Nature Chelsea
Core Area and Corridor Assessment Series:

Assessment of the Larrimac Wildlife Corridor and Conservation Lands

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1.0 INTRODUCTION

Chelsea, Québec exists within the **St. Lawrence lowlands** Ecoregion, a section of the **Mixed Wood Plain Ecozone**. The mixed wood plain is Canada's richest area in biodiversity and the St. Lawrence Ecoregion is a transition from the extremely rich Carolinian forests of the south with the boreal forests of the north. This transition zone is characterized by mixed forests of sugar maple, yellow birch, eastern hemlock, and eastern white pine. However biological diversity is high because of the presence of many southern species such as black cherry, butternut, black ash and bitternut hickory. Chelsea is steward over abundant natural resources, native species, and habitats because of its presence in this transition zone, coupled with low intensity development and the presence of Gatineau Park. Chelsea's rich natural heritage contributes greatly to the quality of life for its citizens. The healthy ecosystems of the region provide economic, environmental, and social benefits to humans. The majority of lands in Chelsea comprise a working landscape, where people live and work and benefit from natural amenities and the ecosystem goods and services that are available in the landscape. The close link between humans and natural amenities requires a harmonious relationship based on the principles of wise use.

Chelsea's Master Plan aims to make the community sustainable, including conserving the biodiversity of the area. The community has several natural advantages in this endeavour, the foremost being the community's proximity to Gatineau Park, a conservation area of 361 square kilometres. This park acts as a core area for biodiversity in the region. The second advantage is the community's proximity to the Gatineau River, one of Québec's major rivers that drains 23,700 km^2 of land within its watershed, and traverses 386 km from north of the Baskatong Reservoir to the Ottawa River. The quality of the water in the Gatineau River is excellent, and it provides habitat for many aquatic species, including the endangered copper redhorse fish. The third advantage is that the current density of houses and roads still permits many species of wildlife to flourish within the community, including on private residential lands. The majority of Chelsea's residential lots are maintained in native forest cover by their owners. In addition, wetlands over 1,000 m^2 are protected by municipal by-law, and the shorelines of lakes and streams are protected by Québec legislation.

According to the Master Plan, Chelsea is fifteen years away from being completely "built out". As Chelsea further intensifies the density of development on the landscape, there is a need to develop a plan for conservation priorities within our municipal boundaries and

with adjacent lands to reduce impacts of habitat loss and fragmentation and isolation of Gatineau Park from surrounding habitat. Provision of information such as a map of the areas of high value to biodiversity and best management practices for balancing needs of native species with human needs is key to achieving sustainable development.

1.1 The Nature Chelsea Project

Nature Chelsea is a partnership project of the Municipality of the citizens group called ACRE (Chelsea and Action Chelsea for the Respect of the Environment). ACRE has a 10 year track record of successful partnership projects with the municipality, including creating bylaws on wetland conservation and pesticide management and well as the management of water quality and quantity. Nature Chelsea (http://www.chelsea.ca/) is the latest project. Its primary goal is to provide useful information to citizens, landowners and land-use planners on the biodiversity values of Chelsea and to identify the necessary municipal conservation initiatives to support biodiversity. The Nature Chelsea approach emphasizes the maintenance of biodiversity and habitat connectivity within the Municipality of Chelsea through proactive conservation planning. On a **fine scale**, Nature Chelsea aims to ensure that ecological design principles are integrated into the early stages of the design of residential subdivisions to protect biodiversity and reduce the subdivision's ecological impact. On a **broad scale**, Nature Chelsea aims to identify core areas with high value to biodiversity and habitat linkages between Gatineau Park and the Gatineau River. Overall, Nature Chelsea considers how the conservation of natural areas might be incorporated early in the community development planning process to ensure the sustainable development of the community, a legacy for biodiversity, and the well-being of our citizens through provision of greenspace.

Nature Chelsea is a conservation planning project that strives to provide useful information to citizens, landowners and Municipal planners on the biodiversity value of natural habitats remaining in Chelsea and to guide decisions about future conservation efforts. Nature Chelsea presents the Chelsea community with an excellent opportunity for integrating an "operational" dimension into local and regional efforts for sustainable development. Moreover, the project results can be fully integrated into municipal planning documents as part of an overall approach to sustainable development. For example, Chelsea's Master Plan will be revised in 2011, and the Municipality of Chelsea will incorporate a Sustainable Development Plan with the Master Plan. The information and decision support tools developed by Nature Chelsea will be a valuable asset to

these guiding documents, and will position Chelsea as a leader in sustainable development in Québec and throughout Canada.

1.2 Vision

Nature Chelsea envisions a system of conserved natural areas, consisting of core habitat areas (terrestrial and aquatic) and corridors that connect the Gatineau River to Gatineau Park, that together comprise an ecological network capable of providing ecological goods and services and supporting rare species, and that is supported by Chelsea residents as a valued asset.

1.3 Goal and Objectives

The goal of Nature Chelsea is to support the conservation of Chelsea's biodiversity and to recognize the conservation of natural areas as critical to successful sustainable development of the Municipality, through:

- **Conservation Planning**: Gathering scientific information to support biodiversity-friendly decision-making, and developing a biodiversity conservation plan designed to ensure effective conservation of biodiversity and natural areas of Chelsea;
- **Outreach**: Increasing public understanding and appreciation of Chelsea's biodiversity, and;
- **Land Stewardship**: Helping landowners to manage their properties in ways that support biodiversity.

