IDENTIFICATION AND CHARACTERIZATION OF ECOLOGICAL CORRIDORS ADJACENT TO GATINEAU PARK

FINAL REPORT

October 2012

CCN NCC Canada

DDM Del Degan, Massé Experts-conseils

IDENTIFICATION AND CHARACTERIZATION OF ECOLOGICAL CORRIDORS ADJACENT TO GATINEAU PARK

FINAL REPORT

Presented to the:

NATIONAL CAPITAL COMMISSION

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October 2012

Message from the Vice-President, Capital Lands and Parks

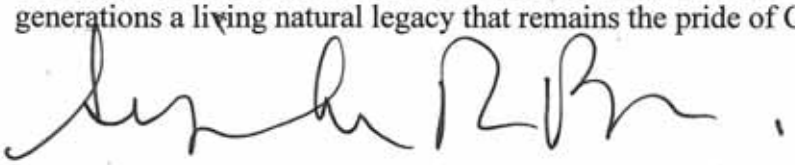
I am pleased to present the National Capital Commission's (NCC) scientific report, *"Identification and Characterization of Ecological Corridors Adjacent to Gatineau Park"*.

The 2010 *Gatineau Park Ecosystem Conservation Plan* recognized the importance of protecting ecological corridors in order to ensure that the flora and fauna for the Outaouais region will endure for future generations. This report addresses a key recommendation of the Conservation Plan in providing detailed information about existing connections between Gatineau Park and other natural areas in the region.

In developing the report, the NCC received valuable scientific and technical advice from an independent committee of experts, while benefitting from the data provided by municipal and regional partners and the input of multiple stakeholders. Our hope is that this information-based tool will add value to land use planning decisions that are ultimately made by private individuals and enterprises or by local and regional authorities.

On behalf of the NCC, I would like to thankfully acknowledge the invaluable contributions of all those who participated in this ground-breaking project.

I invite you to join with us in considering the significance of Gatineau Park and the ecological corridors identified in this report as important to ensuring that we pass on to future generations a living natural legacy that remains the pride of Canada's Capital Region.



Stephen Blight
Vice-President, Capital Lands and Parks
National Capital Commission
October 2012

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Boucher Forest Foundation
Nature Chelsea
Canadian Parks and Wilderness Society (CPAWS) - Ottawa Valley Chapter

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CONTEXTE ET MÉTHODOLOGIE

La conservation à long terme de la biodiversité requiert l'existence de liens fonctionnels entre les espaces naturels. Ceux-ci assurent la pérennité des fonctions naturelles nécessaires pour la survie des populations d'espèces, telles que la migration et l'échange génétique entre les populations.

Le terme corridor écologique désigne un ou des milieux reliant fonctionnellement entre eux différents habitats vitaux pour une espèce ou un groupe d'espèces (sites de reproduction, de nourrissage, de repos, de migration, etc.).

L'objectif principal de ce projet consiste donc à: 1) identifier, 2) caractériser et 3) évaluer les corridors écologiques potentiels adjacents au parc de la Gatineau dans le but de contribuer à la préservation de l'intégrité des écosystèmes et de maintenir la biodiversité du Parc et de la région de la capitale du Canada.

La première étape est basée sur une revue de littérature et la collecte d'informations disponibles pour réaliser l'identification des corridors écologiques potentiels. La seconde étape est axée sur des travaux de terrain afin de pouvoir caractériser les corridors sur un plan écologique. Enfin, l'évaluation et l'énoncé des enjeux de gestion et des propositions d'interventions pour chaque corridor représentent la troisième étape de la démarche. Tout au long du cheminement, des rencontres informatives et des ateliers de travail ont eu lieu avec des experts, les municipalités, les MRC et les groupes d'intérêt environnementaux.

IDENTIFICATION ET CARACTÉRISATION DES CORRIDORS ÉCOLOGIQUES POTENTIELS

Treize corridors ont été identifiés dans le cadre de la présente étude. Le corridor de Wakefield n'a pas été évalué, étant donné qu'il se situe sur les terrains de la CCN et se trouve donc déjà protégé. Par ailleurs, la qualité des données recueillies et la précision du travail d'identification ont permis de mieux définir les limites des corridors et de documenter certains éléments écologiques d'intérêt pour les besoins de l'étude. Ainsi, 12 des 13 corridors écologiques potentiels adjacents au parc de la Gatineau ont été évalués:

- Champlain-Voyageurs;
- Aylmer;
- Ruisseau Breckenridge;
- Luskville;
- Pontiac;
- Bristol;
- du Nord;
- Masham;
- Nord-est du Parc;
- Larrimac;
- Ruisseau Chelsea;
- Philémon-Leamy.

Compte tenu du volume et de la diversité des informations recueillies tout au long de l'étude, une fiche descriptive, accompagnée d'une carte synthèse présente le portrait descriptif de chaque corridor.

ÉVALUATION DES CORRIDORS ÉCOLOGIQUES POTENTIELS

L'évaluation des corridors écologiques potentiels a pour objectif d'identifier les corridors présentant des conditions optimales pour leur conservation et leur mise en valeur. Les caractéristiques écologiques, tout comme l'information provenant des acteurs locaux, représentent les composantes clés du processus de sélection.

L'évaluation s'appuie sur trois thèmes, soit l'unicité du corridor, sa valeur écologique et son potentiel de gestion, déterminé par l'utilisation des terres au sein du corridor et les services écologiques que ce dernier peut fournir à la communauté.

L'évaluation de différents critères pour chacun de ces thèmes a permis de classer les 12 corridors écologiques potentiels en tant que territoires à privilégier pour la conservation en raison de leur importance pour les espèces de la région. Selon les résultats de l'évaluation du thème de l'unicité, le parc de la Gatineau entretient un lien unique avec chaque corridor, formant ainsi un réseau de connexions entre les différents milieux naturels régionaux. Les résultats issus de l'évaluation de la valeur écologique des corridors montrent que chacun d'eux contribue à la biodiversité locale et régionale.

Selon ces résultats, il apparaît que l'ensemble des corridors identifiés dans la présente étude revêt une importance significative pour le parc de la Gatineau et inversement. Leur existence permet aux espèces de se déplacer à travers la région et de contribuer ainsi au bon fonctionnement des écosystèmes. Cela dit, les résultats des évaluations par critère mettent en lumière non seulement les opportunités, mais aussi les défis pour la conservation de chacun des corridors imposés par leurs attributs et leur contexte actuel.

ENJEUX DE GESTION ET PROPOSITIONS D'INTERVENTIONS

La protection, la conservation et la mise en valeur des corridors étudiés seraient envisageables grâce à des stratégies et des propositions d'interventions selon les caractéristiques de chacun. Elles s'appuient sur cinq axes précis, soit:

- La révision réglementaire;
- Le partenariat;
- L'acquisition et les dons;
- La conservation;
- La sensibilisation et la communication.

Ces propositions d'interventions pour les corridors viennent préciser les usages souhaitables en matière d'utilisation du territoire et d'opportunités écotouristiques.

Ce document fournit des outils et des données scientifiques visant à orienter la planification du territoire dans une perspective de développement durable. L'étape suivante sera celle de la mise en œuvre, durant laquelle les partenaires travailleront de concert afin d'harmoniser la réalisation de leurs divers objectifs d'aménagement du territoire tout en respectant la juridiction des terrains.

EXECUTIVE SUMMARY

CONTEXT AND METHODOLOGY

Long-term conservation of biodiversity requires functional links between natural spaces. These links ensure the sustainability of the natural functions required for the survival of species populations, including migration and inter-population genetic exchanges.

The term *ecological corridor* refers to one or more environments that provide functional connections between different critical habitats for species or groups of species (breeding sites, feeding sites, resting sites, migration sites, etc.).

The main purpose of this project was therefore to (1) identify, (2) characterize and (3) prioritize the potential ecological corridors adjacent to Gatineau Park, in order to conserve ecological integrity and maintain biodiversity in the Park and in Canada's Capital Region.

The first phase included a review of the literature and gathering of information to identify the potential ecological corridors. The second step involved fieldwork to characterize the corridors' ecology, while the third and last step involved an assessment and description of management issues and proposed actions for each corridor. Throughout the process, information meetings and workshops were held with experts, municipalities, Regional County Municipalities (RCMS) and interest groups.

IDENTIFICATION AND CHARACTERIZATION OF POTENTIAL ECOLOGICAL CORRIDORS

Thirteen corridors were identified in this study. The Wakefield corridor was not evaluated because it is located on NCC land and is therefore already protected. Thanks to the quality of the information gathered and the precision of the identification work, it was possible to refine the borders of the potential corridors and document certain ecological elements of interest for the purposes of the study. Twelve of the thirteen potential ecological corridors adjacent to Gatineau Park were assessed:

- Champlain-Voyageurs
- Aylmer
- Breckenridge Creek
- Luskville
- Pontiac
- Bristol
- North
- Masham
- Northeast Park
- Larrimac
- Chelsea Creek
- Philémon-Leamy

Given the amount and range of information gathered during the study, descriptive sheets were prepared for each corridor, along with a summary map showing all of the corridors.

EVALUATION OF ECOLOGICAL CORRIDORS

The purpose of the evaluation process was to identify those corridors offering the best conditions for conservation and ecological management. Ecological characteristics of the corridors and the input of local participants were both key components in the selection process.

The evaluation was based on three themes, namely the corridor's uniqueness, ecological value and management potential, determined by land use within the corridor and the ecological services it provides for the community.

Following an evaluation of different criteria for each theme, the 12 potential ecological corridors were all classified as priority areas for conservation due to their importance for the region's species. Based on the findings from the uniqueness evaluation, Gatineau Park has unique links with all the corridors, forming a network of connections between the region's different natural environments. The findings from the ecological value theme evaluation clearly show that all the corridors contribute to local and regional biodiversity.

Based on these findings, it would seem that all the corridors identified in this study are of significant importance to Gatineau Park, and vice-versa. They allow species to move throughout the region, thereby contributing to ecosystem functionality. However, the criteria-based evaluations also revealed not only opportunities for conservation, but also the challenges associated with each corridor due to its current attributes and context.

MANAGEMENT ISSUES AND PROPOSED ACTIONS

It is possible to protect, conserve and manage the corridors studied through strategies and proposed actions based on their individual attributes. These strategies and proposals fall under five headings, as follows:

- Regulatory revisions
- Partnerships
- Acquisitions and donations
- Conservation
- Awareness and communication

The actions proposed for the corridors highlight desirable land use options and ecotourism opportunities.

This document provides tools and scientific data that can be used to inform regional planning from the perspective of sustainable development. The next phase will be implementation, when the partners will work together in an effort to harmonize their various land use objectives, with due respect for individual jurisdictions.

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1. INTRODUCTION

The mandate of the National Capital Commission (NCC) is to build Canada's Capital into a source of pride for all Canadians, a meeting place, a source of learning about Canada, and a site for the conservation of the Nation's heritage including Gatineau Park. The NCC has several significant biodiversity conservation objectives that are set out in the Canadian Biodiversity Strategy (Canadian Environmental Network, 2008), the Gatineau Park Master Plan and the Gatineau Park Ecosystem Conservation Plan (NCC, 2005; Del Degan, Massé, 2010).

One facet of ecosystem conservation is to ensure connectivity with adjacent areas and allow for ecological exchanges. Effective conservation requires a network of interconnected functional ecosystems that allows for species movement. There is a clear need to maintain habitat and the potential for movement, creating conditions in which species are able to adjust gradually to landscape change (Allag-Dhuisme et al., 2010). Given the current context of climate change, the availability of corridors may be even more crucial for species and other resources, in that they appear to foster species circulation, help reduce greenhouse gas emissions and provide protection for areas that are sensitive to extreme weather events (Bentrup, 2008).

The term "ecological corridor" refers to environments that provide functional connections between different critical habitats for species or groups of species (breeding sites, feeding sites, resting sites, migration sites, etc.). Corridors are eco-landscape features that connect or reconnect sub-populations, allowing for movement of individual species members (animals, plants, fungus, etc.) and exchange of genetic material (gene flow) between sub-populations (Beier and Noss, 1998).

The conservation of ecological corridor networks (ecological networks or frameworks) is one of the two main management strategies for the many species threatened by habitat fragmentation (the other, complementary strategy being habitat protection or restoration). Ecological corridors are still not widely used, but have begun to appear in management (restoration) policies and in both domestic and international law since the 1990s, leading to a third and new phase in nature conservation law (Beier and Noss, 1998; Bonnin, 2006a and b, 2007, 2008).

The Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010) presents a preliminary list of 13 potential ecological corridors exhibiting ecological characteristics of interest. The main purpose of the project presented in this report was to identify and characterize the corridors adjacent to Gatineau Park in order to assess their ecological value. Its secondary purpose, in conjunction with partners and adjacent municipalities, was to propose tools that can be used to protect and conserve the natural areas in question.

The identification and characterization of potential ecological corridors adjacent to Gatineau Park is a vital step, since it will provide information that will help the NCC to work with partners to achieve its conservation and restoration objectives for the Park while providing better protection for regional biodiversity. The study identifies the corridors of importance to the Park, establishes a shared information base and serves as a basis for an important management tool.

Very few public agencies have carried out exercises such as this in the past, except to address specific problems (road transportation networks, national parks). The literature therefore offers only a handful of established methodologies that can be used:

- to identify and classify corridors
- to determine their condition
- to propose management, protection and conservation recommendations

The study presented in this report uses a methodology drawn from the literature to identify and characterize potential ecological corridors adjacent to Gatineau Park. It provides a more technical look at the Park's connectivity with other major conservation areas in the region.

The report contains thorough description and characterization of the corridors derived from an analysis of corridor integrity and an examination of current risks relevant to their potential conservation. It also makes a number of general management recommendations.

2. OBJECTIVES

The main objective of the project is to identify, characterize and assess the potential ecological corridors adjacent to Gatineau Park, in order to conserve ecological integrity and maintain biodiversity in the Park and in Canada's Capital Region (NCR).

More specifically, the study:

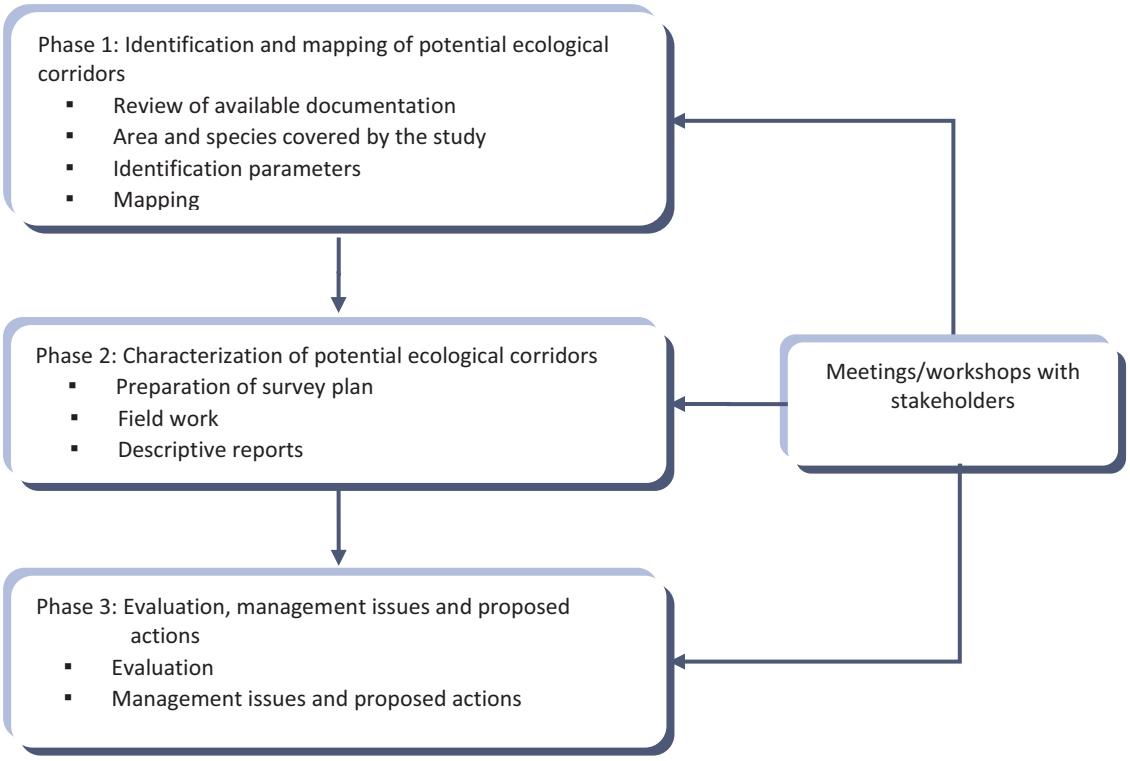
- Identifies and maps the potential ecological corridors, based on available information and studies
- Through field work, characterizes each corridor in detail, in order to verify the available information, assess the existing natural resources and identify elements that may lead to fragmentation of the corridors or alter their functions
- Evaluates the corridors using an evaluation grid, in order to identify those to which priority should be given for conservation
- Identifies management issues and proposes actions to be taken in the corridors, by suggesting uses that are compatible with corridor conservation and desirable in terms of land management and recreational and tourism opportunities.

3. METHODOLOGY

The objectives of the study were presented to the principal stakeholders in order to obtain comments and consent for the project to move forward.

The methodological approach shown in Figure 1 presents the three main phases of the project leading to corridor identification, characterization and evaluation, along with a statement of management issues and proposed actions. In the first phase of the project, the corridors were identified and mapped. In the second phase, fieldwork, the corridors' ecology was characterized. In the third and last phase, the corridors were evaluated, management issues were identified and actions were proposed. Throughout the project, meetings and workshops were held with experts and interest groups to ensure the relevance of the analyses and proposals.

Figure 1 Methodological Approach



3.1 Phase 1: Identification and mapping of potential ecological corridors

The first phase of the study was to identify and map the potential ecological corridors. This involved reviewing the available documentation, deciding on the study area and identification parameters, and mapping the corridors.

3.1.1 Review of available documentation

When the Gatineau Park Ecosystem Conservation Plan was produced (Del Degan, Massé, 2010), a full review of the scientific literature was carried out in order to draw up a preliminary list of potential ecological corridors. All the information on the definitions, identification criteria, connectivity status and main corridor concepts was summarized in the Addendum to the Conservation Plan (Del Degan, Massé, 2007a). All of this documentation was re-examined, and both the review and the addendum were updated by adding the latest research findings and other complementary elements relating to the corridors and connectivity. As part of the literature review, past provincial, national and international examples were also examined, in order to check for and extract additional information on corridors, identification methods and potential management choices (conservation, restoration, management).

