10 km raft study.

Timeframe: Ongoing

Methods used: Grade 10 students raft down a 10 km stretch of the river valley while learning about river ecology, and conducting water chemistry and biology tests. The monitoring results are pooled and viewed on an online database.

Roles/Partners: Alberta RiverWatch

Additional information: [www.riverwatch.ab.ca](http://www.riverwatch.ab.ca)

Biodiversity Threat(s) addressed: Habitat loss, Habitat Degradation

# 5. APPENDICES

## APPENDIX B: EDMONTON'S EIGHT ECOLOGICAL PLANNING AREAS (as illustrated in Map 3, Part 1, Page 15) AND THEIR ATTRIBUTES

### Big Lake Planning Area

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The Big Lake Planning Area encompasses most of the northern portion of the Northwest quadrant of Edmonton. The Biodiversity Core Area within this Planning Area is Big Lake Natural Area. The most important feature of this Planning Area is the direct linkage between the Big Lake Natural Area to Big Lake itself and Lois Hole Provincial Park (Regional Biodiversity Core Areas). Ultimately, the actual size of this Biodiversity Core Area is much larger than what lies within Edmonton. Big Lake Natural Area itself is quite large and includes a variety of habitats and two main waterbodies (Horseshoe Lake and Kirk Lake). It will be crucial to maintain connectivity within this area. There are also multiple natural stepping stones throughout this planning area. The biggest challenge will be to enhance connectivity towards the river valley through the industrial areas.

### Upper North Saskatchewan Planning Area

---

The Upper North Saskatchewan Planning Area encompasses the southern portion of the Northwest quadrant in Edmonton. This Planning Area is the most well ecologically connected Planning Area in Edmonton. It directly abuts two Regional biodiversity core areas – Enoch First Nations Reserve and the river valley upstream of the City. Both sides of the river valley are considered to be Biodiversity Core Areas, including Big Island. In fact, since these Biodiversity Core Areas abut directly with the river upstream of Edmonton, their actual sizes are much larger than what is actually within Edmonton. Several Natural Stepping Stones exist on both sides of the river valley, and Wedgewood Ravine is one of the main Natural Corridors in this Planning Area.

### Whitemud/Blackmud Planning Area

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The Whitemud/Blackmud Planning Area encompasses portions of Edmonton south of the river valley along Whitemud and Blackmud Ravines. This Planning Area is dominated by the Whitemud/Blackmud Biodiversity Core Area which contains the entire ravines. It is important to maintain the continuous and relatively undisturbed nature of this Biodiversity Core Area and therefore a priority will be to avoid encroachment and ensure appropriate buffers.

### Middle North Saskatchewan Planning Area

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The Middle North Saskatchewan Planning Area encompasses the central portions of the river valley and downtown core of Edmonton. The Biodiversity Core Area for this Planning Area is the river valley at Laurier and Buena Vista Parks. This Planning Area contains the most developed and actively used portions of the river valley. Maintaining and restoring ecological connectivity within the Middle North Saskatchewan Planning Area should be a priority. There are no Natural Stepping Stones or Corridors above the river valley but several Semi-Natural Linkages do exist.



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## Lower North Saskatchewan Planning Area

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The Lower Saskatchewan Planning Area encompasses the most of the river valley in the Northeast quadrant of Edmonton. One Biodiversity Core Area has been identified on the north side of the river valley.

## Horsehills Planning Area

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The Horsehills Planning Area encompasses most of the Northeast quadrant in Edmonton. This Planning Area has large portions of undeveloped agricultural matrix. The Biodiversity Core Area is the main portions of the Horsehills Creek System. Within the agricultural portion of this Planning Area, there are numerous Natural Stepping Stones. The developed portion has less Natural Stepping Stones but has a considerable amount of Semi-Natural Linkages. The Horsehills Biodiversity Core Area is heavily fragmented by roads that can also act as barriers.