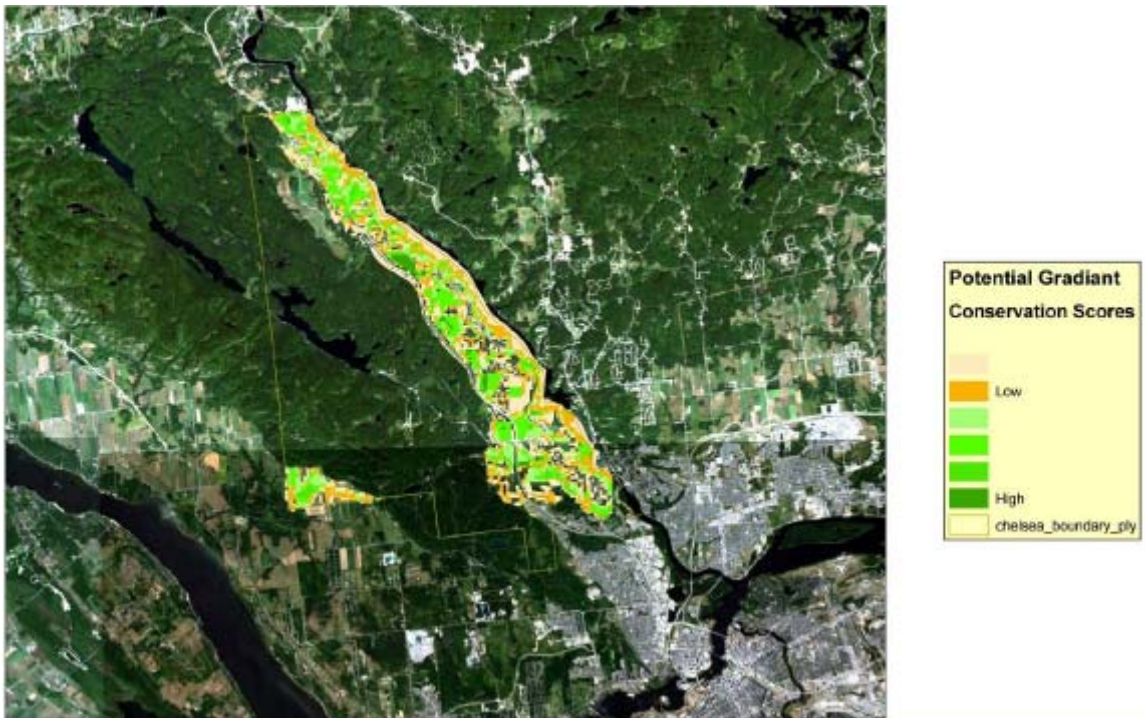
The Nature Chelsea project is considered a pilot, whereby learning outcomes can be applied to a broader region of the Gatineau Hills. Through conservation planning, land stewardship and community outreach, the project aims to assist local governments and the community to make informed decisions about the wise use of natural resources in the working landscape of the Gatineau Hills.

1.4 Nature Chelsea Conservation Planning Assessment

Conservation Planning is a systematic process that aims to conserve ecological values in a manner is both scientifically defensible and transparent and accessible for stakeholders. The process applies principles of conservation biology and uses analytical approaches for assessing conservation values of natural areas. The relative significance of natural lands is characterized with respect to various conservation attributes or values to inform prioritization of conservation goals.

Conservation Planning Assessment is a science-based analysis using the best data currently available to describe and map Chelsea's ecological network, which includes several **core areas** (large patches of forest or wetlands), connected by **linkages**, or **movement corridors**. The core areas provide for the life history needs of its inhabitants, and linkages (movement corridors) allow for the movement of species between habitat patches, across space and time. The methods and detailed results of the Conservation Planning Assessment are detailed in the report: Chelsea Conservation Planning Assessment. The assessment resulted in a Conservation Planning Map (Figure 1) and species occurrence database, designed to inform landowners, residents, and the Municipality of Chelsea on the biodiversity value of natural habitats remaining in Chelsea and to guide decisions about future conservation efforts. It is the result of a collaborative effort involving an expert panel of conservation biologists and regional taxonomic experts. Several agencies and organizations, and many expert scientists contributed data to the Conservation Planning Map and database.

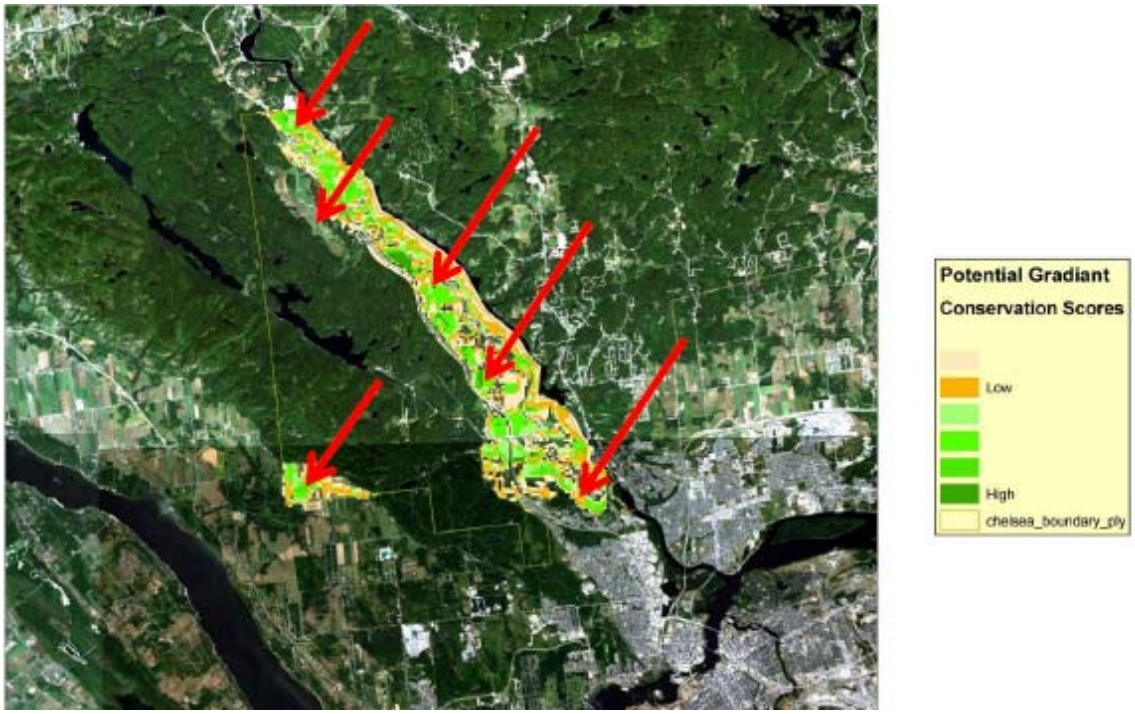
Figure 1 – Model Output for Areas of Conservation Value in Chelsea Based on Intactness, Distance form Disturbance and Rare Species



As a result of the Conservation Planning Assessment, 7 core habitat areas and 8 primary movement corridors were identified. Designation of core habitat areas was based on conservation values, with a focus on large patch size, minimum fragmentation, and presence of riparian or wetland habitats. Based on these criteria, 6 core habitat areas were identified across Chelsea (Figure 1):

- Chelsea Creek Old Field
- Meredith Forest
- Juniper Forest
- Larrimac Forest
- National Capital Commission Forest
- Winnisic Forest
- Hollow Glen Forest and Fields

Figure 2 – Model Outputs for Corridors of High Conservation Value in Chelsea Based on Connecting Key Habitats



Designation of habitat linkages was based on the presence of riparian habitat and or remnant forest that link Gatineau Park with the Gatineau River or Gatineau Park with the Ottawa River, thus contributing to the long-term persistence of key species and habitats in the region.