At the same time, extensive research was carried out to obtain digital data from governments, municipalities and conservation associations, which was subsequently used to map and analyze the corridors:

- Québec's Ministère des Ressources naturelles et de la Faune (MRNF) mainly supplied information on areas and species peripheral to Gatineau Park that had already been studied (e.g. Bristol wetlands), and on the location of regulated wildlife habitats around Gatineau Park (heronries, muskrat habitats, waterfowl gathering areas, etc.).
- Québec's Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) supplied information on the location of alvars and dams around Gatineau Park, the boundaries of various watersheds in the Outaouais region, and the location of protected areas surrounding the Park.
- The Nature Conservancy of Canada (NCC) supplied information on the Blanding's turtle inventory, the location of alvars in the Outaouais region, and reports on natural environments of interest in the area covered by the study.
- Québec's Ministère des Transports (MTQ) supplied information on the location of bridges and culverts relevant to the study.
- Nature Chelsea shared information and data from studies of corridors in the municipality of Chelsea.
- The Conseil régional de l'environnement et du développement durable de l'Outaouais (CREDDO) supplied information on the Deschênes Rapids sector.
- The Centre de données sur le patrimoine naturel du Québec (CDPNQ) supplied a list of species at risk in the Gatineau Park region, along with location data.
- Ontario's Ministry of Natural Resources (OMNR) supplied information on the location of species at risk in the Ottawa sector.
- The Boucher Forest Foundation supplied information on the ecological components of Boucher Forest.
- The Club des ornithologues de l'Outaouais (COO) supplied a list of bird species at risk that had been observed in the corridors.

Additional information was obtained from the NCC's natural resource databases for Gatineau Park.

3.1.2 Area and species covered by the study

Information on the areas in which the corridors are located and the species present in the corridors was used to define the scope of the study. Given that the study extended beyond the boundaries of Gatineau Park, connectivity had to be examined in order to establish not only the study's spatial boundaries, but also the natural environments of interest to be connected to Gatineau Park – for example, protected areas, watercourses, woodlands, and potential species habitats. Connectivity is important in understanding the functions and hence the importance of a corridor for Gatineau Park's ecosystems and other natural areas of interest. It was also important to ensure that none of these environments constituted a sink for any of the species. Two analysis scales were used to establish the Park's connectivity with adjacent areas. The first was used to identify ecological connections between the park and major conservation areas at the greater-landscape level (La Vérendrye Wildlife Sanctuary, Algonquin Park, etc.). The second was used more systematically to study natural areas of interest adjacent to the Park at the regional level. The connectivity study was based on available information and completed the analysis begun during preparation of the Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010).

Given that ecological corridors are directly linked to the species that use them, it was important to identify the species that would be considered in the study and the role each species would play at each phase of the study. A review of the literature and other sources of information were therefore carried out to identify:

- the species present in and around Gatineau Park
- their habitat, breeding and feeding needs
- their characteristics
- their movements, and
- their situation at the regional, provincial and national levels

Species-related information was obtained from the sources mentioned in the previous section, as well as from certain publications (Atlas des oiseaux nicheurs du Québec, etc.), and from observations in the field (summer 2010 and winter 2010-2011).

All the information was entered into a database and checked (duplication, standardization and updating of species names). It was then analyzed and summarized, and the species were classified according to specific criteria, so that they could be used to identify, characterize and select corridors.

3.1.3 Identification parameters

All available information on the ecological components of the corridors was gathered and analyzed in order to identify areas of interest for species movements, such as wooded areas, watercourses, energy transmission lines and so on. As a result of this process, several corridors were identified in the area surrounding Gatineau Park.

Four identification parameters for potential ecological corridors were used at this phase, namely:

- the location and size of woodland areas and watercourses
- identification of biodiversity concentration areas
- the presence of species at risk, and
- natural barriers to species movement

3.1.3.1 Woodland areas and watercourses

This parameter was assessed using the ecoforest map (selection of wooded polygons) and the drainage network map. It helped to highlight natural areas around Gatineau Park, and was important in the process because wooded areas and watercourses constitute potential travel corridors.

3.1.3.2 Biodiversity concentration areas

This parameter was used to identify habitats and natural areas of interest around Gatineau Park. If an area exhibits one or more of the elements from the following list, it is considered to be a biodiversity concentration area:

- High conservation value stands, such as exceptional forest ecosystems (EFEs), cedar groves, wetlands, peat bogs, and woodlands ≥ 100 ha (Horizon Multiressource Inc., 2004)

- Natural formations of interest: alvars, bare dry areas, etc.
- Regulated wildlife habitats (heronries, muskrat habitats, wildfowl gathering areas, white-tailed deer yards, etc.)
- Protected areas (parks, natural reserves, conservation and agro-forest zones, and areas targeted by the "Partners for Nature" program or by NGOs acquiring land to create natural reserves, such as the Nature Conservancy of Canada, etc.)

Because of their attributes, biodiversity concentration areas are of interest for species establishment and dispersal. Although they may not be accurately spatially defined, they nevertheless provide information on a sector's biodiversity potential and are useful in identifying potential ecological corridors, especially in the presence of connexions.

3.1.3.3 Presence of species at risk

For the purposes of the study, species with special provincial and federal status have been grouped together under the heading of "species at risk". According to the definition used in the Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010), a species at risk is an animal or plant species that is legally protected by the federal government's *Species at Risk Act* or the provincial government's *Act respecting threatened and vulnerable species,* or that appears on the list drawn up by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the provincial list of species likely to be designated as threatened or vulnerable.

The presence of a species at risk may indicate the existence of a rare or high quality habitat. Accordingly, the species at risk in the vicinity of Gatineau Park were located in order to guide the delimitation of potential ecological corridors and ensure that their essential habitats were included. Species at risk also need to be protected because they are often rare or unique within the region, and because there is a legal obligation to do so on public land.

3.1.3.4 Natural barriers

This was the final parameter used in the corridor delimitation process, to identify natural physical barriers to species movement and guide corridor layout. Natural barriers were identified from the ecoforest map (steep slopes, major watercourses) and from digital images of contour lines.

3.1.4 Mapping

The potential ecological corridors were mapped using the above parameters. Initially, the exercise revealed the sectors most conducive to the movement and occurrence of species from Gatineau Park.

Further analysis then identified potential connections between Gatineau Park, the sectors identified from the map, and major regional ecosystems of interest for connectivity (Ottawa River, Gatineau River, etc.). The restored orthophoto from 2008 was used to clarify the predefined connectivity boundaries for each corridor. The corridors identified in the Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010) were then added, and were used to guide corridor analysis and definition. Most of the corridors from the Plan were maintained, except for the Wakefield corridor, which was withdrawn from the process because it is located on NCC land and is therefore already protected. Lastly, corridor boundaries were finalized using data from the field.

3.2 Phase 2: Characterization of potential ecological corridors

Characterization in the field is vital to ensure the quality of the information gathered, finalize the descriptions of corridor components, boundaries, functions, barriers, and health, and to identify conservation and management potential.

3.2.1 Preparation of the survey plan and field work

Because of the number and extent of the corridors, the transect method was used in the survey plan. Transects were specific to each corridor, and were predetermined. They were representative of their respective corridors, in that they were designed to transect as many environments and habitats as possible, and also to follow the travel routes of the species using those environments (e.g. watercourses).

The elements of interest identified during the literature review were also surveyed. They included potential habitats situated outside the transect trajectories, as well as infrastructure relevant to the analysis of management choices, wetlands and fragmentation zones.

All relevant observations made during travel inside or outside the corridors (e.g. to reach a transect or an element of interest) were also noted, photographed and georeferenced.

The findings from the fieldwork fell into five categories:

- validation of data from the analysis of photographs and the literature review
- confirmation of corridor boundaries and dimensions
- identification of threats and factors altering corridor functions
- additional information on ecological components, and
- identification of conservation choices and management potential for the corridors

During fieldwork, special attention was paid to the presence of species at risk and species of interest for the study. All such species that were observed were described, photographed, located and georeferenced.

In addition, fieldwork took place in spring, meaning that it was easier to observe plant species at risk due to the less intense vegetation cover at that time of the year.

Data collection sheets were used to note observations in all the potential ecological corridors. Most of the land on which the study took place was not owned by the NCC, and care was taken to obtain permission for the team's visits. For example, all the municipalities concerned were notified, and letters were sent to private landowners before the team visited their property. Special attention was also given to the safety-related aspects of the fieldwork.

3.2.2 Fact sheets

Because of the volume and range of information on each corridor, fact sheets and summary maps were prepared to gather the findings for subsequent use. The sheets provide a full profile of each corridor's components, in the form of a descriptive text and maps.

The fact sheets contain data from the both literature review and the field survey, and describe the corridors under six headings:

- *The connection between the corridor and Gatineau Park*. This section describes the number of connectors between the corridor and the Park, along with the types of environments, their current status, and any potential barriers to species movement, such as roads, dams, and so on.
- *Biodiversity concentration area*. This section provides as complete a description as possible of the natural composition and structure of each area's environments. It also contains information on the state of those environments, and on any threats and stressors that may alter their functions.
- *The human footprint*. This section presents the main threats and stressors in the corridor, and explains how they may hinder its functions.
- *Peripheral and adjacent areas*. This section lists the main environments surrounding the corridor, along with the potential for links between the corridor and other environments of interest (wetlands, forests, etc.).
- *Corridor functionality and management issues*. This section summarizes the main elements from the previous sections, and identifies the main threats to each corridor's functionality. It then sets out management and conservation issues, and ends with a physiographic sere of the corridor, prepared from the field transect, which shows and briefly explains the corridor's physiographic elements and ecological components, along with the extent of the human footprint.
- *List of species*. This section is in table form, and presents all the species identified in the corridor. The lists were prepared from data obtained from the CDPNQ, the MRNF and the COO, as well as from field observations. Where applicable, the table also shows the species' federal and provincial status.

Each fact sheet comes with a detailed map that completes and summarizes the information gathered. The map shows:

- the boundaries of the corridor
- the transect
- the corridor's hydrography
- the plant life and wildlife observed during fieldwork
- natural environments of interest (e.g. wetlands, regulated wildlife habitats, etc.)
- human pressures, such as main roads, bridges and bottlenecks, and
- potential links with neighbouring environments

3.3 Phase 3: Evaluation, management issues and proposed actions in potential ecological corridors

During this phase, each corridor was evaluated using criteria designed to establish its relative value. Management issues were also identified, and actions were proposed.

3.3.1 Evaluation

The purpose of the evaluation was to collate the available information and data and identify the corridors offering the best conditions for conservation and management.

A number of criteria were drawn up from the available information, and were divided by theme:

- Theme 1: The corridor's uniqueness, determined by geographic uniqueness and the uniqueness of its functional groups.
- Theme 2: Ecological value, based on seven criteria relating to the corridor's ecological components and stressors.
- Theme 3: Management potential, based on land use within the corridor and the ecological services that the corridor provides for the community.

An analysis and evaluation grid was used in conjunction with spatial analysis to assess the relative value of each corridor. The findings were evaluated according to the score for each criterion.

3.3.2 Management issues and proposed actions

The methodology relies primarily on information about the corridors and their limitations, current land uses and potential management. Each corridor was examined individually, management issues were identified, and actions were proposed. The proposals were based on the literature and on the effectiveness and applicability of the measures in light of the corridors' limitations. The corridors were then ranked in priority order, based on the proposals.

3.4 Workshops and meetings with stakeholders

The participation of various stakeholders was vital to the study's success, especially given its scope and the size of the target area. The stakeholders were consulted at every phase of the study, in workshops and at formal meetings. The consultations were used mainly to:

- present and check the findings
- improve the proposals made at each phase of the process, and
- obtain the participants' observations and comments

Following the consultations, the corridor characterizations were fine-tuned.

The stakeholders were divided into three main groups:

- External experts' committee
- RCMs and municipalities
- Environmental groups

External experts' committee

Because of the study's scope and the broad range of themes addressed, the decision was made to set up an external experts' committee. The committee was composed of specialized professionals and researchers from several different public and private organizations, including:

- Nature Conservancy of Canada
- Concordia University
- Environment Canada
- Parks Canada
- MRNF
- MDDEP

The committee members were asked to contribute their expertise in the field of ecology and ecological corridors at different phases of the process. They were kept informed of progress and any decisions made, and were able to play a significant role by verifying process quality, critiquing methodological aspects and identifying the limitations of the study.

RCMs and municipalities

It was essential to consult the RCMs and municipalities because they were directly affected by the scope of the project. They were kept informed at every phase of the study and took part in four workshops at which they received updates on the project itself, as well as on the identification, characterization and evaluation of the corridors and the management choices available. They were able to contribute new information, and also allowed the team to consult various land use planning documents that were essential to the corridor selection process. Continued collaboration will be key to the successful implementation of the conservation phase.

Environmental groups

The term "environmental groups" refers to environmental associations and agencies with a direct or indirect interest in Gatineau Park and the ecological corridors. The groups also took part in four workshops similar to those organized for the municipalities. Thanks to their knowledge and experience in the field, they were able to provide valuable additional information on the corridors.

4. IDENTIFICATION AND CHARACTERIZATION OF POTENTIAL ECOLOGICAL CORRIDORS

4.1 Profile of connectivity

4.1.1 Greater landscape-level connectivity

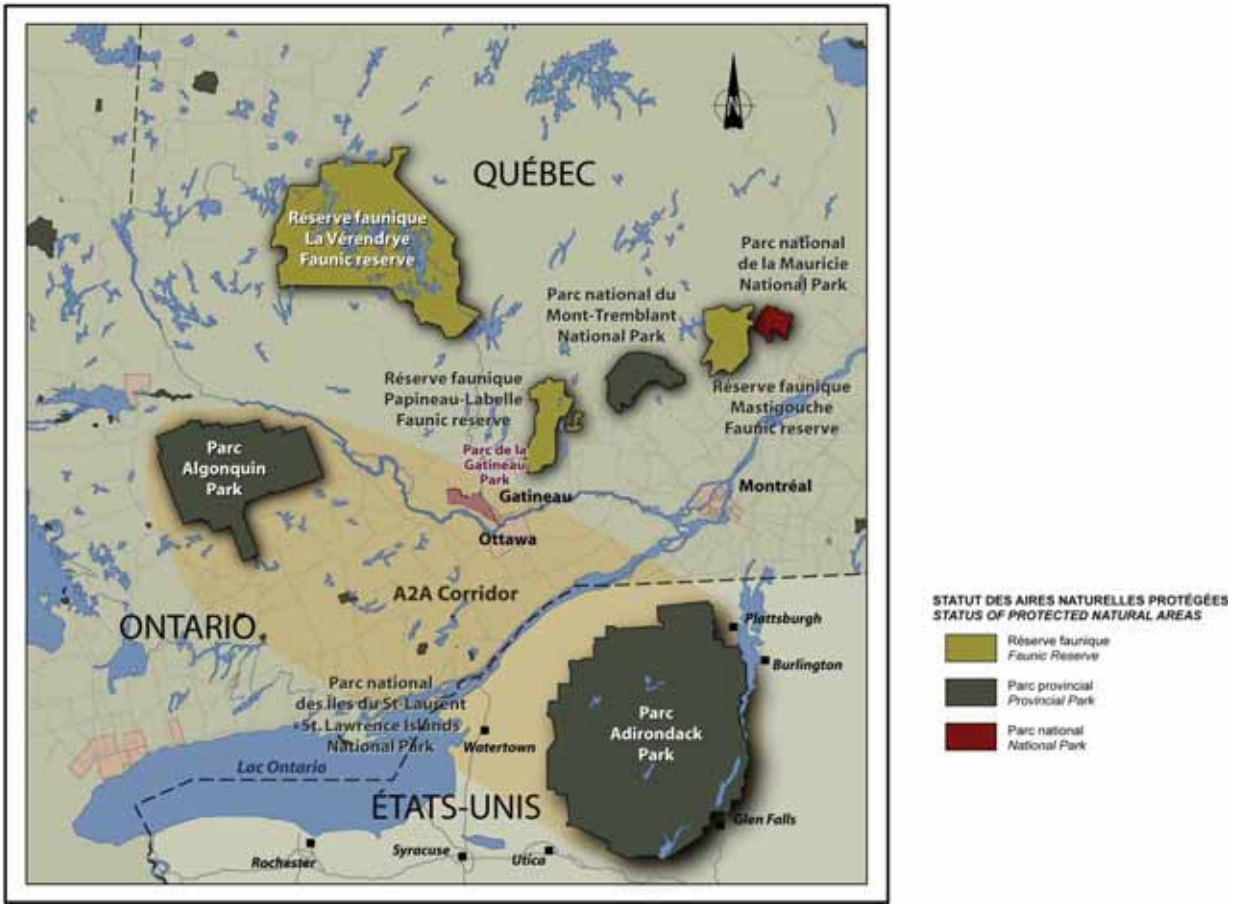
Connections are considered with major ecological units of different sizes: national parks and wildlife sanctuaries, major watercourses, and so on. This patchwork of landscapes contains all types of environments, which because of their size, are connected to several corridors, forming what is referred to as an ecological network.

Ecological links facilitate the movement of plant species, bird species, large game and some fish species. For example, the Dumoine River originates in the La Vérendrye Wildlife Sanctuary and flows through Algonquin Park in Ontario. It is therefore an important ecological corridor for many populations.

Another element to be considered is the Atlantic migration route, a corridor used by many bird species flying across the Gatineau Park sector. The many natural areas surrounding the Park are potential staging areas for these birds.

Lastly, Gatineau Park forms part of a vast migration corridor running between the Adirondack and Algonquin parks, known as Corridor A-2-A (Figure 2). The mission of corridor A-2-A is to restore, improve and maintain ecological connectivity, ecosystem functions and biodiversity, while respecting sustainable human use of this distinct region of Ontario and New York State located between the Algonquin Park and the Adirondack Park (Stephenson, 2001).

Figure 2 Corridor A-2-A between Adirondack Park and Algonquin Provincial Park



4.1.2 Regional connectivity

Gatineau Park's regional connectivity has an impact on its connectivity at the greater landscape level. Any breaks or barriers at the regional level will have an impact upon every other level. Accordingly, the Park's regional connections must link sectors of interest containing protected areas and natural environments of importance for species movement. Regional connectivity was therefore analyzed, and the main ecosystems to be linked to Gatineau Park were identified (Figure 3). These ecosystems became the area covered by the study. Basically, they are as follows:

- The Gatineau River and its riparian environments, including Farmers Rapids, a natural environment of interest known as one of the Outaouais region's largest spawning grounds (Canadian Parks and Wilderness Society (CPAWS), 2004; Fondation de la Faune, 2010).
- The Ottawa River and its riparian environments. This ecosystem contains several wildfowl gathering areas and other protected areas, including the Plaisance National Park, which shelters several resident and migratory species. Its geographic location places it in the centre of the Atlantic migration route. In addition, it hosts several managed and protected natural environments, including the Bristol and Clarendon wetlands, and the MacLaurin, Lochaber Clément bays (Fondation de la faune, 2010).