## Mill Creek Planning Area

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The Mill Creek Planning Area extends south of the Middle Saskatchewan Planning Area and includes both Mill Creek and Fulton Creek. Mill Creek and Fulton Creek are the Biodiversity Core Areas. Within this Planning Area there are several Natural Stepping Stones including Fulton Marsh and numerous Semi-Natural Linkages. To maximize its potential as a Biodiversity Core Area, restoration of Mill Creek is important, particularly in sections where it is currently piped.

## Southeast Moraine Planning Area

---

The Southeast Edmonton Planning Area encompasses the moraine influenced portion of the Southeast quadrant. This Planning area is unique as it does not contain any of the river valley. There are two Biodiversity Core Areas. The majority of this Planning Area is largely agricultural and there are numerous Natural Stepping Stones. Future development will need to recognize the unique nature of this Planning Area especially with regards to wetlands.

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## APPENDIX C: EDMONTON'S PROTECTED NATURAL AREAS

This table lists the natural areas in Edmonton that are currently under some form of protection, either through City or private ownership, through various City zoning designations, or through Crown ownership. The natural areas are grouped according to Ecological Planning Area.

TABLE 3: NATURAL AREAS CURRENTLY UNDER PROTECTION

Natural Area	Area(ha)	Network Element	Owner	Primary Habitat Type
<b>Big Lake Planning Area</b>				
Edmonton portion of Lois Hole	12.1	Regional Core Area	City of Edmonton	River Valley Forest
Centennial Provincial Park				Riverine Wetland
Kinokamau Lake	56.4	Stepping Stone	Inland Cement and CN Conservation Easement with Ducks Unlimited	Wetland
Dunvegan	1.7	Stepping Stone	City of Edmonton	Tableland Forest
Cumberland	1.8	Stepping Stone	City of Edmonton	Tableland Forest
Dunluce	5.6	Stepping Stone	City of Edmonton	Tableland Forest
Albany Wetland Natural Area	9.1	Stepping Stone	Province of Alberta	Wetland
Kirk Lake	21.0	Stepping Stone	Province of Alberta	Wetland
Rapperswill – NW 7016	5.5	Stepping Stone	City of Edmonton	Tableland Forest
<b>Upper North Saskatchewan River Valley Planning Area</b>				
McDonagh Peatland Natural Area – NW 7009	7.8	Stepping Stone	Private Golf Course	Tableland Forest (with peatland)
Winterburn Woodland –NW 302	4.7	Stepping Stone	City of Edmonton	Tableland Forest
NW 254 Stewart Greens – Normandeau Gardens	2.4	Stepping Stone	City of Edmonton	Tableland Forest
Secord - Winterburn School NA - NW 7010	5.7	Stepping Stone	City of Edmonton	Wetland
Big Island	28.3	Regional Core Area	Province of Alberta	River Valley Forest Riverine
SW 51 – Windermere N2	1.4	Stepping Stone	City of Edmonton	Tableland Forest
SW 40 – Windermere N1	2.4	Stepping Stone	City of Edmonton	Tableland Forest
Falconer Heights Natural Area	1.9	Stepping Stone	City of Edmonton	Tableland Forest
White Birch Natural Area – NW 384	13.1	Stepping Stone	City of Edmonton	Tableland Forest (with sandy areas)
Other river valley sites (City owned – Zoned A)	226.6	Core Area and Stepping Stones	City of Edmonton	River Valley Forest Riverine Wetland
<b>Whitemud / Blackmud Planning Area</b>				
MacTaggart Sanctuary	108.9	Core Area	University of Alberta	River Valley Forest Riverine
Whitemud Nature Reserve	116.3	Core Area	City of Edmonton	River Valley Forest Riverine
Hodgson Wetland – SW 6002	2.5	Stepping Stone	City of Edmonton	Wetland
McGrath Heights Natural Area – SW 86	6.6	Stepping Stone	City of Edmonton	Tableland Forest