Six primary linkages (wildlife movement corridors) were identified in Chelsea (Figure 2):

- Chelsea Creek
- Juniper
- Larrimac
- Winnisic
- Meech Creek
- Hollow Glen

1.5 Purpose of Report

The purpose of the current report is to provide details on the Nature Chelsea assessment of one of the identified core areas and wildlife movement corridors: the Larrimac Wildlife Corridor and Conservation Lands.

2.0 BACKGROUND ON HABITAT FRAGMENTATION, CORRIDORS AND CONSERVATION

2.1 The Impact of Habitat Fragmentation

Forest fragmentation occurs when large, contiguous forests are divided into smaller patches by roads, residential and commercial development, agriculture, and timber harvesting. (Wilcove et al. 1998). As mature forests become fragmented, they are less able to support their native species (Gilpin and Soule 1986). For example, birds that are sensitive to forest fragmentation experience diminished reproductive success due to factors that are symptomatic of forest fragmentation, such as brood parasitism and nest predation. Nests constructed near the edge of the forest are vulnerable to parasitism by brown-headed cowbirds, a brood parasite that lays its eggs in the nests of other species. Nest predators such as raccoons, blue jays, common crows, grey squirrels, and domestic cats, are common along forest edges, and nests constructed away from forest interior are more vulnerable to nest predation. Moreover, forest interior species find more of their preferred food in the forest interior, where conditions tend to be moister and there is a greater diversity of microhabitats that support a greater variety of insect species.

Three primary consequences of fragmentation are distinguished: (1) The size of patches becomes smaller, (2) the connectivity between patches decreases due to a reduction in the size of surrounding patches and/or increasing distances to them and (3) the edge to interior ratio increases (Saunders et al. 1991). These changes can disturb the processes of migration, recolonization, and the population dynamics of resident species, resulting in greater risk of population extirpation.

The loss of species from fragmented habitat is well documented in the scientific literature (Samson and Knopf 1994; Laurance et al. 2002). Even large preserves that are isolated cannot maintain viable populations of wide-ranging species (Gurd et al. 2001; Newmark 1995). The impacts of habitat fragmentation are not limited to large-bodied animals; impacts have been documented for small bodied animals such as butterflies (Leidner et al. 2010), insects (Ricketts et al. 2006), birds (Marra et al. 2006) or small mammals (Frankham 2006).

Populations can become isolated within their patch when all of their surrounding patches of habitat are destroyed. This makes migration into different patches difficult and

hazardous. Isolated populations experience elevated extinction risk and are prone to decline due to inbreeding and loss of genetic diversity as well as chaotic swings in numbers due to random chance (demographic stochasticity).

In addition to species loss and reduction of individual movements, habitat fragmentation can cause the disruption of ecological processes such as forest dynamics and trophic interactions (e.g. herbivory, predations, or parasitism). The consequences of disrupting vital ecological processes may be profound (Karieva 1987; Laurance et al. 2001; Kolb 2005; Valladares et al. 2006).

2.2 The Role of Core Habitat, Interior Forest, and Wildlife Movement Corridors

Core Habitat identifies key areas that are important for the long-term persistence of populations of species, including rare species, and a diversity of natural communities and ecosystems. Core habitat should 1) be minimally impacted by anthropogenic stress (e.g. roads, housing, logging, agriculture); 2) provide for the needs of wide-ranging native species; 3) support ecological processes; 4) maintain connectivity among habitats; and 5) enhance ecological resilience to natural and anthropogenic disturbances. Protection of core habitats will contribute to the conservation of specific components of biodiversity (genes, species, and ecosystems).

Forest interior habitat occurs within large patches of forest. Such interior habitat is important because several species require it for survival. The influence of forest edges impacts a range of ecological variables, such as rates of predation and microclimate. Forest interior habitat is related to the configuration of the forest patch. Round or square shaped forests would have a greater amount of interior habitat that a long narrow forest of equal area (acres or hectares).

Forest interior habitat has different ecological properties that than habitat along the edges of forests. Forest edges are sunnier, drier paces, and they support species that prefer the edge of a forest to the forest interior, which tend to be shadier, more humid, and less windy than edge habitat. Typically, forest interior species cannot successfully compete for habitat against species found along forest edges. Moreover, predation tends to be more prevalent along forest edges, which attract predators from adjacent habitat types.

Forest edges are also more accessible to parasites that may occur in adjacent fields or developed areas. Nest parasites, such as Cowbirds, are more common in forests adjacent to the open fields where they feed. Cowbirds lay their eggs in the nests of other birds, and typically push out the other nestlings or out-compete them for food, leaving the host birds to care for the cow bird nestling rather than their own young.

A wildlife corridor, also known as a landscape linkage, a land bridge, or greenway, is typically a linear strip of habitat that is connected to larger reserves or patches of habitat and allows for the movement of wildlife between the patches. Corridors perform several ecological functions, such as allowing wildlife to move out of habitats that have become unsuitable, permitting the colonization of habitats that have become suitable for use, and allowing for recolonization of habitat patches following population extirpation. These functions are critical to preventing reserves from becoming genetically isolated from other habitats in a human-dominated landscape matrix. The negative impacts of isolation of protected reserves has been well documented in the scientific literature, and includes species extinction, population extirpation, reduced genetic resiliency, alteration of plant communities, and reduced functionality of ecological processes (Woodley, 2002).