- The large stretches of forest to the north, including the Mont O'Brien sector. This area contains a set of natural northern environments that have been subjected to very little human pressure. As a result, ecological integrity has not been affected and the area is home to numerous species. Several zones are currently being assessed for classification as protected areas, including Mont O'Brien, the Picanoc River, Lac Vert and Lac des Trente et Un Milles (CPAWS, 2004). The area connecting the Park to this sector is composed mainly of forests and farmland, and there are very few major barriers to species movement. It is therefore used by large wildlife species, for travel and as an extension of their range.

4.2 Species of interest, species at risk and target species

The species identified in and around Gatineau Park can be divided into three categories for the purposes of the study: species of interest, species at risk and target species. Each of these three categories serves a specific purpose, and the same species may therefore appear in more than one category.

Species of interest were identified mainly during fieldwork. They do not necessarily have legal status and are not monitored for specific purposes, but the fact that they are present is an indicator of the diversity, functions and use of the corridor, as well as its ecological condition. Invasive exotic plant species and rare species are regarded as species of interest.

Species at risk include species covered by the definition given in section 3.1.3.3. In all, 178 species at risk were identified in Gatineau Park and in the potential ecological corridors (107 in the corridors alone – see Appendix 1).

Target species may be species at risk or species of interest. They were identified from a set of criteria used to characterize and select the corridors:

- The species' life cycle requirements (feeding, breeding, territoriality) involves a certain level of mobility, with a travel radius ranging from one to several hundred kilometres. Travel takes place via land-based or aquatic corridors. Aerial travel by raptor species is therefore not considered for this criterion.
- Level of knowledge. Because of their status, some species' movements are monitored or studied and information is easily available.
- Priority species for Gatineau Park. In the Gatineau Park Species At Risk Protection Plan (NCC, 2009), the NCC presents conservation measures for 37 species at risk that are present in the Park and protected by federal and provincial legislation. These species were therefore priorities in the selection process.
- Umbrella species are species with ecological niches that are sufficiently broad, or habits that are sufficiently similar, to ensure that any protective measures applied will also protect other species belonging to the same community. Where possible, umbrella species have therefore been included in the list of target species.

The analysis revealed 24 target species, listed in Appendix 2. They are sufficient in number to cover the needs of most of the species identified in both Gatineau Park and the corridors. Several target species have similar corridor usage characteristics, and were grouped together into "functional" groups. Identification of functional groups, as the basic units of functional diversity, is a vital step in understanding ecosystem functions (François et al., 1999). The recent interest in the formal introduction of new classifications lies in the fact that they can help in understanding the role played by biodiversity in

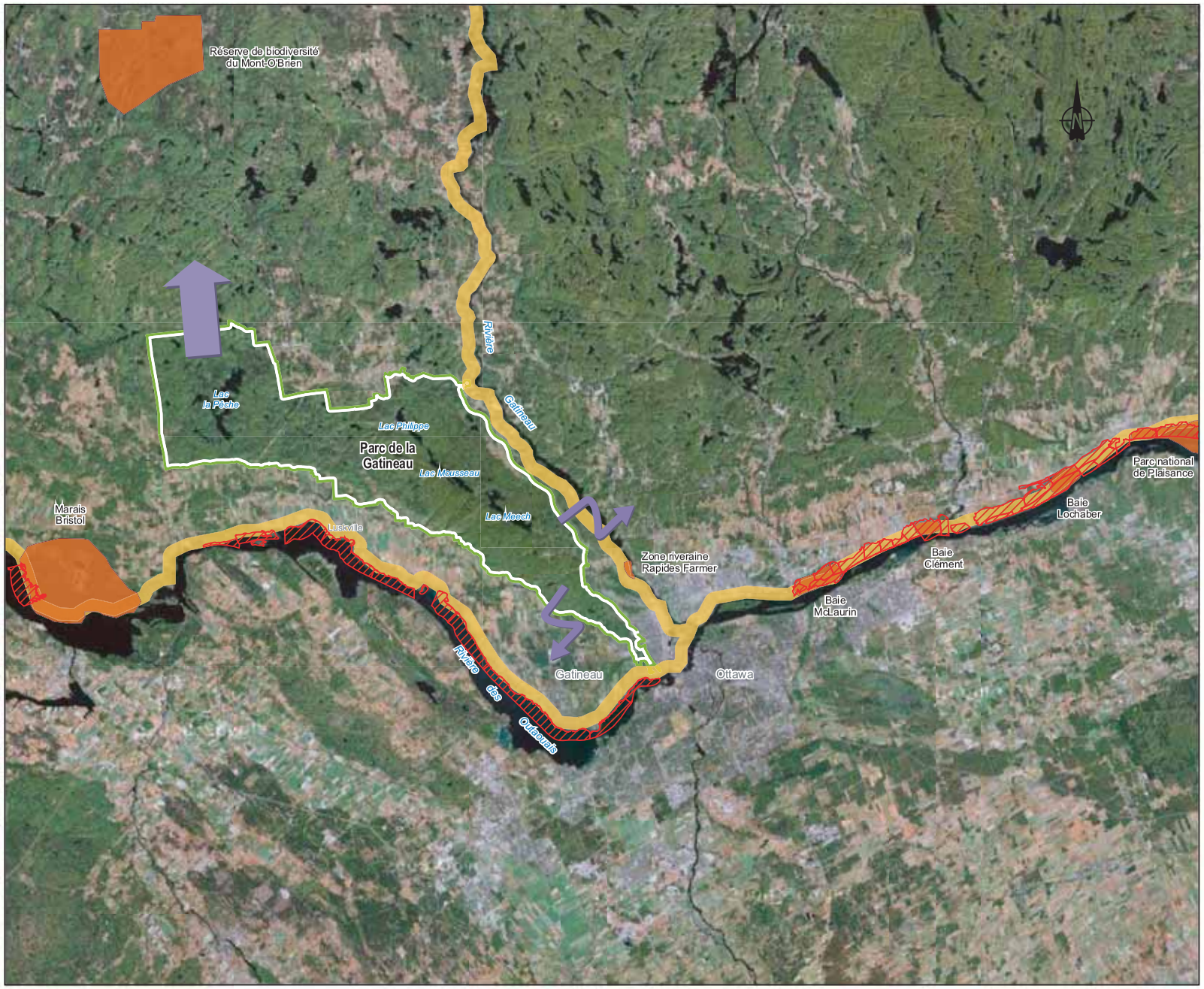
ecosystem functions, and especially in predicting the impacts of changes to environmental factors (Vassiliki, 2009).

The target species were therefore classified from the perspective of functional diversity, into functional groups that address ecological factors in the corridors in different ways. For example, some functional traits can be used to predict whether a species will respond positively or negatively to a given corridor.

The target species were subdivided into six functional groups:

- Large predators
- Aquatic species
- Wetland species
- Closed forest species
- Open environment species
- Calcicole plants

The needs of each functional group, in terms of habitats, corridor width and corridor usage, were identified from the available information (Appendix 2). The minimum corridor width for each functional group was obtained from general taxon data, and not from individual species data, which in most cases was not available (the precautionary principle). The widths shown in Appendix 2 were therefore established for the purposes of the study only, and are deductive measurements. The main barriers to group mobility were also identified.



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REGIONAL CONNECTIVITY
GATINEAU PARK

- Gatineau Park
- Natural Area of Interest
- Riparian Zone of Gatineau and Ottawa Rivers
- Aquatic Birds Concentration Area
- Potential Link

km 0 5 10 km

FIGURE 3

October 2012

DDM Del Degan, Massé Experts-conseils

4.3 Identification and mapping of potential ecological corridors

Analysis of data for the four identification parameters described in section 3.1.3 led to the identification and delimitation of 12 potential ecological corridors adjacent to Gatineau Park (Figure 4):

- Champlain-Voyageurs
- Aylmer
- Breckenridge Creek
- Luskville
- Pontiac
- Bristol
- North
- Masham
- Northeast Park
- Larrimac
- Chelsea Creek
- Philémon-Leamy

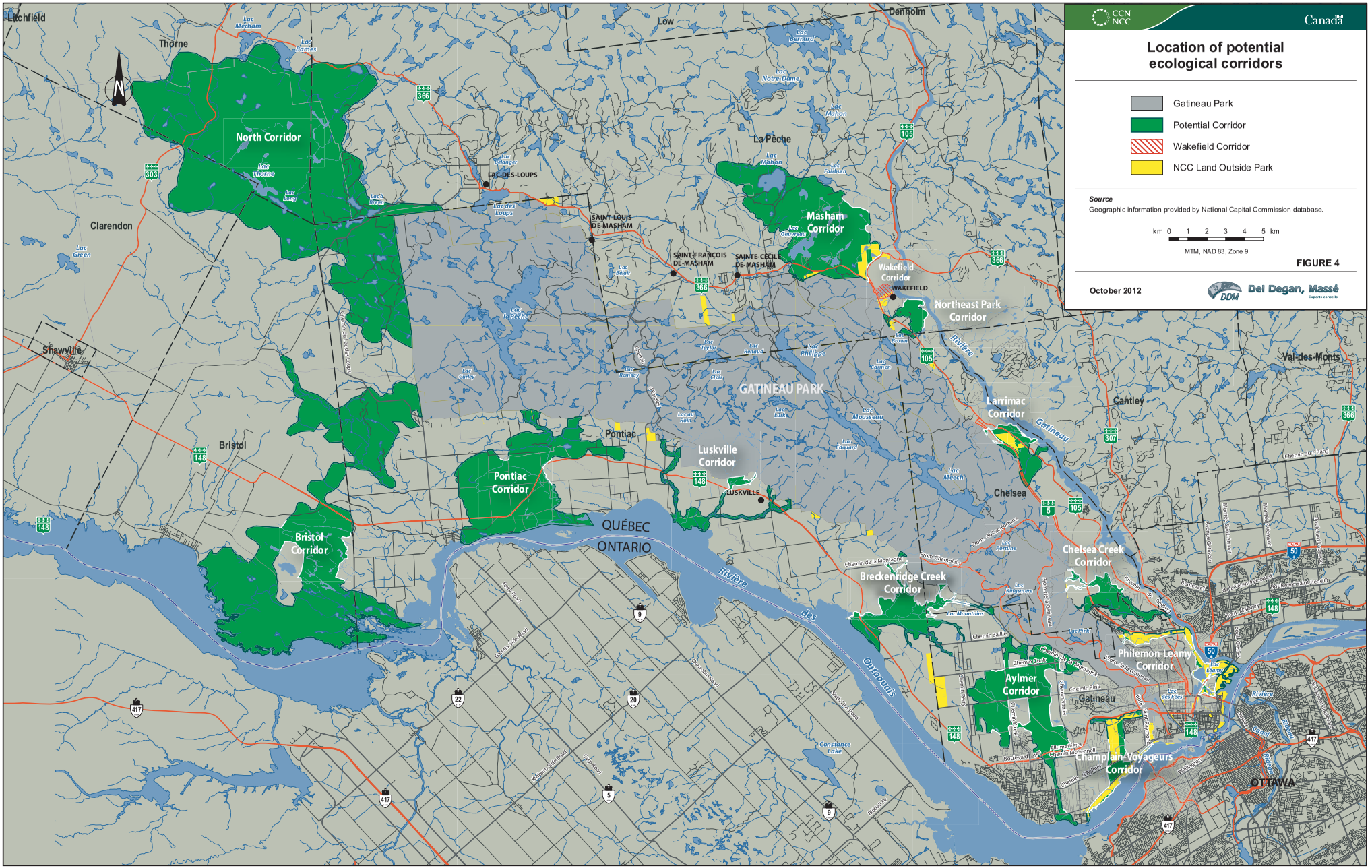
Twelve of the 13 ecological corridors identified in the Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010) were evaluated in this study. The Wakefield corridor was not evaluated because it is located on NCC land and is therefore already protected. Given the quality of the information gathered and the precision of the identification work, it was possible to refine the borders of the potential corridors and document certain ecological elements of interest for the purposes of the study.

The connectivity analysis led to the identification of three main ecosystems to be linked to Gatineau Park, and this information formed the basis of the corridor delimitation process. Delimitation of the 12 potential ecological corridors was required to support the subsequent analyses.

4.4 Descriptive profile of the potential ecological corridors

A descriptive profile of each corridor was drawn up using the available documentation, maps, internal processing, and analyses. The profile also included information from the 14-day field survey carried out in May 2010, during which biodiversity concentration areas were visited, corridor boundaries were adjusted and potential function-altering factors were identified. Two additional field surveys took place during the winter of 2010-2011 (Appendix 3), to observe the movements of large mammal species (e.g. wolves) in the corridors best suited to their needs (Luskville, Pontiac, Bristol, North, Masham, Northeast Park and Larrimac). The list of species for each corridor was completed following this exercise.

Workshops were then organized for the experts' committee, municipalities, RCMs and environmental groups, at which the potential ecological corridors were presented. Additional information on specific sectors was obtained at the workshops, and was used to complete the characterization process. For example, the boundaries of the Aylmer, Pontiac, Larrimac and Philémon-Lemay corridors were changed as a result of ecological information supplied by the municipalities and environmental groups.


CCN NCC
Canada
Location of potential ecological corridors
Gatineau Park
Potential Corridor
Wakefield Corridor
NCC Land Outside Park
Source
Geographic information provided by National Capital Commission database.
km 0 1 2 3 4 5 km
MTM, NAD 83, Zone 9
FIGURE 4
October 2012
Del Degan, Massé
Experts-conseils
North Corridor
Masham Corridor
Wakefield Corridor
Northeast Park Corridor
Larrimac Corridor
Luskville Corridor
Pontiac Corridor
Bristol Corridor
Breckenridge Creek Corridor
Chelsea Creek Corridor
Philemon-Leamy Corridor
Aylmer Corridor
Champlain-Voyageurs Corridor
GATINEAU PARK
QUÉBEC
ONTARIO
Rivière des Outaouais
Rivière Gatineau
Lachfield
Thorne
Low
Denholm
La Pêche
Clarendon
Shawville
Bristol
Pontiac
Chelsea
Cantley
Val-des-Monts
LAC-DES-LOUPS
SAINT-LOUIS-DE-MASHAM
SAINT-FRANÇOIS-DE-MASHAM
SAINTE-CÉCILE-DE-MASHAM
WAKEFIELD
LUSKVILLE
OTTAWA
Constance Lake

4.4.1 Main characteristics of potential ecological corridors

Table 1 presents the main characteristics of the corridors, which are described individually in more detail in the following sections.

TABLE 1 MAIN CHARACTERISTICS OF THE POTENTIAL ECOLOGICAL CORRIDORS

CORRIDOR	AREA (HA)	SHAPE AND SIZE	WOODED AREA (%)	NUMBER OF CONNECTORS TO THE PARK	MAIN FUNCTIONAL GROUP
Champlain-Voyageurs	460	Longitudinal 3 km long 1 km wide	60	1	Aquatic species
Aylmer	1 882	Polygonal 9.5 km long 5 km wide	80	4	Calcicole plants
Breckenridge Creek	882	Heterogeneous 5 km long 5 km wide	80	6	Aquatic species
Luskville	439	Longitudinal 5 km long Three arms, average of 200 m wide	65	7	Wetland species
Pontiac	2 852	Longitudinal 10 km long 5 km wide	75	2	Wetland species
Bristol	6 558	Longitudinal 17 km long 2 km wide	80	1	Wetland species
North	11 684	Longitudinal 17 km long 7 km wide	90	1	Large predators
Masham	2 913	Longitudinal 10 km long 2.5 km wide	75	1	Large predators
Northeast Park	208	Polygonal 2 km per side	90	2	Open environment species
Larrimac	394	Rectangular 1.5 km long 3 km wide	95	3	Closed forest species
Chelsea Creek	438	Longitudinal 6 km long 500 m wide	80	5	Aquatic species
Philémon-Leamy	381	Longitudinal 6 km long 500 m wide	90	1	Wetland species

4.4.2 Champlain-Voyageurs Corridor

The Champlain-Voyageurs corridor connects the southern part of Gatineau Park to the Ottawa River. Its biodiversity concentration area is represented by the Voyageurs corridor valued natural habitat (Del Degan, Massé, 2005), which runs along the banks of the Ottawa River. The link to the Park is achieved via the Champlain corridor's valued natural habitat. The corridor is situated in the City of Gatineau. Its northeastern boundary runs along Boulevard des Allumettières, and a side road crosses the connector. The corridor then runs southwards to the banks of the Ottawa River. There are a number of residential neighbourhoods along the river, both eastwards and westwards (Figure 5).

The corridor covers an area of 460 ha, 60% of which is woodland. It is longitudinal in shape, measuring 3 km long and 1 km wide. Because of its structure and composition, it is suited to aquatic species.

CONNECTION WITH THE PARK

The Champlain-Voyageurs corridor can connect to Gatineau Park via a single connector, namely the eastern extremity of the Champlain corridor valued natural habitat. The loop linking Boulevard des Allumettières to Boulevard Saint-Raymond reduces the wooded area near the connector. Boulevard Saint-Raymond ends the loop and runs along the connector. Traffic on the road is constant and heavy. In addition, there is some recent residential development along the road.

The sector is dominated by young mixed forest stands. There also appears to be a watercourse that runs from Gatineau Park, across the woodland along the northern portion of the corridor.

BIODIVERSITY CONCENTRATION AREA

The Champlain-Voyageurs has a biodiversity concentration area that would benefit from being connected to Gatineau Park. It is composed of the Champlain corridor valued natural habitat, and extends over nearly 120 ha of damp woodland and small wetlands. It runs along the banks of the Ottawa River over a distance of nearly 5 km, and the northern portion is bounded by Boulevard de Lucerne.

Forest stands are dominated by silver maple (*Acer saccharinum*), along with wetland-associated flora because of recurrent inflows of water (spring floods). Because of the lack of relief and the area's proximity to the Ottawa River, water accumulates in several locations, forming small wetland areas. Many amphibian species have been observed in the wetlands and in the silver maple forest. The health of these areas is acceptable, although several invasive plant species are present (e.g. purple loosestrife (*Lythrum salicaria*)).

The shoreline area is characterized by a shallow water zone dominated by aquatic grass beds. Several amphibian species, such as the green frog, use the sector. Birds, including waterfowl, feed on fry found in the grasses, and the zone has been classified as a waterfowl gathering area.

Although the shoreline area is fairly well-preserved, the human footprint is more visible in the terrestrial portion. A bicycle trail runs across the woodland, and there are several informal trails down to the water. There are also two golf courses, creating an obstacle in the centre of the biodiversity concentration area. Because of its location, the recreational attractions located within the area are very busy (road, golf course, bicycle trail).

HUMAN FOOTPRINT

The human footprint in the Champlain-Voyageurs corridor is significant. There is much large-scale human infrastructure, including the golf courses located in the centre of the corridor, which continue to the banks of the Ottawa River. Constructs relating to these infrastructures, including fences and water containment systems, considerably limit the movement of species in general and aquatic species in particular.

Two roads greater than 20 metres wide also run across the southern portion of the corridor, and two bicycle trails cross the northern and southern sections. All of this infrastructure is used heavily, and invasive plants have also been observed in their vicinity.