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Natural Area	Area(ha)	Network Element	Owner	Primary Habitat Type
Southwest Mixedwood Natural Area – SW 6001		3.8	Stepping Stone	City of Edmonton Tableland Forest
Virginia Park – SW 31	2.5	Stepping Stone	City of Edmonton	Tableland Forest
North Virginia Park – SW 74	1.1	Stepping Stone	City of Edmonton	Tableland Forest
Other river valley sites (City owned – Zoned A)	445.5	Core Area and Stepping Stones	City of Edmonton	River Valley Forest Riverine
Middle North Saskatchewan River Valley Planning Area				
U of A Forest Reserve (Old Growth)	9.0	Regional Biological Corridor	University of Alberta	River Valley Forest
Other river valley sites (City owned – Zoned A)	465.1	Regional Biological Corridor	City of Edmonton	River Valley Forest Riverine
Lower North Saskatchewan River Valley Planning Area				
East Fraser Woodland	2.6	Stepping Stone	City of Edmonton	River Valley Forest
NE 8010 - 167 Avenue – Meridian Street Natural Area	4.2	Stepping Stone	City of Edmonton	Tableland Forest
Other river valley sites (City owned – Zoned A)	103.6	Stepping Stones	City of Edmonton	River Valley Forest Riverine
Horsehills Planning Area				
Vriend Lake	9.25	Stepping Stone	Province of Alberta	Wetland
Moran Lake	90.1	Stepping Stone	Province of Alberta	Wetland
Crystallina Woodland	5.0	Stepping Stone	City of Edmonton	Tableland Forest
Schonsee Wetland Natural Area	11.2	Stepping Stone	City of Edmonton and Province of AB	Wetland
McConachie Natural Area	13.8	Stepping Stone	City of Edmonton	Tableland Forest
Poplar Lake	15.9	Stepping Stone	Province of Alberta	Wetland
Mill Creek Planning Area				
Mill Creek Ravine Park – RV 93	124.1	Stepping Stone	City of Edmonton	River Valley Forest
Upper Mill Creek Ravine – RV 97	138.4	Stepping Stone	City of Edmonton	River Valley Forest
Maple Ridge Natural Area	5.2	Stepping Stone	City of Edmonton	Wetland
Starblanket Park	1.6	Stepping Stone	City of Edmonton	Tableland Forest
Weinlos Natural Area	1.5	Stepping Stone	Neighbourhood	Tableland Forest
Pollard Meadows Natural Area	1.4	Stepping Stone	City of Edmonton	Tableland Forest
Roper Pond – SE 5090	15.5	Stepping Stone	City of Edmonton	Wetland
Fulton Marsh	21.3	Stepping Stone	City of Edmonton	Wetland
SE 5094 – Fulton Pylypow Woodland	12.3	Stepping Stone	City of Edmonton	River Valley Forest
Other river valley sites (City owned – Zoned A)	141.6		City of Edmonton	River Valley Forest
Southeast Moraine Planning Area				
Southeast Slough Natural Area – SE 5010	9.9	Stepping Stone	Province of Alberta	Wetland

# 5. APPENDICES

## APPENDIX D: EDMONTON'S WILDLIFE AND NATIVE PLANT BIODIVERSITY

As with most biodiversity studies, the diversity of certain taxa in Edmonton are better known than others. For example, bird diversity is well known in Edmonton, due in large part to a local environmental non-profit group that conducts annual monitoring. Mammal, amphibian, reptile and fish diversity is also relatively well known. Although Edmonton has several local groups dedicated to studying invertebrates, their diversity is one of the least well known measures of biodiversity, partly due to the huge number of species, their relatively small sizes and the labour intensiveness of collection and identification. Therefore, the invertebrate biodiversity numbers in this appendix reflect only some of the more easily acquired data. Similarly, due to the high diversity of plant species in Edmonton, the listed species numbers for vascular plants represent the best-known data to this date.