Wildlife corridors connecting core reserves reduce habitat fragmentation and increase the effective amount of habitat that is available for species (Noss 1987, 1992; Saunders and Hobbs 1991; Noss et al. 1996). In a recent volume on wildlife corridors, Kevin Crooks and M. Sanjayan list the benefits of corridors including: 1) increasing or maintaining species diversity; 2) allowing for individuals to colonize habitat patches thus reduce extirpation risk; 3) allowing for recolonization of extinct local populations; and 4) preventing inbreeding depression due to low amount of genetic material in a small population. Movement corridors are especially important for migratory animals and those with large home ranges with need several large connected patches for survival. Larger habitats support greater biodiversity, larger populations, and a wider range of food sources and shelter. They also improve the long-term genetic viability of wildlife in core reserves by allowing for movements of individuals and interbreeding of populations between reserves.

Wildlife Corridors must be wide enough to allow easy movement for the largest-bodied mammals, including black bear, white-tailed deer, and wolves. Wildlife Corridors can also function at smaller scales to provide habitat connectivity for small-bodied species, including amphibians, fish, birds, insects, and even plants. In urban areas, corridors can provide important linkages in a highly fragmented landscape.

3.0 CONSERVATION ASSESSMENT OF LARRIMAC FOREST

3.1 General Description

The Larrimac forest core area is located east of Highway 5, west and south of the Larrimac Golf Course. The forest is connected to Gatineau Park via a stream and riparian habitat, as well as a large tunnel underpass. The total area is approximately 337 acres (Figure 3), and is comprised mixed forest, numerous wetlands, vernal (ephemeral) pools, hills, valleys, and streams.

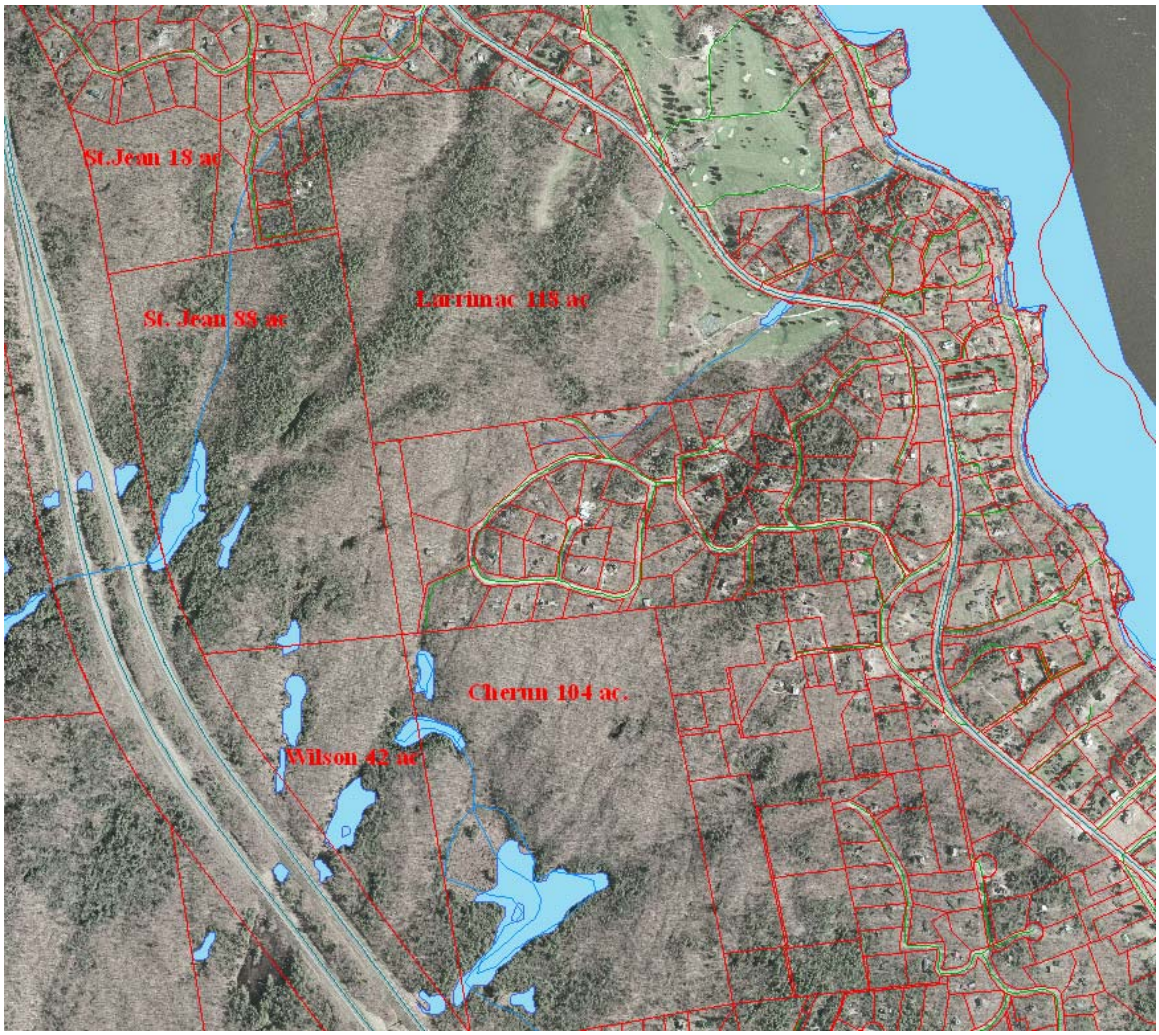


Figure 3. Larrimac Forest Area Land Ownership Map, Chelsea Québec.

3.2 Priority Natural Communities

A natural community can be defined as an interacting assemblage of plant and animal species that share a common environment and co-occur throughout the landscape. Examples of natural communities include forests, treed swamps, bogs, and marshes. Nature Chelsea gives conservation priority to types of natural communities with limited regional distribution, and to the best examples documented of more common types such as mature maple forest. Conservation of these natural communities will support the persistence of characteristic common as well as rare species within Chelsea. The following descriptions of priority natural areas are pertinent to the Larrimac Forest.

3.2.1 Vernal Pools

Vernal, or ephemeral pools are small seasonal wetlands that provide critical habitat for numerous species, particularly during the spring breeding season for amphibians and invertebrates. The persistence of populations of vernal pool-breeding species depends on the presence of the vernal pool as well as the condition of adjacent upland forest habitat for foraging, overwintering, and migration of individuals among pools. Areas with numerous vernal pools support viable populations of vernal pool breeders because individuals breeding at the different pools interact over time and maintain the overall population as breeding success shifts among pools with changing environmental conditions. The Larrimac forest supports numerous vernal pools.