The woodland areas adjacent to the residential neighbourhoods surrounding the corridor are used by the local population. Several informal trails run through the woodlands, and garbage is a common sight.

PERIPHERAL AND ADJACENT ENVIRONMENTS

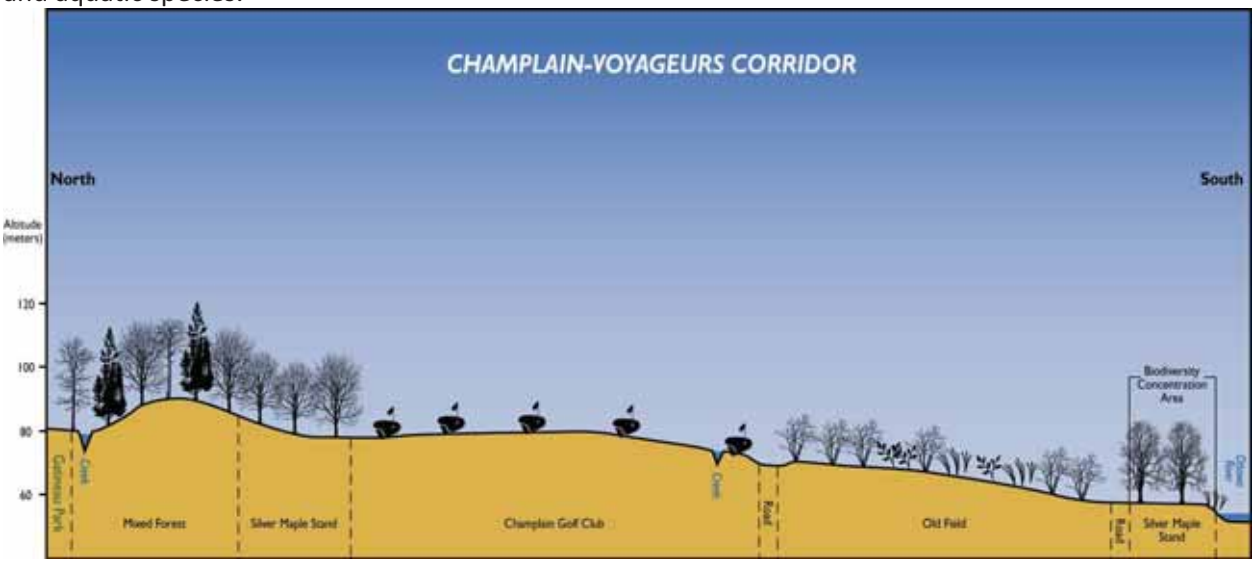
The Champlain-Voyageurs corridor is situated in a highly urbanized area with many residential neighbourhoods and other infrastructure, including shopping malls and golf courses. Pressure around the corridor is therefore high, and has an impact on the corridor.

An area of agricultural old fields is situated northwest of the corridor, not far from the Aylmer corridor. Despite the presence of Boulevard de l'Outaouais, this sector may be of interest for species' movement between the Aylmer and Champlain-Voyageurs corridors.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

The connection potential of the Champlain-Voyageurs corridor is poor. The northern section of the corridor comprises mature woodland, and is intersected by a creek. Although there are a number of trails, including a bicycle trail, in the sector, the woodland area is continuous and the creek is of good quality. In the central and southern sectors, virtually the entire width of the corridor is taken up by a golf course. The human footprint is almost omnipresent, and several physical barriers of human origin hinder species' movement. In addition, the Boulevard des Allumettières cuts across the only connector with Gatineau Park.

The biodiversity concentration area hosts a number of wetland and aquatic species, and it, along with the riparian area, is used by amphibians, reptiles, birds, fish and vegetation. However, the size of the biodiversity concentration area, combined with its poor connection potential, means that the corridor is of limited interest for forest wildlife, large game and the dispersal of certain plant species. The main issue for the Champlain-Voyageurs corridor would be to strengthen the connection potential for wetland and aquatic species.



List (non-exhaustive) of species at risk, target species and species of interest observed in the field

Group	Scientific name	Species at risk	Target species	Species of interest observed in the field
Plants	*Quercus alba*	X		
	Pycnanthemum virginianum	X		
	Ranunculus flabellaris	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	
Reptiles	*Lampropeltis triangulum triangulum*	X		
	Sternotherus odoratus	X		
Birds	*Histrionicus histrionicus*	X		
	Calidris canutus	X		
	Buteo lineatus	X		
	Chordeiles minor	X		
	Falco peregrinus	X		
	Bucephala islandica	X		
	Ardea herodias			X
	Podiceps auritus	X		
	Asio flammeus	X		
	Chaetura pelagica	X		
	Contopus borealis	X		
	Dendroica cerulea	X	X	
	Wilsonia canadensis	X		
	Seiurus motacilla	X		
	Melanerpes erythrocephalus	X	X	
	Lanius ludovicianus	X	X	
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
	Sterna caspia	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X

Information is derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).

CCN NCC

Canada

CHAMPLAIN-VOYAGEURS CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 5

October 2012

Del Degan, Massé

4.4.3 Aylmer Corridor

The Aylmer corridor is situated in the municipality of Gatineau and connects with the southern portion of Gatineau Park. It connects to the Park Pink Lake, and there are several other connectors near Notch Road, along Chemin de la Mongagne Nord. The southern section of the corridor is bounded by Boulevard des Allumettières and the adjacent residential neighbourhoods (Figure 6).

The corridor covers an area of 1,882 ha, 80% of which is woodland. It is polygonal in shape, measuring 9.5 km long by 5 km wide. Because of its structure and composition, it is suited to calcicole plants.

CONNECTION WITH THE PARK

There are four potential connectors between the Aylmer corridor and Gatineau Park. They vary in size and mainly comprise woodland areas and regenerating old fields. Chemin de la Montagne Nord is the main barrier to species' movement. It is a secondary road, roughly 10 m wide, used for recreational purposes and by residents, meaning that traffic is light to moderate. There are some homes and hamlets along the road, blended into large areas of woodland. Opposite the homes, the road is bordered by the dense forests of Gatineau Park. The main connector runs alongside the Park over a distance of more than 800 metres, and is composed mostly of mixed forests.

BIODIVERSITY CONCENTRATION AREA

The Aylmer corridor has a biodiversity concentration area that would benefit from being linked to Gatineau Park. It covers an area of more than 450 ha, composed mostly of woodland, including Boucher Forest among others. It is bounded to the north by Cook Road, to the west by Perry Road and to the east by Vanier Road. Its southern boundary is formed by Boulevard des Allumettières.

This natural area is composed of mixed and softwood stands with patches of cedar grove. The stands are young, and most are under 50 years of age, except in the southern portion, which hosts some mature hardwoods. The forest grows on soil that is excessively drained, with several depressions where water is able to accumulate. In these locations, the forest is replaced by treed swamps, along with areas of wetland in some cases.

Because of its diversity, the area offers habitats suited to several plant and animal species. Calcicole plants such as the Rams Head Lady's Slipper (*Cypripiedium arietinum*), which is classified as vulnerable under provincial legislation, were observed. The mixed and softwood stands may offer habitats suitable to species such as the Canadian lynx (*Lynx canadensis*). As for the patchwork of forested wetlands, swamps and marshlands, it is conducive to the presence of several amphibian and bird species. For example, the painted turtle (*Chrysemis picta*) and some individual wood ducks (*Aix sponsa*) were observed in one of the sector's treed swamps. Blue-spotted salamanders (*Ambystoma laterale*), yellow-spotted salamanders (*Ambystoma maculatum*), milk snakes (*Lampropeltis t. triangulum*), black bears (*Ursus americanus*) and mustelids were also observed on several occasions.

The human footprint in the area is low to moderate. There are a few informal hiking trails and ATV trails, along with a zone of influence roughly 20 metres wide due to the adjacent homes. The main disturbance consists of a quarry, located in the centre of the natural area, splitting it into two parts. The quarry affects not only the environment, but also wildlife movement. The two woodland sections are linked by a small wooded fringe south of the quarry. A section of woodland east of the quarry also belongs to the quarry owners. Homes are currently being built around the quarry, and it is difficult to predict whether or not the quarry will continue to exist. The quarry's presence also means that more trucks use the adjacent roads.

HUMAN FOOTPRINT

The human footprint in the Aylmer corridor is moderate. There are very few residential neighbourhoods, and the areas of regenerating agricultural old fields offer a range of habitats. Regenerating tree clusters and hedges are used by small wildlife and so-called edge-dwelling species such as the snowshoe hare (*Lepus americanus*).

The road network constitutes the main disturbance in the corridor. The corridor is criss-crossed by a veritable latticework of roads, some of which are very busy, including the roads near the quarry, Pink Road and Cook Road, where no modification for wildlife management was observed. In addition, there are many private fences along the roads and lanes.

The quarry and landfill site are the main sources of disruption in the corridor. They have generated additional infrastructure such as fences, logged areas, water diversions and water retention works.

Two hydro-electricity transmission lines cut across the corridor from east to north. Although they are of human origin, some benefits for species can be obtained by maintaining the vegetation under the lines. For example, areas such as these are suited to woody plants such as the raspberry (*Rubus idaeus*), which in turn benefit animal species such as the bear.

PERIPHERAL AND ADJACENT AREAS

The Aylmer corridor is located in an urban area, which explains the presence of a highly-developed road network. There are many residential neighbourhoods, along with other infrastructure such as shopping malls, golf courses and industrial zones. Pressure on the corridor is therefore high, and has generated some significant impacts. Residential development continues, and is now encroaching into woodland areas, especially in the southern portion of the corridor.

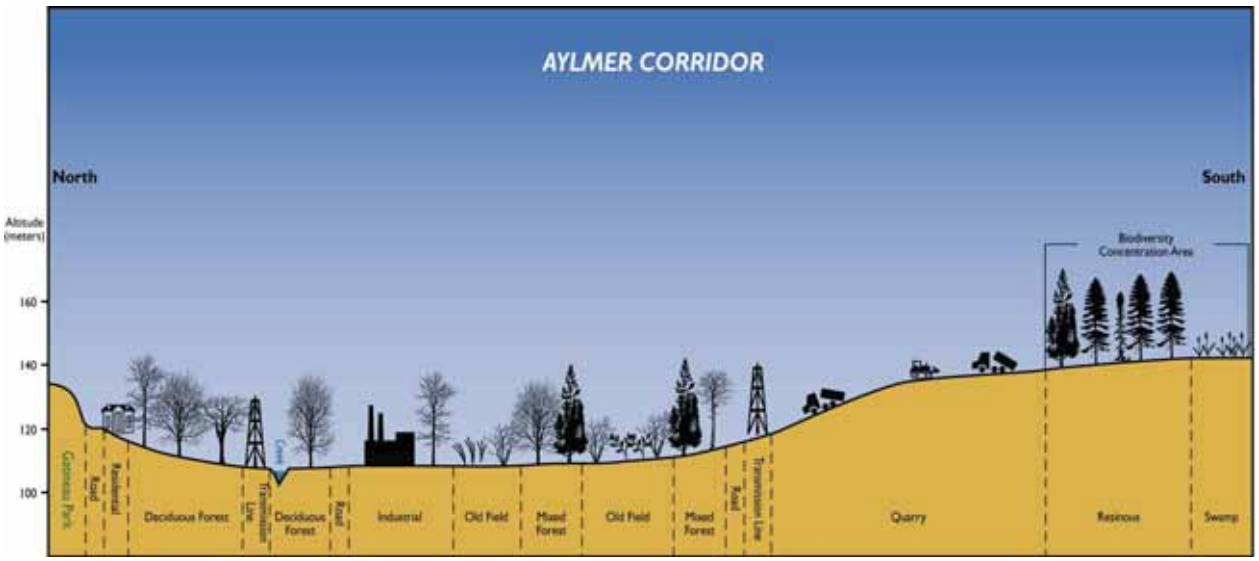
Agriculture is still dominant to the west of the Aylmer corridor. There are several areas of regenerating old fields, along with small wetlands. The same type of habitat was observed east of the corridor, where small areas of wetland and regenerating old fields are located in the midst of an urban and industrial landscape. As a result, there is potential for connection in these two sections of the corridor, and the isolated natural environments found here serve in some respects as buffer zones for the Aylmer corridor.

Lastly, the Champlain-Voyageurs and Breckenridge Creek corridors are both located close by. Although they are separated by an urban and agricultural network, it may be useful to encourage connections between the three corridors.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

Because of the number, size and quality of its connectors, the Aylmer corridor offers good potential for connection with Gatineau Park. The human footprint in the corridor is moderate, but peripheral pressure is high. The biodiversity concentration area hosts many forest and wetland species, including turtles, frogs, snakes, birds, small and large mammals and plant species at risk, all of which have been observed in the field (visually and from tracks). Because of the size and health of the natural environment, it could be used by mammals such as wolves and lynx.

The connection between Gatineau Park and the biodiversity concentration area is good. The area is dominated by forests, and there are only two disruptions. Having said this, a number of disturbances were observed in the woodlands, including logging areas, pastures, trails and fences. The main issue for the Aylmer corridor is to encourage wildlife mobility in the woodland near the main roads.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Carex sychnocephala*	X		
	Cycpripedium reginae	X		
	Cypripedium arietinum	X	X	X
	Draba nemorosa	X		
	Dryopteris clintoniana	X		
	Panicum philadelphicum	X		
	Scirpus pendulus	X		
	Tricostema brachiatum	X		
	Solidago ptarmicoides	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Pseudacris triseriata	X	X	
	Ambystoma laterale			X
	Ambystoma maculatum			X
Reptiles	*Lampropeltis triangulum triangulum*	X		X
	Chrysemys picta			X
Birds	*Buteo lineatus*	X		
	Aix sponsa			X
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Podiceps auritus	X		
	Asio flammeus	X		
	Chaetura pelagica	X		
	Contopus borealis	X		
	Dendroica cerulea	X	X	
	Wilsonia canadensis	X		
	Seiurus motacilla	X		
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Lepus americanus			X
	Ursus americanus			X
	Neovison vison			X

Information derived from observations during the field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).

CCN NCC

Canada

AYLMER CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1,000 m

FIGURE 6

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.4 Breckenridge Creek Corridor

The Breckenridge Creek corridor is characterized by the watercourse bearing the same name, and by its tributaries. The Creek originates in Gatineau Park and flows into the Ottawa River. Most of the corridor is located in the municipality of Pontiac, but the eastern sector is divided between the municipality of Chelsea and the City of Gatineau. Several connectors, in the form of streams and their riparian strips, are situated along Chemin de la Montagne, which marks the northern boundary of the corridor. Watercourses flow into the Creek throughout its descent towards the Ottawa River (Figure 7).

The corridor covers an area of 882 ha, 80% of which is woodland. It is unevenly shaped, measuring an average of 5 km long and 5 km wide. Because of its structure and composition, it is used mainly by aquatic species.

CONNECTION WITH THE PARK

There are six potential connectors between the Breckenridge Creek corridor and Gatineau Park, including several watercourses and a riparian strip that varies in width between 200 and 500 metres. The watercourses all originate in Gatineau Park and flow into Breckenridge Creek at different levels. Most are in good health and have wide, unbroken riparian strips composed of young mixed woodland. As for the connectors in the western portion of the corridor, most do not have riparian strips and are surrounded by agricultural fields.

Chemin de la Montagne is the main barrier to species movement. It is a secondary road, roughly 10 metres wide, used by residents and for recreational purposes. Traffic is light to moderate. Watercourses cross the road by means of culverts of different sizes. However, some of the culverts are partially blocked by build-up and garbage of human origin.

BIODIVERSITY CONCENTRATION AREA

Breckenridge Creek corridor has two biodiversity concentration areas that would benefit from being connected to Gatineau Park. The first is located more or less in the centre of the corridor, at the confluence of several watercourses. Areas range from young mixed woodlands to regenerating old fields, to watercourses and wetlands such as marshes and swamps. The human footprint is low, and there are no roads or other human infrastructure apart from two hydro-electricity transmission lines and a few ATV trails. Several species from different functional groups were observed in the corridor, including green frogs (*Lithobates clamitans melanota)*, leopard frogs (*Lithobates pipiens)*, red-bellied snakes (*Storeria occipitomaculata)*, black bears (*Ursus americanus*), forest-dwelling birds and raptors.

The second biodiversity concentration area lies along the banks of the Ottawa River over a distance of roughly 2 km, and covers an area of 100 ha. It is composed of hardwood stands of different ages, interspersed with wetlands including swamps and lakes. As is the case for the preceding biodiversity concentration area, the human footprint is low, with only one private road. Because of its location and condition, the area hosts a large number of wetland and aquatic species. As a result, a portion of the area is managed by the Nature Conservancy of Canada as a protected area, and Québec Oiseaux also owns land in the sector.

HUMAN FOOTPRINT

The human footprint in the Breckenridge Creek corridor is low. The area is composed of woodland and former agricultural land at different phases of regeneration. The main developments are recreational and private in nature, and include informal trails as well as ATV access points to private land.

The road network constitutes the main disturbance. Chemin de la Montagne, although moderately busy, runs along Gatineau Park and therefore cuts across most of the connectors, except for the one located at the western end of the corridor. The watercourses flowing out of Gatineau Park are controlled by a number of different structures, the quality of which varies. Route 148 cuts across the southern section of the corridor, creating a disruption between the second biodiversity concentration area and the remainder of the corridor. Traffic on this road is heavy and fast-moving. A structure to facilitate amphibian and reptile crossings has been built along the road in the Vipond Lake sector.

PERIPHERAL AND ADJACENT AREAS

The Breckenridge Creek corridor is surrounded by agricultural land that includes cultivated fields, regenerating old fields and tree clusters. Some residential neighbourhoods are situated fairly close to the corridor's boundaries, the most obvious of which is the one surrounding the Mountains Lake connector (eastern end of the corridor). The homes are adjacent to the lake, and the riparian strip is virtually non-existent.