TABLE 4: LOCAL AREA SPECIES LISTING

### A. BIRDS

Source: Edmonton Nature Club bird list

Total Species: 178

Total Sensitive/At-Risk Species: 32

\* INDICATES PROVINCIAL LISTING AS SENSITIVE  
\*\* INDICATES PROVINCIAL LISTING AS AT RISK

<b>GEESE, SWANS, &amp; DUCKS</b> American Wigeon Blue-winged Teal Bufflehead Canada Goose Canvasback Common Goldeneye Common Merganser Gadwall Greater Scaup Greater White-fronted Goose <b>Green-winged Teal*</b> Hooded Merganser <b>Lesser Scaup*</b> Mallard <b>Northern Pintail*</b> Northern Shoveler Red-breasted Merganser Redhead Ring-necked Duck Ruddy Duck Snow Goose Tundra Swan  <b>PHEASANTS &amp; GROUSE</b> Gray Partridge Ring-necked Pheasant Ruffed Grouse	<b>LOONS &amp; GREBES</b> Common Loon <b>Horned Grebe*</b> <b>Pied-billed Grebe*</b> Red-necked Grebe  <b>PELICANS, CORMORANTS, &amp; HERONS</b> <b>American White Pelican*</b> <b>Black-crowned Night-Heron*</b> Double-crested Cormorant <b>Great Blue Heron*</b>  <b>HAWKS, EAGLES, &amp; FALCONS</b> American Kestrel <b>Bald Eagle*</b> Cooper's Hawk Merlin Northern Goshawk <b>Northern Harrier*</b> <b>Osprey*</b> <b>Peregrine Falcon**</b> Red-tailed Hawk Rough-legged Hawk Sharp-shinned Hawk Swainson's Hawk*	<b>RAILS &amp; CRANES</b> American Coot <b>Sandhill Crane*</b> <b>Sora*</b>  <b>PLOVERS &amp; SANDPIPERS</b> American Avocet Greater Yellowlegs Killdeer Least Sandpiper Lesser Yellowlegs Long-billed Dowitcher Marbled Godwit Semipalmated Sandpiper Solitary Sandpiper Spotted Sandpiper Willet Wilson's Phalarope Wilson's Snipe  <b>GULLS &amp; TERNS</b> <b>Black Tern*</b> Bonaparte's Gull California Gull Common Tern <b>Forster's Tern*</b> Franklin's Gull Herring Gull Ring-billed Gull
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# 5. APPENDICES

## PIGEONS & DOVES

Mourning Dove  
Rock Pigeon

## OWLS

**Barred Owl\***

Boreal Owl  
Great-horned Owl  
Long-eared Owl  
Northern Saw-whet Owl  
Snowy Owl

## HUMMINGBIRDS & KINGFISHERS

Belted Kingfisher  
Ruby-throated Hummingbird

## WOODPECKERS

American Three-toed Woodpecker

**Blackbacked Woodpecker\***

Downy Woodpecker  
Hairy Woodpecker  
Northern Flicker

**Pileated Woodpecker\***

Yellow-bellied Sapsucker

## FLYCATCHERS

Alder Flycatcher  
Eastern Kingbird

**Eastern Phoebe\***

**Least Flycatcher\***

Western Wood-Pewee  
Shrikes & Vireos  
Blue-headed Vireo  
Northern Shrike  
Philadelphia Vireo  
Red-eyed Vireo  
Warbling Vireo

## JAYS & CROWS

American Crow  
Black-billed Magpie  
Blue Jay  
Common Raven

## SWALLOWS

Bank Swallow

**Barn Swallow\***

Cliff Swallow

**Purple Martin\***

Tree Swallow

## CHICKADEES & NUTHATCHES

Black-capped Chickadee  
Boreal Chickadee  
Brown Creeper  
Red-breasted Nuthatch  
White-breasted Nuthatch

## WRENS & KINGLETS

Golden-crowned Kinglet  
House Wren  
Marsh Wren  
Ruby-crowned Kinglet

## THRUSHES

American Robin  
Hermit Thrush  
Swainson's Thrush  
Townsend's Solitaire

## MIMICS & WAXWINGS

Bohemian Waxwing  
Cedar Waxwing  
European Starling  
Gray Catbird

## WARBLERS & TANAGERS

American Redstart

**Bay-breasted Warbler\***

Black & White Warbler

**Blackburnian Warbler\***

Blackpoll Warbler

**Black-throated Green Warbler\***

**Canada Warbler\***

**Cape May Warbler\***

Chestnut-sided Warbler  
Common Yellowthroat  
Connecticut Warbler  
Magnolia Warbler  
Mourning Warbler  
Northern Waterthrush  
Orange-crowned Warbler  
Ovenbird  
Palm Warbler  
Tennessee Warbler