3.2.2 Forest Interior

The Larrimac forest is the best example in Chelsea of an intact forest that is least impacted by roads and housing development. Interior forest habitat supports many bird species sensitive to the impacts of roads and development, such as the Red-eyed Vireo and Ovenbird, and helps maintain ecological processes found in unfragmented forest patches.

3.2.3 Forested Riparian Habitat

The Larrimac forest is bisected by several streams flowing to northwesterly to the Gatineau River. The streams originate at the height of land where they is a series of wetlands and ponds in Gatineau Park and on the Larrimac forest. The stream flow creates seasonal flooding and the presence of a riparian community. Theses moist communities are critical movement areas for insects, amphibians, and reptiles which cannot tolerate the dryer ridges.

3.2.4 Hemlock Ridges

The Larrimac forest contains a series of prominent Hemlock ridges that run southwest to northeast direction. These ridges are virtually pure hemlock and represent some of the northern most examples of pure stands of this species. The hemlock ridges are important travel corridors or many species of wildlife, offering excellent escape terrain for clear sight lines against predators.

3.2.5 Butternut Forest

The Larrimac forest has a very high diversity of tree species. Butternut (*Juglans* cinerea) is a tree that is listed under Canada's Species at Risk Act as Endangered. This is the highest category of risk, and means the species is facing imminent extirpation or extinction. Butternut is scattered throughout the Larrimac forest. However there is a significant stand of Butternut in the northwest corner of the Larrimac forest, where there are dozens of individuals. Many of these trees are healthy and show no impact of Butternut canker.

3.2.6 Old Growth

Within the Larrimac forest, there are some forest stands containing old growth trees. While we did not core any trees for this study there are some exceptional examples of old growth red oak, white ask and hemlock.

3.2.7 Wetland Complexes

The Larrimac Forest contains several undisturbed wetlands, those with intact buffers and little fragmentation or other stressors associated with development. These wetlands support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.). The wetlands range in size from large cattail marches to small pocket fens that are late successional and have developed over centuries.

3.3 Ecosite Descriptions

Ecosystems can be described in a hierarchical manner, such as the Ecological Classification System of Canada (ELC), which describes a nested hierarchy of spatially-defined polygons including ecozones, ecoprovinces, ecoregions, and ecodistricts. Within ecoregions, forested land can be further classified into ecological sites, or ecosites, which are defined by an assemblage of factors such as topography, geology, landforms, soil type and moisture regime, aspect, and slope, together which determine the type of plant community that grows on the site. An ecosite can be defined as a habitat patch with specific natural vegetation community and specific site characteristics, which differs from other types of ecosites in its ability to produce certain types of vegetation.

The Québec ecoforestier classification system has defined and mapped forest units at larger scales than the ecosite level. Ecosites are a finer scale of resolution and describe a suite of site conditions including elevation, slope, aspect, soil drainage and soil texture. Ecosite descriptions can be used to predict the composition and productivity of forest communities. Ecosite maps are useful in landscape planning, habitat supply modeling, forest ecosystem management guidelines, and rare plant habitat delineation (Neily et al. 2003).

Ecosites in the Larrimac forest were defined by delineating landforms on aerial photos that typically govern the location of particular plant communities. The preliminary mapping was validated with site visits to define soil type and moisture/nutrient conditions. Fifteen ecosite types were identified in the Larrimac Forest by plant ecologist Dr. Serguei Ponomarenko and ecosystem ecologist Dr. Donald McLennan (Figure 4). The majority of the Larrimac forest is comprised of upland sugar maple forest, upland mixed mature forest, and upland hemlock-white pine mature forest. The Larrimac forest also includes wetlands of several types, including shrubby rich fen, open fen, typha march, and beaver ponds. The variety of ecosite types contributes to the ecological value of the Larrimac forest. A description of each ecosite type follows.