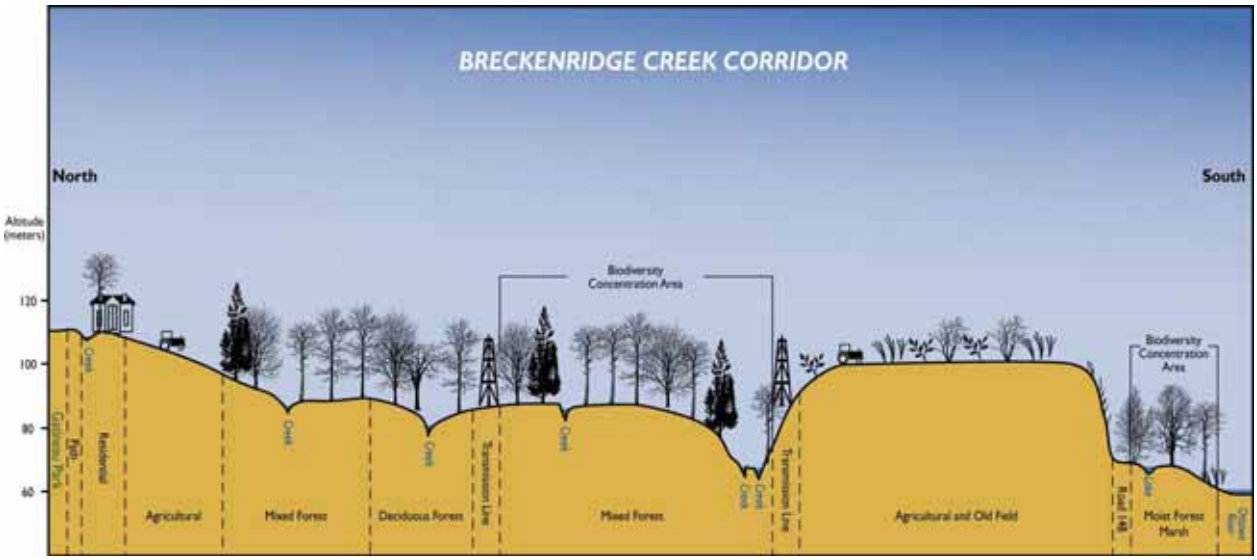
The Breckenridge Creek corridor is located slightly over 2 km from the Aylmer corridor. Despite the fact that the urban fabric has intensified in the sector, the presence of regenerating old fields suggests a potential for connection between the two areas.

Lastly, watercourses adjacent to the corridor flow into Breckenridge Creek. Although most do not originate in Gatineau Park, they nevertheless form a network that offers potential for the movement of certain species associated with aquatic environments.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

Generally speaking, the Breckenridge Creek corridor is functional. There are several connectors that form links with Gatineau Park and allow for watercourses to flow into Breckenridge Creek. Connectivity between the biodiversity concentration areas is good, and is characterized by regenerating old fields and young woodland areas. The low human footprint means that the land can be used to its full potential by species associated with aquatic environments.

The biodiversity concentration areas are large enough to host species associated with forest environments. There are also enough different wetland and aquatic environments to provide habitats suited to their associated species. The main issue would therefore be to restore certain portions of riparian strips upstream of the corridor, to allow for species mobility and limit the impacts of agriculture on water quality.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Allium tricoccum*	X		
	Sisyrinchium angustifolium	X		
	Carex faux-rubanier	X		
	Carex cephalophora	X	X	
	Cerastium nutans	X		
	Corydalis aurea ssp. aurea	X		
	Acer nigrum	X		
	Torreyochloa pallida	X		
	Ulmus thomasii	X		
	Pterospora andromedea	X		
	Ranunculus flabellaris	X		
	Fallopia japonicavar. japonica			X
	Wolffia borealis	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Lithobates (Rana) pipiens			X
	Lithobates (Rana) catesbeianus			X
	Pseudacris triseriata	X	X	
Reptiles	*Storeria occipitomaculata*			X
	Emydoidea blandingii	X	X	
	Chrysemys picta			X
Birds	*Aquila chrysaetos*	X		
	Ammodramus savannarum	X	X	
	Buteo lineatus	X		
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Falco peregrinus	X		
	Podiceps auritus	X		
	Asio flammeus	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Dendroica cerulea	X	X	
	Wilsonia canadensis	X		
	Melanerpes erythrocephalus	X	X	
	Lanius ludovicianus	X	X	
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
	Sterna caspia	X		
	Cistothorus platensis	X		
Mammals	*Odocoileus virginianus*			X
	Ursus americanus			X

Information derived from observations during the field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).

CCN NCC

Canada

BRECKENRIDGE CREEK CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 7

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.5 Luskville Corridor

Luskville Corridor is composed of a biodiversity concentration area bordering the Ottawa River, which itself comprises three main watercourses originating in Gatineau Park. The corridor is situated in the municipality of Pontiac, opposite to the Eardley Escarpment in Gatineau Park (Figure 8).

The corridor covers an area of 439 ha, 65% of which is woodland. It is longitudinal in shape, measuring 5 km long with three arms each measuring an average of 200 metres in width. Because of its structure and composition, the corridor is suited to wetland species.

CONNECTION WITH THE PARK

There are seven potential connectors between the Luskville corridor and Gatineau Park. They are generally fairly wide (ranging from 200 metres to nearly 1 km), and their environmental quality is good. There are no roads or human developments in any of the connectors. However, some fallow land and cultivated fields are present in the connectors located to the east of the corridor.

The connectors are composed of areas of mixed forest, some of which are mature. There are also several watercourses of varying sizes in each connector, all originating in Gatineau Park. Because of the size and condition of the connectors, they are used by several groups of wildlife. For example, five of the seven connectors are situated in the Gatineau Park white-tailed deer yard. Bear, coyote and amphibian tracks have also been observed in the connectors.

BIODIVERSITY CONCENTRATION AREA

The Luskville corridor includes a biodiversity concentration area that would benefit from being connected to Gatineau Park. It runs along the Ottawa River over a distance of slightly over 2 km, and forms a natural area of roughly 100 ha. The biodiversity concentration area is dominated by damp forests, composed of hardwood species such as the silver maple (*Acer saccharinum*). Water is present throughout the area, and evidence of flooding can be seen on tree trunks. The mouths of the watercourses flowing out of Gatineau Park are also located in the connectors, surrounded by wetlands (marshes and swamps).

Because of the location and range of natural areas, the area hosts many species associated with wetlands and aquatic environments. Large numbers of green frogs *(Lithobates clamitans melanota)* and leopard frogs (*Lithobates pipiens*) have been observed, along with black bear (*Ursus americanus*) and white-tailed deer (*Odocoileus virginianus*) tracks. The biodiversity concentration area is generally in good condition, with virtually no major disturbances other than a few ATV trails.

The riparian area is also wooded and does not appear to be under pressure from human activity. It is classified as a waterfowl gathering area.

HUMAN FOOTPRINT

The human footprint in the Luskville corridor is variable. Disturbances in the biodiversity concentration area and in the connectors are minimal, but are much more intense in the section of the corridor linking these two elements. For the most part, the watercourses flowing towards the biodiversity concentration area do not have riparian strips and are under pressure from agricultural activities. Erosion levels are high along some sections of the watercourses, with repercussions for water quality. The travel corridor is very narrow, and is non-existent in some sectors.

Route 148 also cuts across the northern portion of the corridor. It is a wide road (more than 20 metres), bordered by several houses, and traffic is heavy. The road crosses the corridor's various watercourses by means of structures that vary significantly in terms of size and quality. To the east of the corridor, Route 148 becomes a dual carriageway, increasing in width.

PERIPHERAL AND ADJACENT AREAS

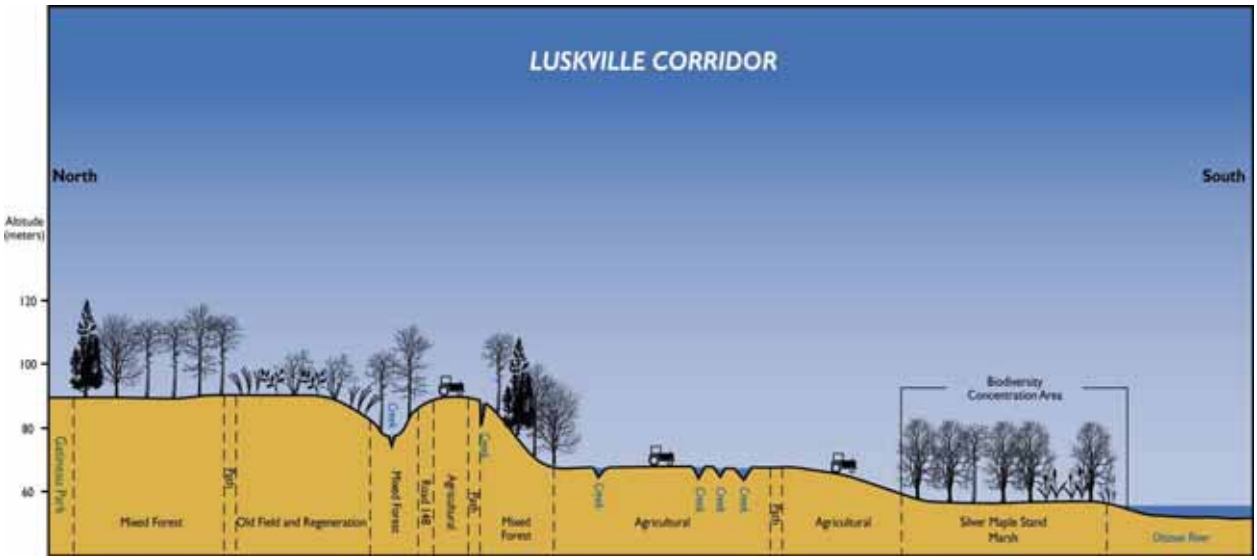
The Luskville corridor is surrounded by agricultural land (cultivated fields and pastures) on all sides. There are a few small residential neighbourhoods along the main roads. Connections with other areas are therefore limited, especially given that the agricultural land runs up to the banks of the Ottawa River, where the riparian strip is virtually non-existent.

The Luskville corridor is located roughly 2 km from the Pontiac corridor. Despite their proximity, connection would be difficult due to the presence of residential neighbourhoods and agricultural land.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

There is good potential for connections between the Luskville corridor and Gatineau Park, due to the number, size and quality of the available connectors, which allow both aquatic and terrestrial species to travel easily from Gatineau Park. Combined with the biodiversity concentration area, these environments provide conditions suited to several species groups. The connectors are located at the foot of Eardley Escarpment and could therefore serve as a buffer zone for the fragile Eardley ecosystem. The corridor would also allow for the dispersal of species that may otherwise be isolated due to the escarpment's topography. For example, the eastern red cedar (*Juniperus virginiana*) was observed in one of the corridor's connectors.

However, the links between the connectors and the biodiversity concentration area have been damaged. They are under strong pressure from agriculture, and their width is limited. Accordingly, the main issue for the Luskville corridor would be to restore riparian strips along the watercourses in order to allow for species to travel to the biodiversity concentration area, and also to preserve water quality and features.

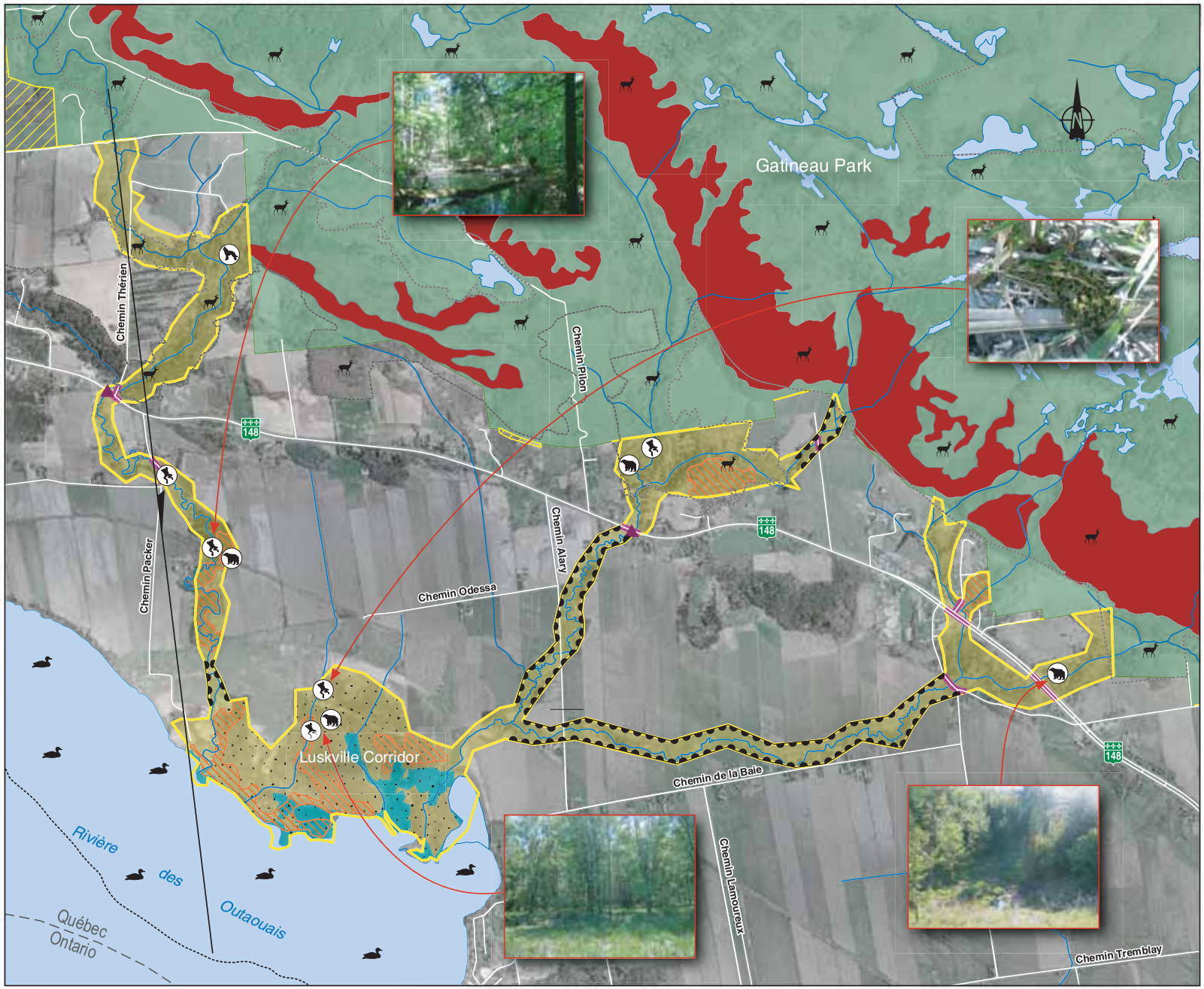


LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Prunus susquehanae*	X		
	Juniperus virginiana var. virginiana	X		X
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Pseudacris triseriata	X	X	
	Lithobates (Rana) pipiens			X
Birds	*Aquila chrysaetos*	X		
	Buteo lineatus	X		
	Meleagris gallopavo			X
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Falco peregrinus	X		
	Podiceps auritus	X		
	Catharus bicknelli	X		
	Asio flammeus	X		
	Chaetura pelagica	X		
	Vermivora chrysoptera	X		
	Wilsonia canadensis	X		
	Melanerpes erythrocephalus	X	X	
	Lanius ludovicianus	X	X	
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
	Coturnicops noveboracensis	X		
	Sterna caspia	X		
	Cistothorus platensis	X		

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Mammals	*Odocoileus virginianus*			X
	Canis latrans			X
	Lontra canadensis			X
	Ursus americanus			X
	Neovison vison			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).



CCN NCC

Canada

LUSKVILLE CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 8

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.6 Pontiac Corridor

The Pontiac corridor is characterized by a very large species travel corridor towards the banks of the Ottawa River. It is situated in the municipality of Pontiac and connects to Gatineau Park near La Pêche Lake (Figure 9).

The corridor covers an area of 2,852 hectares, 75% of which is woodland. It is longitudinal in shape, measuring an average of nearly 10 km long and 5 km wide. Because of its structure and composition, it is suited to wetland species.

CONNECTION WITH THE PARK

The Pontiac corridor could connect to Gatineau Park via two connectors, respectively 500 metres and 1 km wide. The former is composed of regenerating agricultural old fields, offering a range of habitats from prairie grassland to tree clusters. The latter contains several small watercourses flowing out of Gatineau Park, along with a riparian zone composed of young hardwood trees and meander belts with small swamps and marshes.

Given their size and composition, both connectors are suited to aquatic and terrestrial wildlife. They both connect to Gatineau Park's white-tailed deer yard.

Steele Road runs across both connectors. It is used by locals, and traffic is moderate. There are a few private trails running from the road towards the woodland areas.

BIODIVERSITY CONCENTRATION AREA

The Pontiac corridor has two biodiversity concentration areas that would benefit from being connected to Gatineau Park. The first is located in the central portion of the corridor, and covers an area of more than 359 ha, composed of woodlands and wetlands. The forest stands are young, with mature hardwood and softwood trees in certain places. Several watercourses flow out of the biodiversity concentration area, creating marshlands, swamps and small lakes. A hydro-electricity transmission line also runs across the southern portion of the area, and several roads cut across the midsection. Most are gravel and of moderate width (15 metres). They serve a handful of homes and are used only sporadically. Because of the range and condition of the natural areas, the area is suited to virtually all species groups, and amphibians, reptiles, birds, small mammals and large mammals have all been observed.

The second biodiversity concentration area runs along the Ottawa River over a distance of roughly 7 km, and covers an area of more than 500 ha of woodlands and wetlands. The forests are composed of humidity tolerant deciduous trees, some of which have reached maturity. There are several watercourses flowing into the Ottawa River, creating marshlands and swamps. Wetland and aquatic species, including amphibians, are present in the area in large numbers. The riparian areas are fairly busy. Roads have been built to serve a handful of homes and a bathing area. Nevertheless, the human footprint is moderate and limited to the roadside areas.

HUMAN FOOTPRINT

The human footprint in the Pontiac corridor is moderate. There are very few residential areas. However, there are several areas of regenerating agricultural old fields that provide a range of habitats, including tree clusters and regenerating hedges used by small wildlife, as well as edge-dwelling species such as the snowshoe hare (*Lepus americanus*).

The main disturbance is the road network. The corridor is criss-crossed by a network of small roads, and although most are used infrequently and have only a minor impact, their presence has altered the environment because of the associated runoff ditches and logging activities. Some of the roads cut across wetland areas, severing the connection with the original water network and hindering the mobility of aquatic species. Route 148, heavily used by vehicles travelling at high speed, cuts across the northern portion of the second biodiversity concentration area. Its impacts are more marked, and it constitutes a barrier for wildlife, particularly amphibians and reptiles.

Some smaller parcels of forest belong to private landowners, who carry out logging operations and build drainage ditches and fences. The alterations and disruptions caused by these activities may hinder species travel.

There are plans to build an airpark, composed of a private airport surrounded by residential developments, in the southern portion of the corridor, opposite Mohr Island. The proposed park would cover an area of roughly 70 ha, much of it wetland, and would run along the Ottawa River over a distance of roughly 1 km (Pontiac Air Park, 2012).

Lastly, two hydro-electricity transmission lines cut across the corridor. Although of human origin, these areas can nevertheless be of use to wildlife if the vegetation under the lines is maintained. For example, they are suited to the emergence of woody plants such as the raspberry (*Rubus idaeus*), which in turn are sought-after by species such as the bear. The fact that they have been cleared also makes them suitable for certain amphibian species, including the striped chorus frog. Some frog breeding ponds have been identified in the sector.