**Western Tanager\***

Wilson's Warbler  
Yellow Warbler  
Yellow-rumped Warbler

## SPARROWS, BUNTINGS, & CARDINALS

American Tree Sparrow  
Chipping Sparrow  
Clay-coloured Sparrow  
Dark-eyed Junco  
Fox Sparrow  
Harris's Sparrow  
Le Conte's Sparrow  
Lincoln's Sparrow  
Rose-breasted Grosbeak  
Savannah Sparrow  
Snow Bunting  
Song Sparrow  
Swamp Sparrow  
Vesper Sparrow  
White-crowned Sparrow  
White-throated Sparrow

## BLACKBIRDS & ORIOLES

**Baltimore Oriole\***

Brewers Blackbird  
Brown-headed Cowbird  
Common Grackle  
Red-winged Blackbird

**Rusty Blackbird\***

Yellow-headed Blackbird

## FINCHES & WEAVER FINCHES

American Goldfinch  
Common Redpoll  
Evening Grosbeak  
Hoary Redpoll  
House Finch  
House Sparrow  
Pine Grosbeak  
Pine Siskin  
Purple Finch  
Red Crossbill  
White-winged Crossbill

# 5. APPENDICES

## B. MAMMALS

Source: Smith, H.C. 1979. Mammals of the Edmonton Area. Province of Alberta, Culture and Historical Resources Division.

Total Species: 47

Total Sensitive/May be at Risk Species: 4

\* INDICATES PROVINCIAL LISTING AS SENSITIVE  
\*\* INDICATES PROVINCIAL LISTING MAY BE AT RISK

### SHREWS

Arctic shrew  
Dusky shrew  
Masked shrew  
Pygmy shrew  
Water shrew

### BATS

Big Brown bat  
Hoary bat\*  
Keen's bat  
Little Brown bat  
Northern Long Eared Bat\*\*  
Silver-haired bat

### HARES AND RABBITS

Snowshoe hare  
White-tailed Jack rabbit

### RODENTS

Beaver  
Deer mouse  
Franklin's ground squirrel  
Gapper's Red-backed vole  
Least chipmunk  
Meadow Jumping mouse  
Meadow vole  
Muskrat  
Northern Bog lemming  
Northern Flying squirrel  
Northern Pocket gopher  
Porcupine  
Prairie vole  
Red squirrel  
Richardson's ground squirrel  
Thirteen-lined ground squirrel  
Western Jumping mouse  
Woodchuck

### CANINES

Coyote  
Gray wolf  
Red fox

### BEARS

Black bear

### RACCOONS

Raccoon

### WEASELS

Ermine  
Badger\*  
Least weasel  
Long-tailed weasel\*\*  
Mink  
Striped skunk

### CATS

Cougar  
Lynx

### UNGULATES

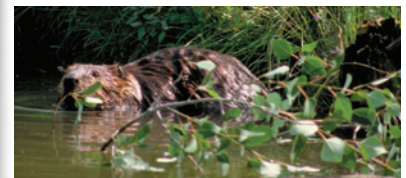
Moose  
Mule deer  
White-tailed deer

### AMPHIBIANS

Boreal chorus frog  
Boreal toad  
Canadian toad  
Tiger salamander  
Wood frog

### REPTILES

Plains garter snake  
Red-sided garter snake



# 5. APPENDICES

## C. FISH

Total Species: 27

Total Sensitive / at Risk Species: 3

SPECIES GROUP	#OF SPECIES
Codfishes	1
Minnows and Suckers	15
Mooneyes	2
Perches	2
Salmonids	3
Sculpins	1
Sticklebacks	1
Sturgeons	1
Trout-perches	1

## D. REPTILES

Total Species: 2

Total Sensitive Species: 2

SPECIES
Western Plains Garter Snake
Red-sided Garter Snake

## E. AMPHIBIANS

Total Species: 5

Total Sensitive / May be at Risk ( \* ): 2

SPECIES
Chorus Frog
Wood Frog
Tiger Salamander
Canadian Toad ( * )
Boreal Toad ( * )



## F. INVERTEBRATES

Records from E.H. Strickland Museum Database  
([www.entomology.ualberta.ca/](http://www.entomology.ualberta.ca/)).  
Not absolute number of species in Edmonton.