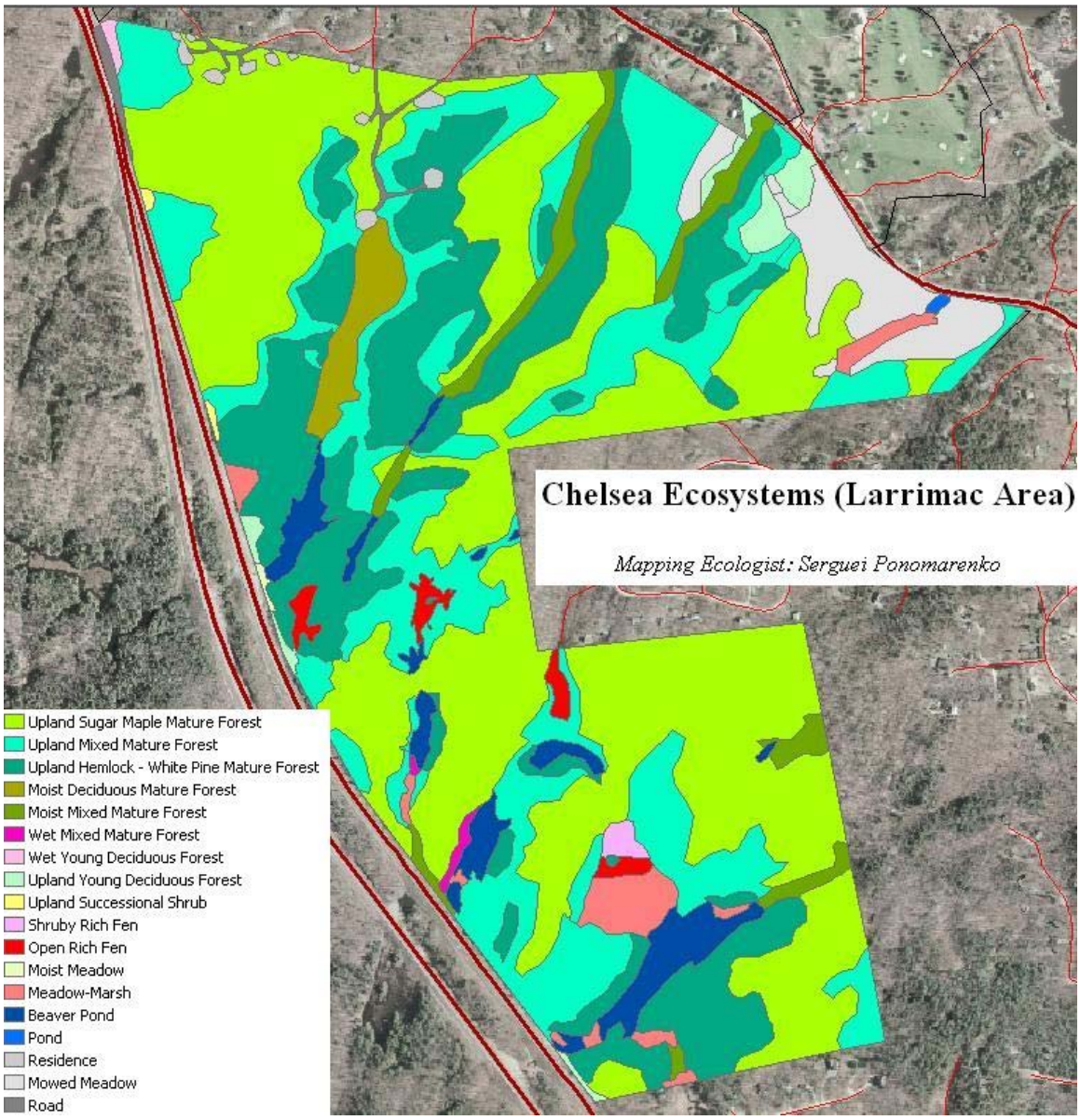


Figure 4. Larrimac Forest Ecosites Map, Chelsea Québec.

3.2.1 Upland Forest Community Group

This group is comprised of several moderately to well-drained ecotypes with a high level of floristic similarity, although individual ecotypes have sets of species that are characteristic to them. Upland indicator species are always dominant in this group. These communities also differ by the level of past disturbance and age.

Upland Sugar Maple Mature Forest

This is one of the matrix communities in the area that occupies moderately well-drained gentle slopes of all aspects. Sugar Maple (*Acer saccharum*) is the dominant or co-dominant species in all layers (Figure 5). Other tree species including White Ash (*Fraxinus Americana*), American Beech (*Fagus grandifolia*), Basswood (*Tilia americana*) and Red Oak (*Quercus rubra*) can be co-dominant in canopy or lower layers. Two variants of this community can be differentiated based on nutrient status: Sugar Maple Mesic Forest and Sugar Maple Rich Forest. Sugar Maple Rich Forest tends to have a polydominant canopy structure with higher percent of White Ash, Basswood and Butternut (*Juglans ceneria*) [endangered status in Canada] and has a specific set of indicator ground species. Sugar Maple Mesic Forest tends to have a higher dominance of Sugar Maple and occasionally co-dominance of American Beech.

Figure 5. Upland sugar maple forest in the Larrimac forest, Chelsea Quebec

Upland Red Oak - Sugar Maple Mature Forest

This community is similar to Upland Sugar Maple Mature Forest, but dominated by red oak. It occupies upper portions of slopes mainly of southern aspect. These sites are well-drained and have a slightly different suite of ground species.

Upland Mixed Mature Forest

This is a transitional community between Upland Sugar Maple Mature Forest and Upland Hemlock Mature Forest. It occupies gentle slopes of predominantly eastern and western aspects. The ground layer is typically comprised of mesic forest species.

Upland Hemlock Mature Forest

This community typically occupies northern slopes and is characterized by absence of recent disturbances (Figure 6). Hemlock (*Tsuga canadensis*) is the main canopy species. Minor components include White Pine (*Pinus strobus*), Eastern White Cedar (*Thuja occidentalis*), Yellow Birch (*Betula alleghaniensis*), American Beech and other deciduous species. It has the least number of introduced species and the highest diversity of fungi species.

Figure 6. Upland Hemlock Mature Forest in the Larrimac Forest, Chelsea Quebec.

3.2.2 Moist and Wet Forest Group

This group embraces several ecotypes with imperfect and poor drainage and presence of both upland and wetland indicator species such as Sensitive Fern (*Onoclea sensibilis*) and Cinnamon Fern (*Osmunda cinnamomea*) in the floristic composition.

Moist Mixed Mature Forest

This ecotype is composed of both deciduous and coniferous species such as American Ash, Green Ash (*Fraxinus pensylvanica*), Yellow Birch, Red Maple (*Acer rubrum*) and Eastern Hemlock.

Moist Deciduous Mature Forest

This ecotype often occurs along existing drainage corridors with permanent or intermittent creeks (Figure 6). Canopy dominant species are Red Maple and Yellow Birch; less common are Green Ash, American Ash and Sugar Maple. Species of ferns are often dominant in the ground cover.

Figure 7. Butternut tree, found in moist mature forest ecosite in Larrimac Forest.

Wet Mixed Mature Forest

This is a swamp community with often expressed micro relief. Tree species and some upland ground species grow on hummocks and wetland species occupy depressions between hummocks. Tree species may include Eastern Hemlock, Yellow Birch, Black Ash, Green Ash, Red Maple, Balsam Fir and White Spruce. A variant of this community is Hemlock-Yellow Birch Swamp with two species dominant in the canopy.

Black Ash Swamp

This is a wetter community than Moist Deciduous Mature Forest and typically has mostly Black Ash and Red Maple as co-dominant species in different proportions. It always occupies lower portions of drainage depressions. Ground cover is species rich.

Grey Alder Swamp

This can be a wet to very wet community that grades to a marsh or a rich fen. It occupies margins of large depressions and beaver ponds and experiences fluctuations of water table on an annual and perennial basis. Grey Alder (*Alnus incana ssp. rugosa*) sometimes together with other wetland tall shrubs (such as Mountain Holly (*Nemopanthus mucronata*) and American Winterberry (*Ilex verticillata*)) creates the tall shrub layer. In the low shrubs, Sweet Gale (*Myrica gale*) and Narrow-Leaved Meadowsweet (*Spiraea alba*) are common. A combination of marsh and rich fen species is common in the ground layer.

3.2.3 Open Wetland Ecosites

This group of ecosites includes communities with poor and very poor drainage. They are too wet to sustain tree growth although individual trees may occur in transitional communities or on micro-relief elevations. Wetland indicator species are always dominant on this group.

Open Rich Fen/Shrubby Rich Fen

This community occupies transitional depressions with slow ground water movement (Figure 8). The water level is relatively stable. The species diversity in this community is very high and some species would not occur in other communities. The main stratum is a herb layer although a sparse shrub layer can be present. The moss layer has high diversity including species of *Sphagnum, Drepanocladus, Aulacomnium* and others.