PERIPHERAL AND ADJACENT AREAS

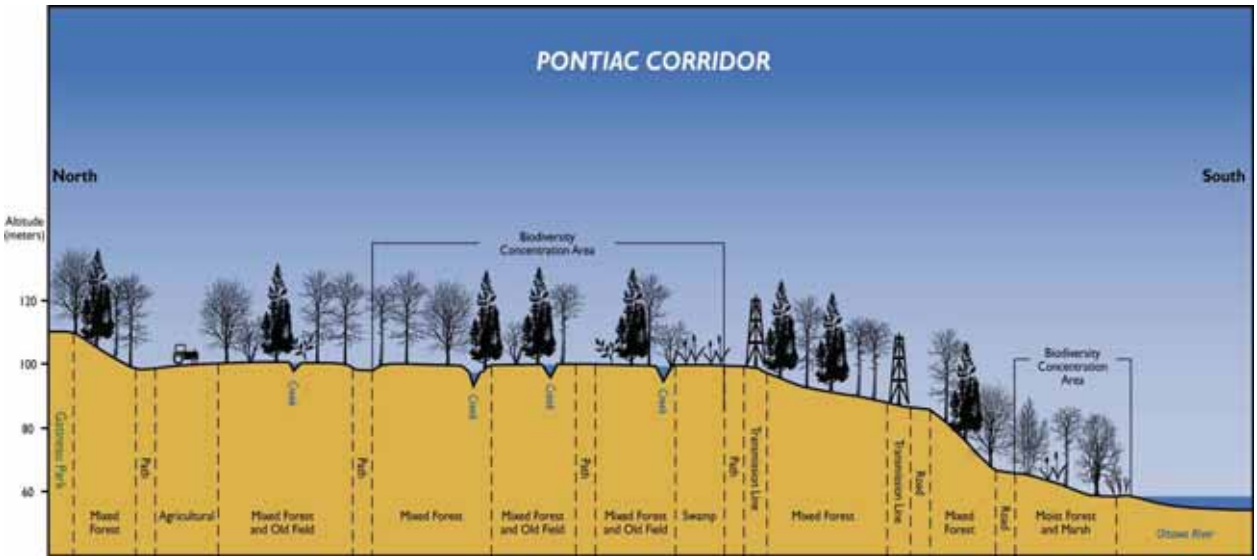
Agriculture is practised in the sector, and the corridor is surrounded by agricultural land. The fields are dotted with tree clusters and small woodland areas, most of which are managed (logging, plantations). Homes have been built along some of the sector's roads. Connectivity around the corridor is therefore limited.

The western and northeastern sectors of the corridor are located fairly close to the Bristol and Luskville corridors (less than 3 km). There is some potential for connection, especially for terrestrial wildlife, via tree clusters, fallow areas and small watercourses.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

The Pontiac corridor has significant connection potential. The corridors, including the connectors, are wide, offering a range of environments that have suffered very little human influence. The biodiversity concentration areas are huge and diversified, again with very little human influence. Because of its size and diversity, the corridor is functional for all species groups, including aquatic and forest species.

Having said this, the developments found in some woodlots and along certain roads constitute disturbances and create disconnects with the surrounding environment. Logging activities, fences and roads may affect how the corridor is used by some species. Similarly, many of the watercourses originating in or running through the corridor are often disturbed to a significant degree (water quality, no riparian strip). The main issues for the Pontiac corridor are to conserve these watercourses in order to ensure that aquatic species are able to travel to the Ottawa River, and to conserve wooded parcels of land so that large wildlife species are able to use the corridor.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Carex molesta*	X		
	Lathyrus ochroleucus	X		
	Gratiola aurea	X		
	Muhlenbergia sylvatica	X		
	Juglans cinerea	X		
	Ulmus thomasii	X		
	Pycnanthemum virginianum	X		
	Viola affinis	X		

LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD (cont.)

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Pseudacris triseriata	X	X	
Reptiles	*Thamnophis sirtalis*			X
	Apalone spinifera	X		
	Emydoidea blandingii	X	X	
Birds	*Aquila chrysaetos*	X		
	Histrionicus histrionicus	X		
	Calidris canutus	X		
	Ammodramus savannarum	X	X	
	Buteo lineatus	X		
	Meleagris gallopavo			X
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Falco peregrinus	X		
	Bucephala islandica	X		
	Ardea herodias			X
	Podiceps auritus	X		
	Catharus bicknelli	X		
	Asio flammeus	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Vermivora chrysoptera	X		
	Wilsonia canadensis	X		
	Melanerpes erythrocephalus	X	X	
	Lanius ludovicianus	X	X	
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
	Sterna caspia	X		
	Cistothorus platensis	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Lasionycteris noctivagans	X		
	Lasiurus cinereus	X		
	Lasiurus borealis	X		
	Mustela erminea			X
	Lontra canadensis			X
	Ursus americanus			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).

CCN NCC

Canada

PONTIAC CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 9

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.7 Bristol Corridor

The Bristol corridor is characterized by a huge species migration corridor towards the Ottawa River. It has only one connector, located in the western portion of Gatineau Park. The corridor is split between the municipalities of Pontiac and Bristol (Figure 10).

The corridor covers an area of 6,558 ha, 80% of which is woodland. It is longitudinal in shape, measuring an average of 17 km in length and 2 km in width. Because of its structure and composition, it is suited to wetland species.

CONNECTION WITH THE PARK

The Bristol corridor is connected to Gatineau Park by just one connector that is 1.5 km wide and is composed of a variety of forest stands (hardwood, mixed, softwood). There is also a small mature cedar grove in the middle of the connector. A little-used gravel road marks the boundary between the connector and Gatineau Park. There are other gravel roads in the connector, but they have only a minimal impact due to their small size and structure. A moderately-sized, operating sand pit is located in the vicinity of the connector.

BIODIVERSITY CONCENTRATION AREA

The Bristol corridor has one biodiversity concentration area that would benefit from being connected to Gatineau Park. It covers an area of more than 1,700 ha composed of woodlands and wetlands, and runs along the Ottawa River over a distance of 20 m. nearly half the area is composed of wetlands, in the form of different-sized swamps and marshlands, often connected by narrow watercourses, some of which originate further north in the area. The woodland areas surrounding these environments are also diverse, ranging from hardwood stands to mature white pine stands.

The size and diversity of these areas is reflected in their biodiversity. Numerous calcicole plants have been observed in the woodlands and riparian areas. Wetland and aquatic species, including amphibians, reptiles, fish and birds, are also present. Several heronries are located in and around the biodiversity concentration area, and the western portion of the area is classified as a waterfowl gathering area. The biodiversity concentration area is also used by mammals, including the white-tailed deer (as a deer yard).

A few private roads cut across the biodiversity concentration area, connecting to cottage resorts along the river. These sites are located in the central portion of the biodiversity concentration area; there is no human presence in either the eastern or the western section.

The main disturbance is a working quarry in the northern portion of the biodiversity concentration area. Because of its central location, it creates a clear break. In addition to the disturbance caused by noise, the developments associated with the quarry also have an impact (alteration of hydrology and typography, logging operations, etc.). Two main roads to the quarry cut across several wetland areas, including marshes. High-speed truck traffic is constant, causing mortality among species that attempt to cross the roads (Blanding's turtle carcasses were observed on both roads).

HUMAN FOOTPRINT

The human footprint in the Bristol corridor is variable and limited to specific sectors. Disturbances in the northern and southern sections of the corridor are minimal, and are limited to a few cottage areas and gravel roads.

However, the disturbances in the central portion of the corridor are more significant. The width of the connection corridor is significantly limited over a distance of roughly 3 km, to as little as 200 metres. There are several old field sectors, some of which have no tree vegetation. Some roads, including Route 148, also cut across this sector, and fences were observed along Route 148. A hydro-electricity transmission line also cuts across this portion of the corridor. Further south, the quarry covers an area of more than 400 ha, creating a hole in the centre and generating a supporting network of roads and other developments.

PERIPHERAL AND ADJACENT AREAS

The Bristol corridor is located in a sector dominated by agriculture. Most of the area surrounding the corridor is composed of cultivated fields, interspersed with regenerating old fields and tree clusters. In some sectors, the woodland areas are denser and larger, providing potential for connection with other natural areas. This is the case in the eastern portion of the corridor, located not far from the Pontiac corridor.

The northwestern portion of the corridor is located close to the large mass of forest that characterizes the northern section of Gatineau Park. Although agriculture is the dominant activity, the corridor is bordered by wide sections of woodland and several watercourses. Connection northwards would therefore be possible here.

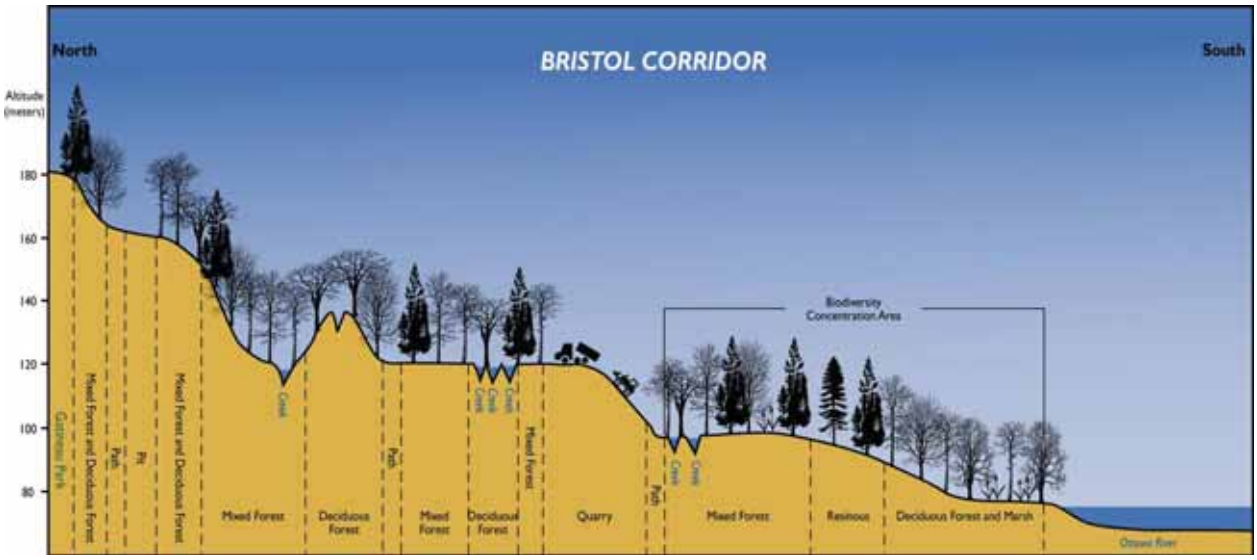
CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

The Bristol corridor offers an interesting connection potential for terrestrial and aquatic species. The connector and the biodiversity concentration area both offer a range of natural areas and a sufficiently large area to host all species groups. Plant species at risk, aquatic birds, amphibians, reptiles and mammals have all been observed in the corridor.

The human footprint in most of the corridor is negligible, and this is especially true for the biodiversity concentration area and the connector. However, the corridor is subjected to two types of human pressure. The first of these is the quarry and its access roads, which have fractured the wetlands and caused mortality among certain wetland species. The second is the narrowing of the centre of the corridor, which limits species mobility, especially for large mammals. The main issues for the Bristol corridor are to promote movement of wildlife from the wetlands around the quarry, and to broaden the central corridor to promote conditions favourable to large mammal movement.

In addition, there are two major projects currently underway in the southern portion of the Bristol corridor, between the quarry and the banks of the Ottawa River. The first of these involves conservation; a large area of land has been purchased by the Nature Conservancy of Canada, with help from the MRNF, with a view to creating a wildlife sanctuary. The purpose of this is to ensure that the land is managed in such a way as to conserve biodiversity. The second involves recreation and tourism, in the form of the proposed Sault-des-Chats regional park, a 4,000 ha collaborative initiative involving seven partners (two municipalities, two RCMs, two local development corporations and the Outaouais regional conference of

elected officers). The project focuses on recreation and tourism, but also promotes natural habitat protection and maintenance of the quality of life of the sector's residents (Groupe IBI/DAA, 2010). Coordinating these two projects will constitute a significant management challenge for the sustainable development of this sector of the corridor.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Adlumia fungosa*	X		
	Asclepias tuberosa var. interior	X		
	Bromus kalmii	X		
	Carex sartwellii	X		
	Carex cephalophora	X	X	
	Carex siccata	X		
	Ceanothus herbaceus	X		
	Ceanothus americanus	X		
	Prunus susquehanae	X		
	Quercus alba	X		
	Corydalis aurea ssp. aurea	X		
	Cypripedium arietinum	X	X	
	Asplenium rhizophyllum	X		
	Acer nigrum	X		
	Galium circaezans	X		
	Juniperus virginiana var. virginiana	X		
	Gentianopsis crinita	X		
	Lathyrus ochroleucus	X		
	Panax quinquefolius	X		
	Helianthus divaricatus	X		

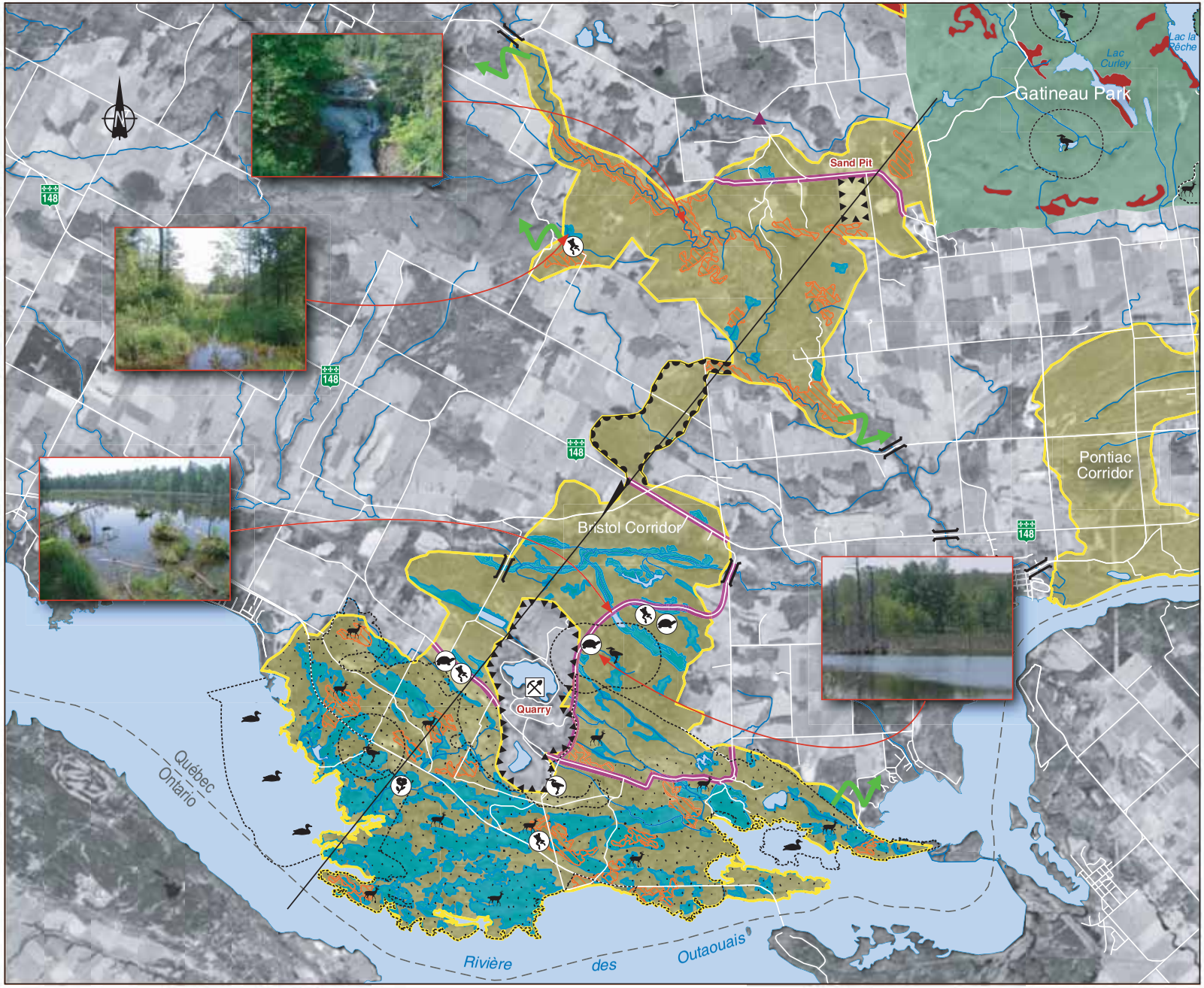
LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD (cont.)

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Hypericum kalmianum*	X		
	Triadenum virginicum	X		
	Minuartia michauxii	X		
	Ulmus thomasii	X		
	Panicum philadelphicum	X		
	Panicum flexile	X	X	
	Platanthera flava var. herbiola	X		
	Polygala polygama	X		
	Polygala senega	X		
	Pterospora andromedea	X		
	Pycnanthemum virginianum	X		
	Ranunculus flabellaris	X		
	Persicaria robustior	X		
	Rubus flagellaris	X		
	Selaginella eclipes	X		
	Spiranthes lucida	X		
	Sporobolus heterolepis	X		
	Sporobolus vaginiflorus var. vaginiflorus	X		
	Sporobolus compositus var. compositus	X		
	Rhus aromatica var. aromatica	X		
	Trichostema brachiatum	X		
	Uvularia grandiflora	X		
	Solidago ptarmicoides	X		
	Vicia americana	X		
	Wolffia borealis	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
Reptiles	*Nerodia sipedon sipedon*	X		
	Thamnophis sauritus septentrionalis	X		
	Emydoidea blandingii	X	X	
	Chrysemys picta			X
Birds	*Aquila chrysaetos*	X		
	Ammodramus savannarum	X	X	
	Buteo lineatus	X		
	Strix nebulosa			X
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Falco peregrinus	X		
	Ardea herodias			X

List (non-exhaustive) of species at risk, target species and species of interest observed in the field (cont.)

Group	Scientific name	Species at risk	Target species	Species of interest observed in the field
Birds	*Asio flammeus*	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Wilsonia canadensis	X		
	Ixobrychus exilis	X		
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
	Cistothorus platensis	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Lasionycteris noctivagans	X		
	Lasiurus cinereus	X		
	Lasiurus borealis	X		
	Canis latrans			X
	Mustela erminea			X
	Lynx canadensis		X	X
	Martes americana			X
	Alces alces			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).



CCN NCC

Canada

BRISTOL CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 10

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.8 North Corridor

The North corridor is characterized by an extensive network of woodlands and lakes connecting to the neighbouring forests. Because of the diversity and condition of its natural areas, the corridor is suited to terrestrial species, especially large predators.

The corridor is located north of Gatineau Park, at the western end of La Pêche Lake (Figure 11). It covers an area of 11,684 ha, more than 90% of which is woodland (the remainder is composed of lakes and watercourses). It is longitudinal in shape, measuring an average of 17 km in length and 7 km in width. Because of its size, it overlaps into several municipalities (north-south, clockwise): Thorne, La Pêche, Pontiac, Bristol and Clarendon.