SPECIES GROUP	#OF SPECIES
Beetles	188
Butterflies	66
Caddisflies	34
Dragonflies and Damselflies	22
Land snails and slugs	>18
Mosquitoes	36
Moths	951
Pseudoscorpions	8-10
Spiders	~450
Thrips	50
Ticks	5-10



# 5. APPENDICES

## G. VASCULAR PLANTS

Plant Group	Families represented	# of species/family	Total # of species
Trees			
	Aceraceae	1	7
	Betulaceae	1	
	Pinaceae	3	
	Salicaceae	2	
Shrubs			
	Betulaceae	4	54
	Caprifoliaceae	8	
	Cornaceae	1	
	Cupressaceae	1	
	Elaeagnaceae	4	
	Empetraceae	1	
	Ericaceae	5	
	Fabaceae	1	
	Grossulariaceae	6	
	Rhamnaceae	1	
	Rosaceae	8	
	Salicaceae	14	
Forbs/Herbs			
	Adoxaceae	1	292
	Amaranthaceae	2	
	Anacardiaceae	1	
	Apiaceae	8	
	Apocynaceae	2	
	Araliaceae	1	
	Asclepiadaceae	1	
	Asteraceae	63	
	Balsaminaceae	1	
	Boraginaceae	4	
	Brassicaceae	18	
	Campanulaceae	2	
	Caprifoliaceae	1	
	Caryophyllaceae	13	
	Chenopodiaceae	10	
	Convolvulaceae	2	
	Cornaceae	1	
	Dipsacaceae	1	
	Euphorbiaceae	1	
	Fabaceae	24	
	Fumariaceae	1	
	Gentianaceae	2	



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Plant Group	Families represented	# of species/family	Total # of species
	Geraniaceae	4	
	Iridaceae	1	
	Juncaginaceae	2	
	Lamiaceae	12	
	Liliaceae	9	
	Lobeliaceae	1	
	Lythraceae	1	
	Malvaceae	1	
	Onagraceae	7	
	Orchidaceae	10	
	Parnassiaceae	1	
	Plantaginaceae	3	
	Polygalaceae	1	
	Polygonaceae	9	
	Primulaceae	5	
	Pyrolaceae	4	
	Ranunculaceae	22	
	Rosaceae	13	
	Rubiaceae	5	
	Santalaceae	2	
	Saxifragaceae	2	
	Scrophulariaceae	9	
	Solanaceae	3	
	Urticaceae	1	
	Valerianaceae	1	
	Violaceae	5	
Grasses			
	Poaceae	60	60
Sedges			
	Cyperaceae	41	41
Aquatics			
	Alismataceae	2	11
	Callitrichaceae	2	
	Haloragaceae	1	
	Lemnaceae	2	
	Polygonaceae	1	
	Potamogetonaceae	1	
	Sparganiaceae	1	
	Typhaceae	1	
Rushes			
	Juncaceae	7	7
Fern and Fern Allies			
	Lycopodiaceae	1	13
	Ophioglossaceae	1	