Figure 8. Open rich fen ecosite found in Larrimac forest, Chelsea Quebec.

Meadow – Marsh

This community occupies portions of beaver pond depressions and is subject to periodic flooding. This community can host a great number of species although the species composition and diversity in a particular stand can vary in broad limits depending on the history of the disturbance regime.

Moist Meadow

This community represents the driest end of Meadow – Marsh community. It can also be found in upland areas with subsurface seepage and periodic anthropogenic disturbance. It has a higher proportion of upland meadow species compare to the Meadow – Marsh community.

Cattail Marsh

This community often occurs adjacent to Meadow – Marsh and occupies wetter areas with stagnant water at or above the surface a significant portion of the growing season (Figure 8). Two species of cattail are dominant in this community. It can have the same species as Meadow – Marsh community but with lower diversity. Some aquatic species

such as Water Lilly (Nuphar variegata) and Frogbit (Hydrocharis morsus-ranae) are also very common in this community.

Figure 8. Cattail marsh ecosite in Larrimac Forest, Chelsea Quebec.

3.2.4 Pond Community Ecosites

Beaver Pond

This ecotype defines communities that have water above the surface during most of the growing season. It is dominated by floating leaf or submerged aquatic vegetation, and may form a complex with floating mat fen. Note that there are no good examples of large floating mat fens within the area, but small fragments of it are common.

Pond

This community is a water body resulting from the damming of a creek. As an ecosystem it has lower biological diversity compared to beaver ponds and more stable water regimes.

3.2.5 Anthropogenic and Early Successional Upland Community Group

Communities in this group had a severe anthropogenic disturbance in the past or have such disturbances at regular interval.

Upland Young Deciduous Forest

There is a variety of types within this community that differ according to the disturbance history, severity of impacts by invasive species and proximity to the natural forests.

Upland Successional Shrub

This type usually occupies some post-agricultural lands or surfaces created in a course of road construction. This ecosite type typically has a high rate of invasive species presence.

Mowed Meadow

This is an anthropogenic type with frequent disturbance. The species diversity is very low and represented mostly by exotic species. Nevertheless, it represents a very specialized habitat for some species (such as wild thyme, *Thymus serpyllum*).

Wet Young Deciduous Forest

Younger-aged hygric to sub-hygric forests in small depressions composed of red maple with a understory of ferns and sedges. These areas have a history of forest harvest.

3.3 Species Occurrence

Nature Chelsea organized and conducted several surveys to record species occurrence in the Larrimac Forest. In June 2009 and 2010, components of the Larrimac Forest were surveyed as part of the Nature Chelsea BioBlitz by taxonomic experts in plants, birds, reptiles and amphibians, insects, and mammals. Between 2009 and 2010, a total of 190 species were recorded in the Larrimac forest, including 117 plant species, 31 bird species, four amphibian species, 28 insect species, and 11 mammal species (Figure 9).

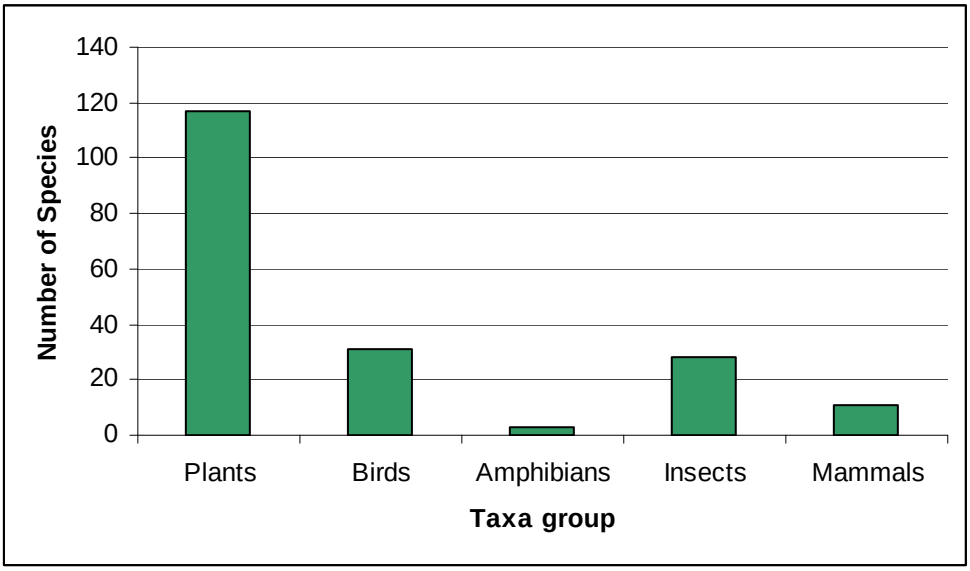


Figure 9. Species recorded in the Larrimac Forest during the 2009 and 2010 BioBlitz

Among the bird species recorded during breeding season, five species are considered forest interior birds, including veery, black-throated green warbler, black and white warbler, ovenbird and yellow-throated vireo. These species are sensitive to forest loss and fragmentation, and overall habitat degradation.

In addition, as part of a wildlife corridor study, a mammal survey was conducted using remote cameras and snow tracking transects during fall 2009 – spring 2010. Details of the mammal surveys are provided below.

3.4 Species at Risk

We recorded three species at risk in the Larrimac forest, including the butternut tree (*Juglans cinerea)*, the white trillium (*Trillium grandiflorum)*, and the bellwort (*Uvulaire grande-fleur*). The butternut is listed as endangered by the Species at Risk Act, and the white trillium and the bellwort are listed as threatened under the Québec Species at Risk Act. During fall 2009 and 2010, a survey of Butternut trees was conducted. The Larrimac forest contains stands of healthy butternut trees. Butternuts are dying throughout their range due to an introduced canker species (a fungus). It is not well known whether some individuals are resistant to the canker. If this is indeed the case, the future of the butternut tree may depend on finding a preserving healthy stands of trees.

Large-flowered bellwort (Uvularia grandiflora) is a plant in the family Colchicaceae, native to eastern North America. It is found in the Gatineau at the northern extend of its range and is listed as threatened in Quebec because of forest cutting and urbanisation. In the Larrimac forest it is found in rich, older growth sites.