CONNECTION WITH THE PARK

The North corridor has only one connector that runs alongside Gatineau Park over a distance of nearly 10 km. The connector is dominated by a forest composed of hardwood and mixed stands of varying ages. Some small sectors of forest have reached maturity. There are also several lakes along the connector, linked by small watercourses.

There are no roads or infrastructures of human origin in the connector, although a few private ATV trails, mostly leading to lakes, were observed.

BIODIVERSITY CONCENTRATION AREA

The condition of the corridor's natural areas, combined with a virtually non-existent human footprint, means that the entire area boasts a very rich biodiversity. It is impossible to highlight any specific biodiversity concentration area. The corridor is characterized by an extensive forest mass, composed of hardwood and mixed stands. The forest has reached maturity in some places. A network of lakes and watercourses exists throughout the corridor, and some portions of the area exhibit a steep, sloping relief.

The large area of forest provides habitats conducive to forest-dwelling species and large predators. Three-quarters of the area covered by the corridor has been identified as a white-tailed deer yard. Sign (feces) of wolves have also been observed in the vicinity of the connector.

The network of lakes and watercourses shelters species associated with aquatic and wetland environments. Amphibians and common snapping turtle (*Chelydra serpentina)* clutches have been observed not far from the connector.

HUMAN FOOTPRINT

The low human impact consists in a network of mostly gravel roads used by private landowners for recreational and residential purposes (e.g. waterfront cottages). Other roads in certain sectors of the corridor are used for forestry operations.

PERIPHERAL AND ADJACENT AREAS

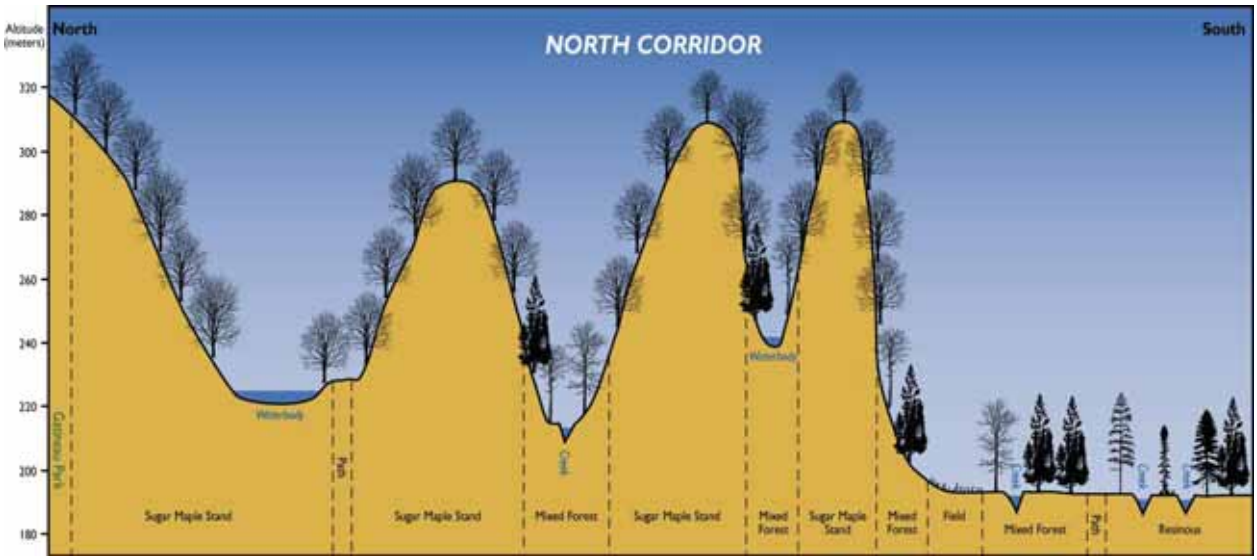
The southern portion of the North corridor is dominated by agricultural land, interspersed with old fields and tree clusters. The woodlands are more extensive in some places, and offer potential for connection with more southerly areas, including the Bristol corridor.

The northern portion is surrounded by woodlands, and consists in a continuation of the corridor's environments, i.e. a network of lakes and watercourses within a forest mass. There are very few human disturbances (a handful of private roads and trails). Connection between the corridor's boundaries and the northern sector would therefore be possible.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

The North corridor is fully functional due to its location, size, environment and the quality and condition of its natural communities. It provides a travel corridor for many species, including the wolf. Because the level of human presence is low, the area is composed of vast expanses of forest extending beyond the corridor. The boundary description is therefore for information purposes only, and the corridor could extend several kilometres northwards through its connection with the Mont-O'Brien biodiversity reserve (Figure 3).

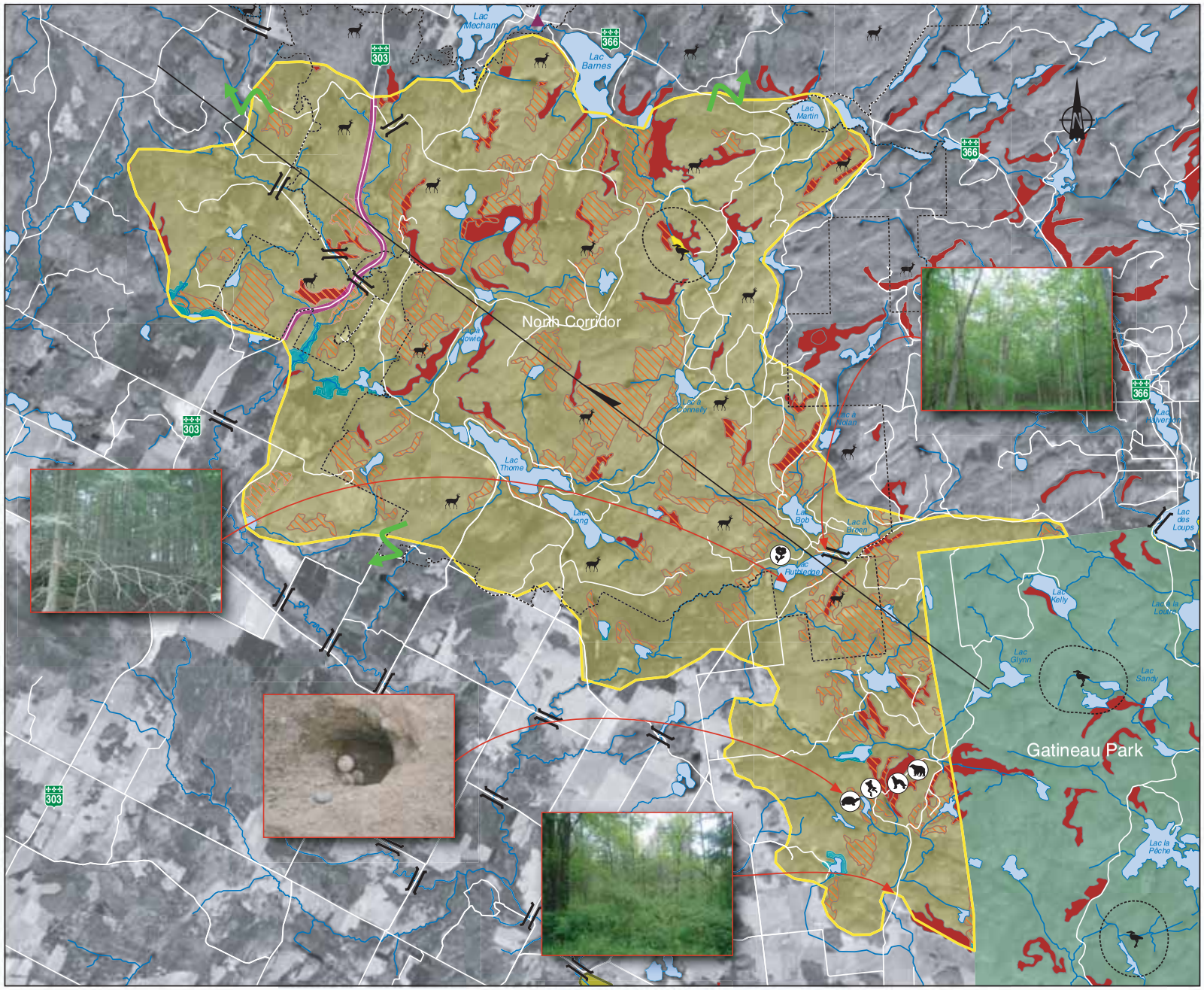
A large portion of the connector is also linked to Gatineau Park. Because of its condition, it offers good connection potential, and a wide variety of wildlife species has been observed. The main issue for the North corridor is therefore to conserve the connector in order to allow wildlife to travel to and from the neighbouring natural areas. Two parcels of land owned by the Nature Conservancy of Canada, totalling 265 ha, are located in this connector, directly adjacent to Gatineau Park.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Uvularia grandiflora*	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Lithobates (Rana) catesbeianus			X
Reptiles	*Emydoidea blandingii*	X	X	
	Chelydra serpentina	X	X	X
Birds	*Ammodramus savannarum*	X	X	
	Buteo lineatus	X		
	Ardea herodias			X
	Wilsonia canadensis	X		
	Haliaeetus leucocephalus	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Canis latrans			X
	Canis lupus lycaon	X	X	
	Lynx canadensis		X	X
	Martes americana			X
	Ursus americanus			X
	Alces alces			X
	Mustela vison			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).



CCN NCC

Canada

NORTH CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 11

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.9 Masham Corridor

Like the North corridor, the Masham corridor is characterized by an extensive network of woodlands and lakes connecting to the Northern forest mass. The entire corridor is located in the municipality of La Pêche, not far from the Gatineau River. It connects to the Northeast Park sector of Gatineau, near Philippe Lake (Figure 12).

The corridor covers an area of 2,913 ha, roughly 75% of which is woodland (the remainder is composed of lakes and watercourses). It is longitudinal in shape, measuring an average of 10 km in length and 2.5 km in width. Because of the range and condition of its natural areas, it is suited to terrestrial species, especially large predators.

CONNECTION WITH THE PARK

The Masham corridor has only one connector that runs along Gatineau Park over a distance of nearly 4 km. The connector is dominated by a forest composed of hardwood and mixed stands of different ages, some of which have reached maturity. The connector is situated opposite large tracts of forest located in Gatineau Park.

Route 366 cuts across the connector and serves a number of secondary roads and lanes. Traffic is moderate. Homes have been built along the main and secondary roads. However, generally speaking, residential development is limited and both sides of the road are bordered by wooded strips.

BIODIVERSITY CONCENTRATION AREA

It is impossible to identify a single biodiversity concentration area because of the quality of the natural areas in the corridor and the low human footprint. The corridor is characterized by an extensive forest mass composed of hardwood and mixed stands. Several areas of the forest have achieved maturity. The corridor also boasts a network of lakes and watercourses, and steep slopes are present in some sectors.

The woodland areas provide habitats conducive to species associated with the forest, and to large predators. Sign of wolves and white-tailed deer have been observed within the corridor. The network of lakes and watercourses shelters species associated with aquatic and wetland environments. Some amphibian species have been observed, along with birds such as the Great Northern loon (*Gavia immer*).

HUMAN FOOTPRINT

The human footprint is low, and localized. In the southern portion of the corridor, homes have been built along the main and secondary access roads, forming hamlets. The central and northern sectors are used for vacation purposes, especially around the lakes. A number of lanes and ATV trails cut across the corridor. Some areas are used for agricultural purposes. Generally speaking, they are surrounded by wooded hedges, old fields and tree clusters. An electricity transmission line cuts across the northern portion of the corridor.

PERIPHERAL AND ADJACENT AREAS

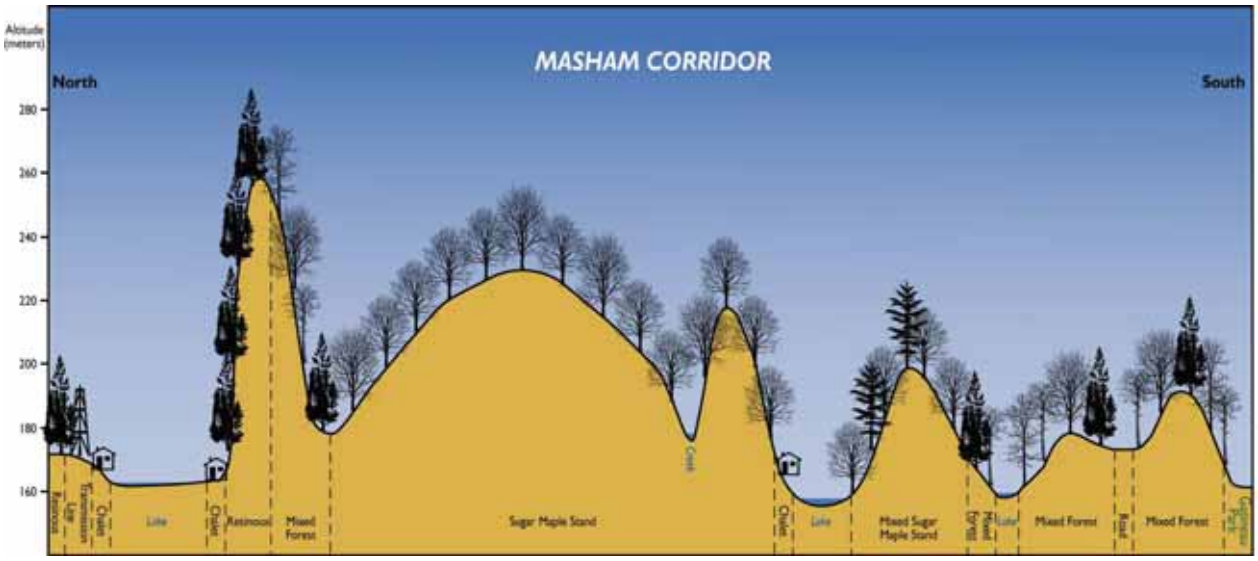
Agriculture dominates the western and eastern sections of the corridor. It is characterized by a patchwork of cultivated fields, old fields, and tree clusters. Wooded hedges surround the fields in some sectors, and large areas of woodland, along with lakes and wetlands, can also be seen. Connection is therefore considered possible in these sectors.

The northern portion is adjacent to the Northern forest mass, and is a continuation of the natural areas observed in the corridor. It comprises a network of lakes and watercourses, scattered throughout large areas of woodland. Human disturbances are rare, and are limited to a handful of private lanes and trails. A connection between the corridor boundaries and the northern sector is therefore possible. Through the connection, the Masham and North corridors could bolster a regional network of natural environments linked to the Mont O'Brien biodiversity reserve.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

Because of its location, size and the quality and condition of its natural areas, the Masham corridor could serve as a broad travel corridor for species associated with forest and aquatic environments, and particularly for large wildlife. The low level of human impact has resulted in the development of large expanses of woodland around the corridor, allowing for a diversity of travel corridors. Corridor boundaries are therefore for information purposes only, since the northern portion of the corridor could easily extend over several additional kilometres.

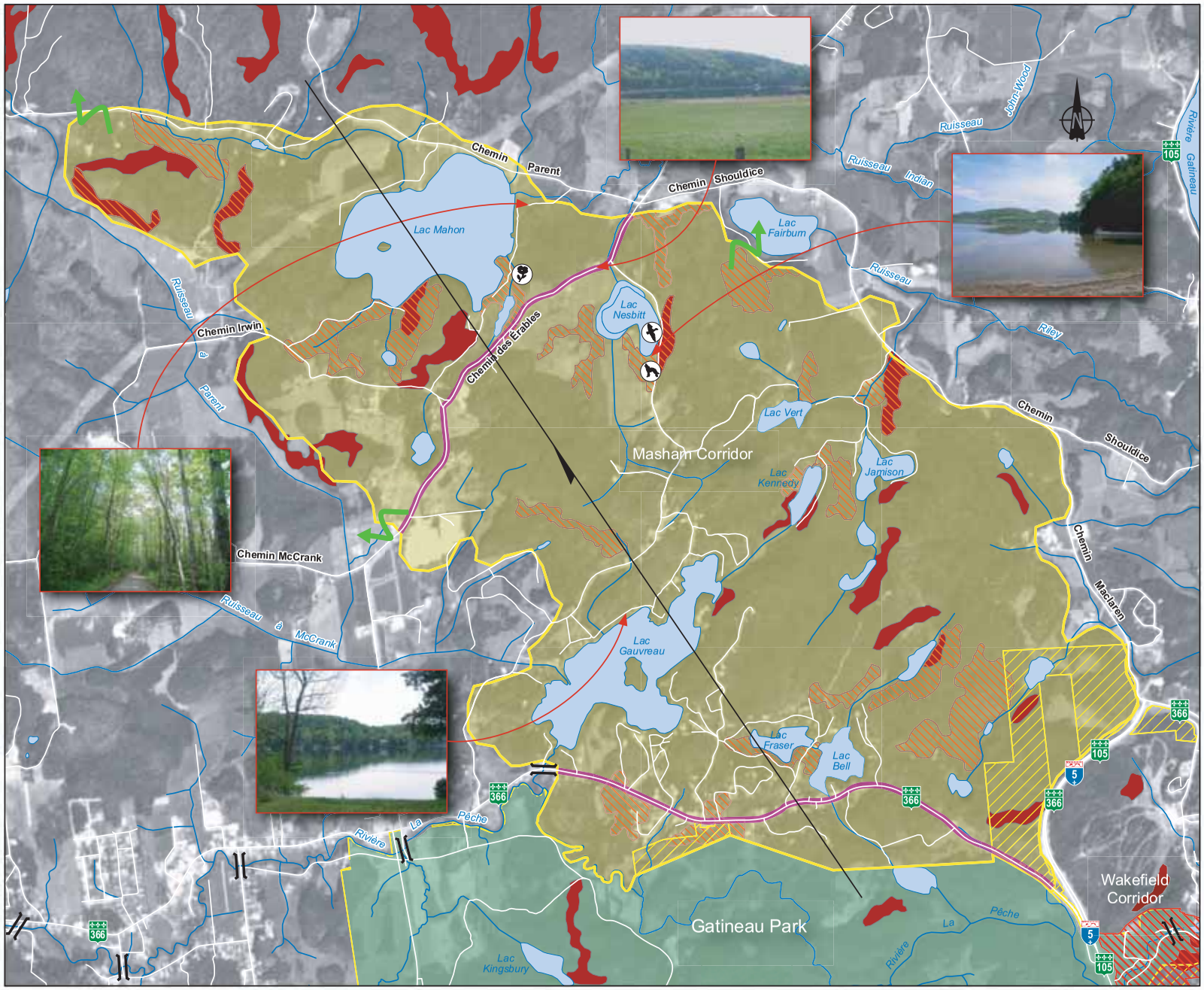
A significant portion of the connector is also linked to Gatineau Park. Due to its condition, it offers good connection potential and a wide range of wildlife species have been observed. However, human footprint in the form of homes and roads is present in the connector and around several lakes. The main issue for the Masham corridor is therefore to conserve intact wooded strips along the connector and around the main lakes, to ensure that the corridor's species are able to travel to the Northern forest mass.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Allium tricoccum*	X		
	Conopholis americana	X		
	Ulmus thomasii	X		
	Trillium grandiflorum	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Nerodia sipedon sipedon	X		
	Lampropeltis triangulum triangulum	X		
Birds	*Aquila chrysaetos*	X		
	Buteo lineatus	X		
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Vermivora chrysoptera	X		
	Wilsonia canadensis	X		
	Lanius ludovicianus	X	X	
	Gavia immer			X
	Haliaeetus leucocephalus	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Canis latrans			X
	Mustela erminea			X
	Canis lupus lycaon	X	X	
	Lontra canadensis			X
	Lynx canadensis		X	
	Martes americana			X
	Ursus americanus			X
	Neovison vison			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).