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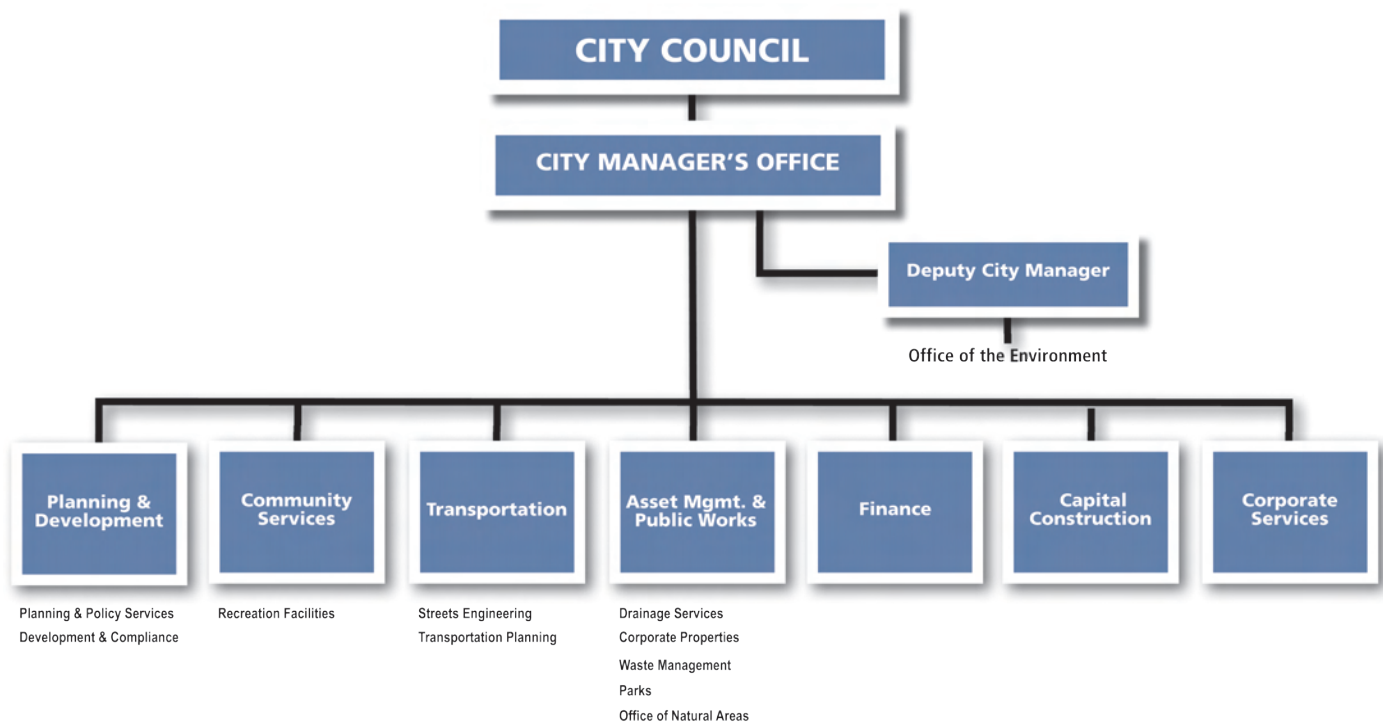
Plant Group	Families represented	# of species/family	Total # of species
	Polypodiaceae	4	
	Selaginellaceae	1	
	Equisetaceae	7	
Parasitic/Carnivorous			
	Droseraceae	1	2
	Monotropaceae	1	
Total Vascular Plant Species in Edmonton		487	

## H. FUNGI

There have been 221 species of fungi documented in Edmonton. Seventy-two of these are Ascomycetes and 149 are Basidiomycetes. Of these, 10 species are edible and 6 species can be used for medicinal purposes.

## APPENDIX E: CITY OF EDMONTON ORGANIZATIONAL STRUCTURE, INCLUDING OFFICES AND BRANCHES INVOLVED WITH NATURAL AREAS PROTECTION.

FIGURE 5: CITY OF EDMONTON OFFICES AND BRANCHES INVOLVED WITH NATURAL AREAS PROTECTION



# 5. APPENDICES

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6	River valley	Jennifer Meers
8 + cover	Skyline	www.edmonton.com
10	Historic river valley	COE EA-10-1159
17	First people	COE EA-10-2865
17	Settlers	COE EA-10-1165
17	Mining	COE EA-10-1180
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20 + cover	Long-tailed Weasel	Gerald Romanchuk
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22	White-tailed Jack rabbit	Royal Alberta Museum
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