Trillium grandiflorum, commonly known as Great White Trillium, is a perennial member of the lily family. In Quebec, it is found only is the rich sugar maple forests of south. Like Large-flowered bellwort, its status as a species at risk is because of poor forestry practices and land conversion to urbanisation.

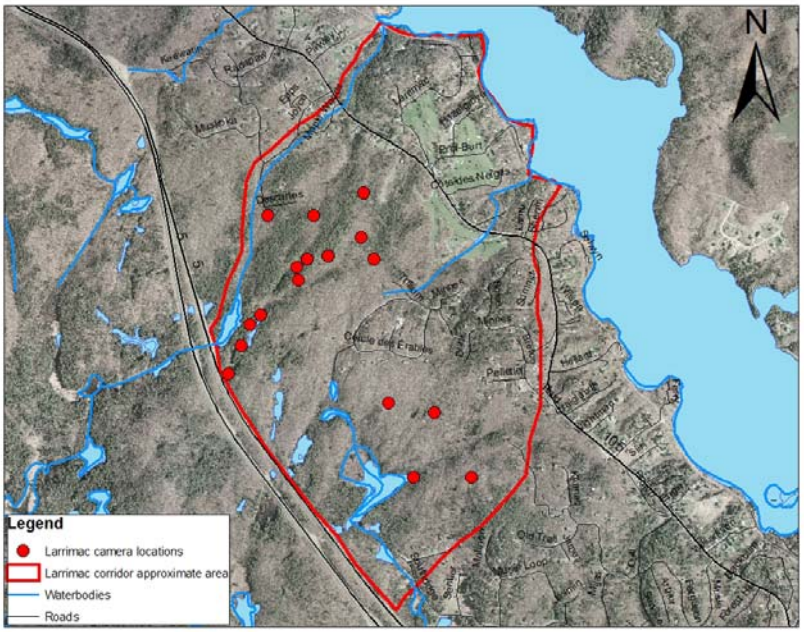
All of the above species are also impacted by high populations of white tailed deer. At high population levels, excessive browsing by deer can eliminate species such as bellwort and great white trillium. The presence of wolves and coyotes controls deer populations and allows the persistence of these rare species. Wolves and deer are maintained by keeping core conservation lands and wildlife corridors. This is just one example of how the maintenance of species at risk requires the maintenance of health connected ecosystems.

3.5 Wildlife Movement Corridor Surveys

The Larrimac corridor is one of eight potential wildlife movement corridors identified within the Municipality of Chelsea (Figure 2), connecting Gatineau Park to the Gatineau River or Gatineau Park and the Ottawa River. These linear strips of forest enable movement of wildlife between core habitats, thus reduce potential for isolation of the park and its associated ecological effects. Corridors were identified in areas of low road density, large patches of forest, or riparian habitats.

In 2009, Nature Chelsea, in collaboration with the University of Ottawa, initiated research to investigate the use of four of the corridors by medium- to large sized mammals. Larrimac forest was one of the four corridors under investigation. Motion detection cameras and snow tracking were used to determine the abundance of mammals within each corridor. Data collection in the Larrimac wildlife corridor took place from November 11th 2009 till July 29th 2010. During the study, a motion detection camera was strapped to a tree in the corridor for a period of two weeks then moved to a new location within the corridor (Figure 10). The camera surveys were supplemented with snow tracking in the winter.

Figure 10. Location of motion detection cameras in the Larrimac forest and wildlife movement corridor in Chelsea, Québec from November 11th 2009 till July 29th 2010.



The camera surveys document use of the Larrimac areas by a wide range of species, characteristic of a rich and diverse forest. Of note is the presence of species that are wary of humans, fisher and the category we call “canine”. At this point we are recording as “canine” because of the difficulty of differentiating, from photos, of eastern wolf and eastern coyote. It is most likely that both species, eastern wolf and eastern coyote, have been recorded using the Larrimac forest. The recording of these human-wary species supports that this area is being used preferentially as a movement corridor. This study is ongoing and we will wait for it completion to make more definitive conclusions.

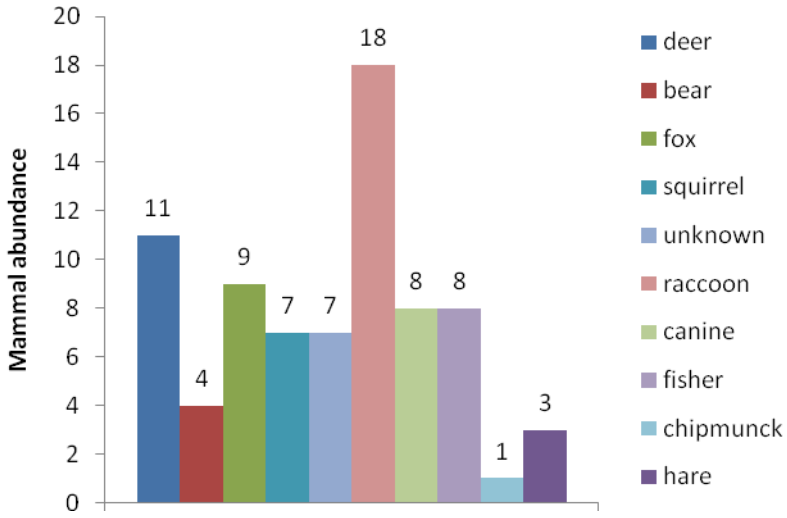


Figure 11. Mammal abundance and species recorded from November 11th 2009 to July 29th 2010 within the Larrimac corridor, Chelsea Québec. Records were collected using Reconyx motion detection cameras and snow tracking in the winter.

CONCLUSIONS

The Larrimac forest contains the largest remaining forest in Chelsea. This area has a high number of ecological values summarized below:

- Rich ecosite diversity that includes high species richness of forest trees black ash, bitternut hickory
- 207 species of vascular plants
- Old growth stands, including exceptional examples of red oak
- Locally rare wetlands, large wetland complex
- Late successional fen complex, centuries old, with sundew, sedges
- 31 species of birds – very rich including forest interior species ovenbird, hermit thrust, American redstart, Philadelphia vireo.
- Species at Risk – Butternut, Large-flowered bellwort and Great White Trillium
- Excellent stand of Butternut Trees
- Large mammals moving through the corridor – bear, coyote, wolf? and fisher
- Wildlife corridor with both riparian areas and open hemlock ridges tending from Gatineau Park to the Gatineau River.

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