CCN NCC

Canada

MASHAM CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 12

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.10 Northeast Park Corridor

The Northeast Park corridor connects the northeastern sector of Gatineau Park to a wooded zone near the Gatineau River, near Brown Lake. The corridor is located in the municipality of La Pêche, a few kilometres south of the Wakefield Mill. Riverside Drive, which runs alongside the Gatineau River, marks the corridor's northern boundary (Figure 13).

The corridor covers an area of 208 ha, 90% of which is woodland. It forms a polygon measuring roughly 2 km per side. Because of its structure and composition, the Northeast Park corridor is suited to terrestrial species, especially those that use open environments.

CONNECTION WITH THE PARK

The Northeast Park corridor is linked to Gatineau Park via two connectors located to the south and west of the corridor. The first runs adjacent to Gatineau Park over a distance of almost one kilometre. It is composed mainly of young mixed forest stands. The second connector is similar in composition, but the forests are interspersed with homes. It covers a smaller area and is only a few metres wide opposite the homes. In Gatineau Park, the connectors link to extensive forests.

Route 105 cuts across both connectors. It is wide (more than 20 metres) and traffic is heavy. No wildlife modifications were observed, but the forest borders the road near the southern connector, providing a vegetation screen for wildlife. The two connectors also fall within the proposed extension of Highway 5, which will be built in the coming years.

BIODIVERSITY CONCENTRATION AREA

The Northeast Park corridor has one biodiversity concentration area that would benefit from being linked to Gatineau Park. It comprises roughly 50 ha of young mixed forests, with some sectors dominated by fir and hemlock. The relief is often hilly, with moderate slopes on which softwood stands have become established. There are some small bare areas at the top of the hill that offer dry conditions and are dominated by lichens and white pine, along with a group of acidic soil plants including the common lady's slipper (*Cypripedium acaule*).

Because of its diversity, the area is of interest to wildlife species associated with forests, and to certain reptiles. Numerous signs of white-tailed deer were observed, and a small deer yard (roughly 1 ha) was identified.

The human footprint in the biodiversity concentration area is low. Stand age suggests that human activity used to take place in the sector. A large property and several associated informal trails are located in the centre of the biodiversity concentration area. In addition, the proximity of residential neighbourhoods has created a zone of influence of approximately 20 metres, within which trails have formed and trees have been cut.

HUMAN FOOTPRINT

The human footprint in the Northeast Park corridor is moderate. There are a few residential neighbourhoods in the northern and southern sections, adjacent to the biodiversity concentration area. The homes are situated at some distance from one another, and are surrounded by forests. Some informal trails and old field areas can be seen near the homes.

Route 105, which cuts through the two connectors, constitutes the main disturbance. It is wide, and traffic is heavy and fast, hindering wildlife movement. The railway running alongside Riverside Drive, adjacent to the Gatineau River, also hinders connectivity.

PERIPHERAL AND ADJACENT AREAS

The Northeast Park corridor is located in a moderately inhabited residential sector. The neighbourhoods are composed of hamlets interspersed with small wooded fringes. A tract of agricultural land separates the two connectors, and is interspersed with tree clusters and wooded hedges. Connection is possible in this sector, but a roadside fence constitutes a barrier to wildlife movement.

The cliff located along the Gatineau River is a major barrier to species mobility. The cliff also overlooks the railway and Riverside Drive, hindering wildlife movement in the sector. The corridor is therefore not connected to the Gatineau River, but links only to the biodiversity concentration area.

A large tract of forest, composed of mixed woodlots and a few mature cedar groves, is located south of the corridor, offering potential habitat for forest-dwelling species. However, the human footprint in the forest is high, with numerous trails and logged areas. In addition, there is an active quarry near the corridor's eastern boundary. Part of the quarry is no longer in operation, but is used for recreational purposes (scuba diving, summer camps). The quarry's location and the associated human presence also constitute an obstacle to species mobility.

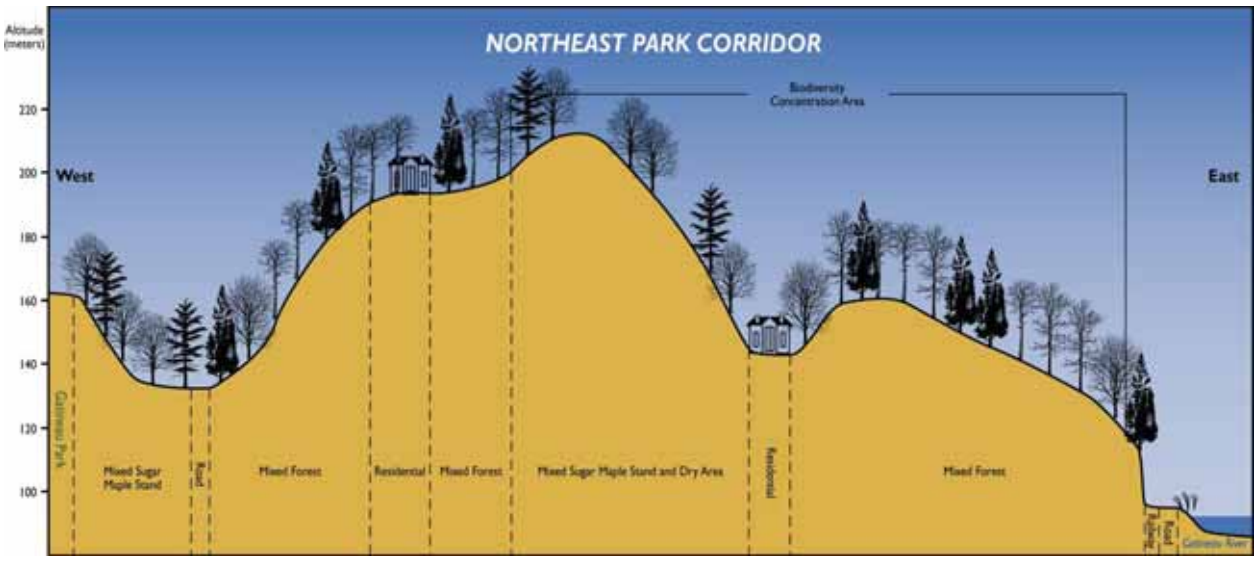
The Wakefield corridor is located roughly one kilometre to the north of the Northeast Park corridor (identified in red in Figure 13). Situated partly in Gatineau Park and wholly on NCC land, it is composed of the La Pêche River, which originates in Gatineau Park and flows into the Gatineau River. The corridor flows under the main roads, allowing, among other things, for species travel. A riparian strip is present along most of its length, providing a habitat of interest to aquatic species and enhancing the diversity of habitats in adjacent corridors. The Wakefield corridor was not characterized and assessed like the other corridors, because it is located almost entirely on NCC land and is therefore protected to a certain extent.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

The Northeast Park corridor offers potential for species movement, as well as shelter for forest-dwelling wildlife, due to the quality of its habitats. The main connector is wide and wooded, and the human footprint in the biodiversity concentration area is low. There are also some natural environments around the corridor, and links to these areas would enrich the corridor's biodiversity as well as increasing the potential habitat area for wildlife.

Human development within the corridor is minimal, and the residential neighbourhoods are scattered. However, homes built between the connectors and in the biodiversity concentration area reduce the size

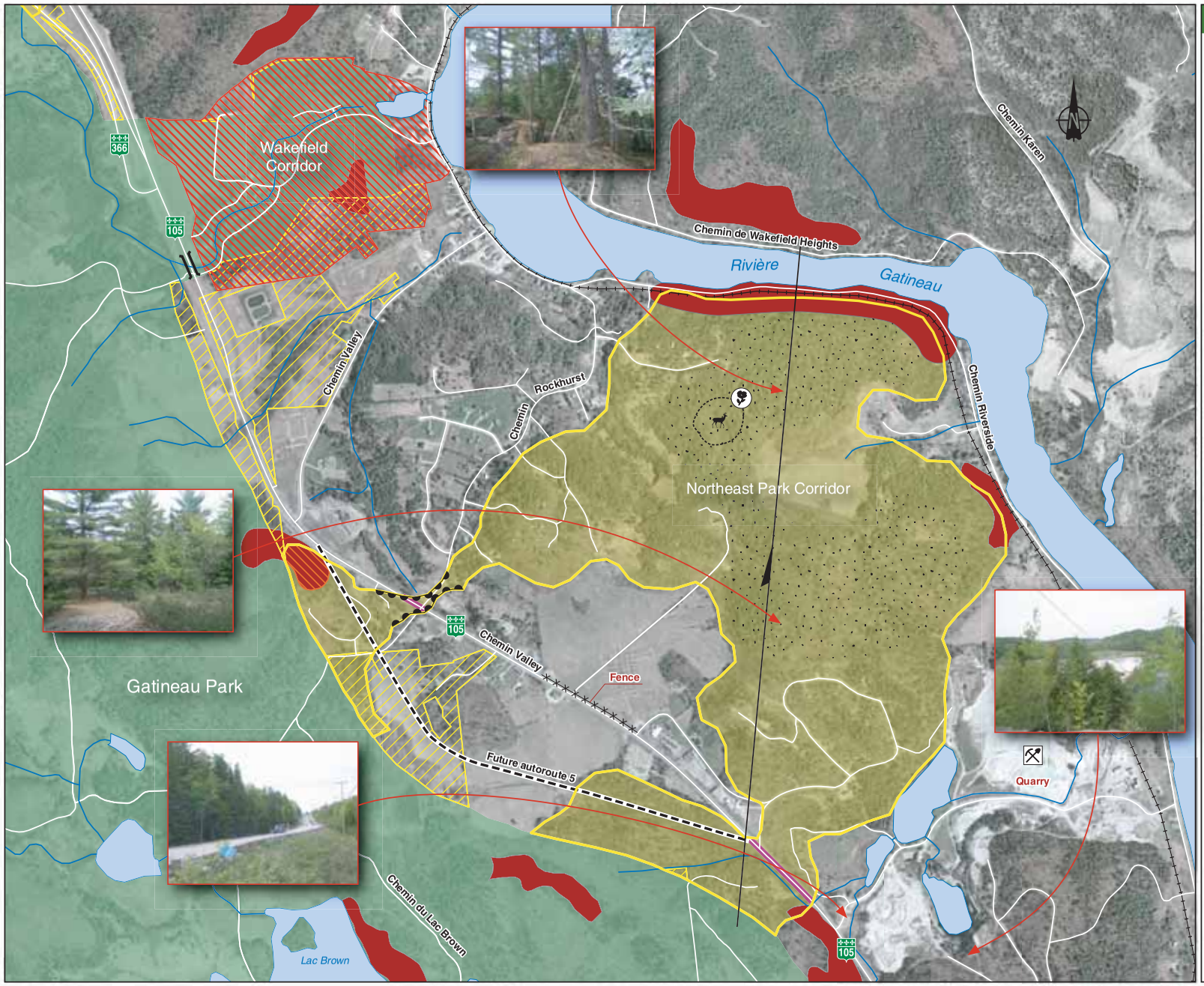
of the travel corridors, and a residential neighbourhood has considerably narrowed one of the corridors. New residential developments and the Highway 5 extension may also affect the quality and size of the biodiversity concentration area and connectivity with the Park. The main issue for the Northeast Park corridor is therefore to conserve homogeneous wooded areas in order to optimize species mobility between Gatineau Park and the biodiversity concentration area.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Cycpripedium acaule*			X
Birds	*Aquila chrysaetos*	X		
	Ammodramus nelsoni	X		
	Buteo lineatus	X		
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Vermivora chrysoptera	X		
	Wilsonia canadensis	X		
	Haliaeetus leucocephalus	X		
Mammals	*Odocoileus virginianus*			X
	Lepus americanus			X
	Lynx canadensis		X	X
	Martes americana			X
	Ursus americanus			X
	Perdrix perdrix			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).



CCN NCC

Canada

NORTHEAST PARK CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 100 200 300 400 500 m

FIGURE 13

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.11 Larrimac Corridor

The Larrimac corridor connects Gatineau Park to a large tract of mature forest on hilly ground. The corridor then slopes gently to the Gatineau River. It is located east of Gatineau Park and is situated in the municipality of Chelsea (Figure 14).

The corridor covers an area of 394 ha, 95% of which is woodland. It is rectangular in shape, measuring an average of 1.5 km long and 3 km wide. Because of its structure and composition, the corridor is suited to species associated with the forest in general, and with closed forest environments in particular.

CONNECTION WITH THE PARK

A broad wooded strip borders Gatineau Park, providing connection potential over a distance of several kilometres. However, the hilly relief includes a number of cliffs, and these, combined with the presence of Highway 5, limit the ability of wildlife to travel through the sector. The three connectors also lie adjacent to portions of land that are more accessible in terms of relief. They are composed of mature maple groves interspersed with small depressions where water accumulates, creating patches of marshland. Although there are two connectors that allow wildlife to pass under Highway 5, the road nevertheless constitutes an disruption, due to its width and heavy traffic.

At the northwestern boundary of the corridor, Highway 5 separates into a dual carriageway, and a wildlife crossing has been constructed at that location. The crossing consists in two culverts that wildlife species can use to pass under the highway. Several tracks of different species were observed in the crossing, including a wolf track. Although the wildlife crossing is of human origin, it is considered to be a corridor connector, and forms part of the corridor. In the more southerly connector, another, similar wildlife crossing has been constructed under the highway, near the culverts shown on the map. Its surface has been asphalted.

BIODIVERSITY CONCENTRATION AREA

The Larrimac corridor has one biodiversity concentration area that would benefit from being connected to Gatineau Park. It covers an area of more than 50 ha of woodland growing on a hilltop. The woodland is a mature sugar maple grove. Further down the hillsides, the maple grove is mixed with hardwood trees. In addition, some of the land in the biodiversity concentration area is owned by the NCC (Figure 14).

The human footprint in the biodiversity concentration area is low. There are no structures of human origin, apart from a few informal trails in the woods. Because of its structure and condition, the biodiversity concentration area offers a habitat of interest to forest-dwelling species. Birds and mammals use it as shelter, because of its altitude and inaccessibility.

The biodiversity concentration area is located near another wooded area of more than 100 ha, located in the southern portion of the corridor. It contains creeks originating in Gatineau Park and flowing into the

Gatineau River. The creeks are accompanied by small lakes and areas of marshland, surrounded by young hardwood forests. This natural area consists of a network of wetlands that complement the forest-dominated biodiversity concentration area. The land located between these two sectors is partially urbanized, with wooded corridors.

HUMAN FOOTPRINT

The human footprint in the Larrimac corridor is sporadic. Homes have been built along the roads, or in small isolated hamlets. The sites are fairly well-spaced, and are wooded, creating small travel corridors. Some homes have also been built on the banks of the Gatineau River, although many unoccupied, wooded sections still remain.

The main disturbance derives from the road network, since two major roads cut across the northern and southern sections of the corridor. Highway 5 cuts across the corridor's western section. Because of its size and heavy traffic, it is difficult for terrestrial wildlife to cross the highway, despite the two crossings built to address this problem. As for Route 105, it cuts across the northern portion of the corridor. It is of moderate size (roughly 20 metres wide), and traffic is also moderate. Several private lanes connect to the road, serving residential hamlets. The road is bordered by forest, thereby improving the crossing potential. A railway also cuts across the northern portion of the corridor.

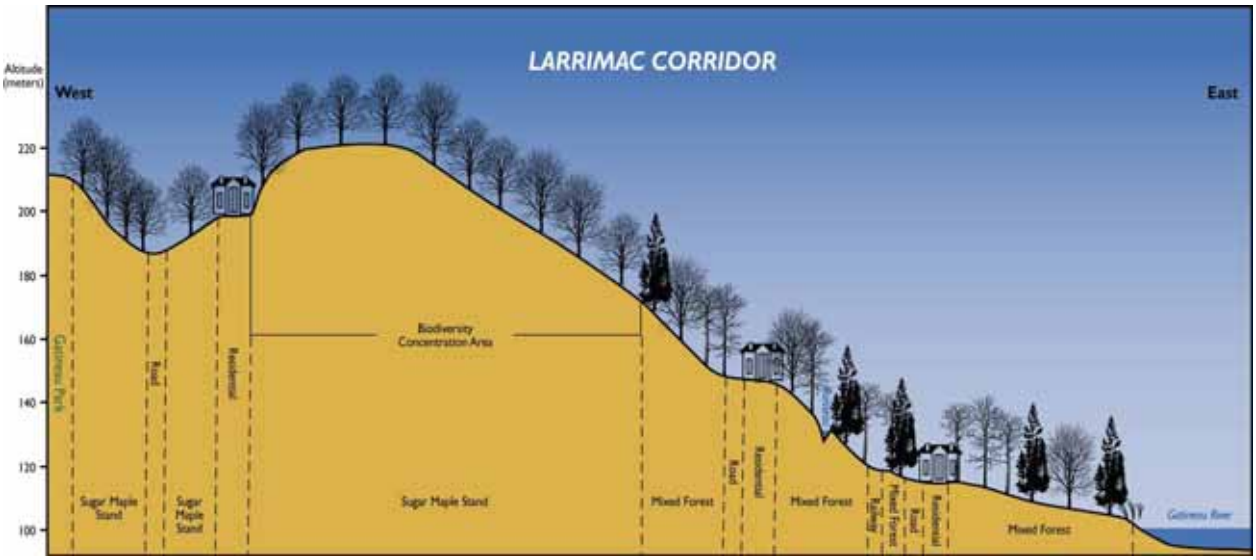
PERIPHERAL AND ADJACENT AREAS

The Larrimac corridor is surrounded by an undeveloped urban framework. As is the case in the corridor itself, homes are divided into hamlets located at some distance from one another, meaning that small wooded fringes are present around the corridor. Although limited in area, they can nevertheless be used by small mammals and forest birds as shelter and for travel.

CORRIDOR FUNCTIONALITY AND MANAGEMENT

The Larrimac corridor offers good connection potential because of the low human impact both in and around the corridor. The biodiversity concentration area is in good condition, and provides a good quality habitat for forest-dwelling species. The connectors measure between 500 metres and one kilometre in width, and offer a range of natural environments. Tracks observed in the wildlife underpasses show that the area is used by large mammals, including wolves.

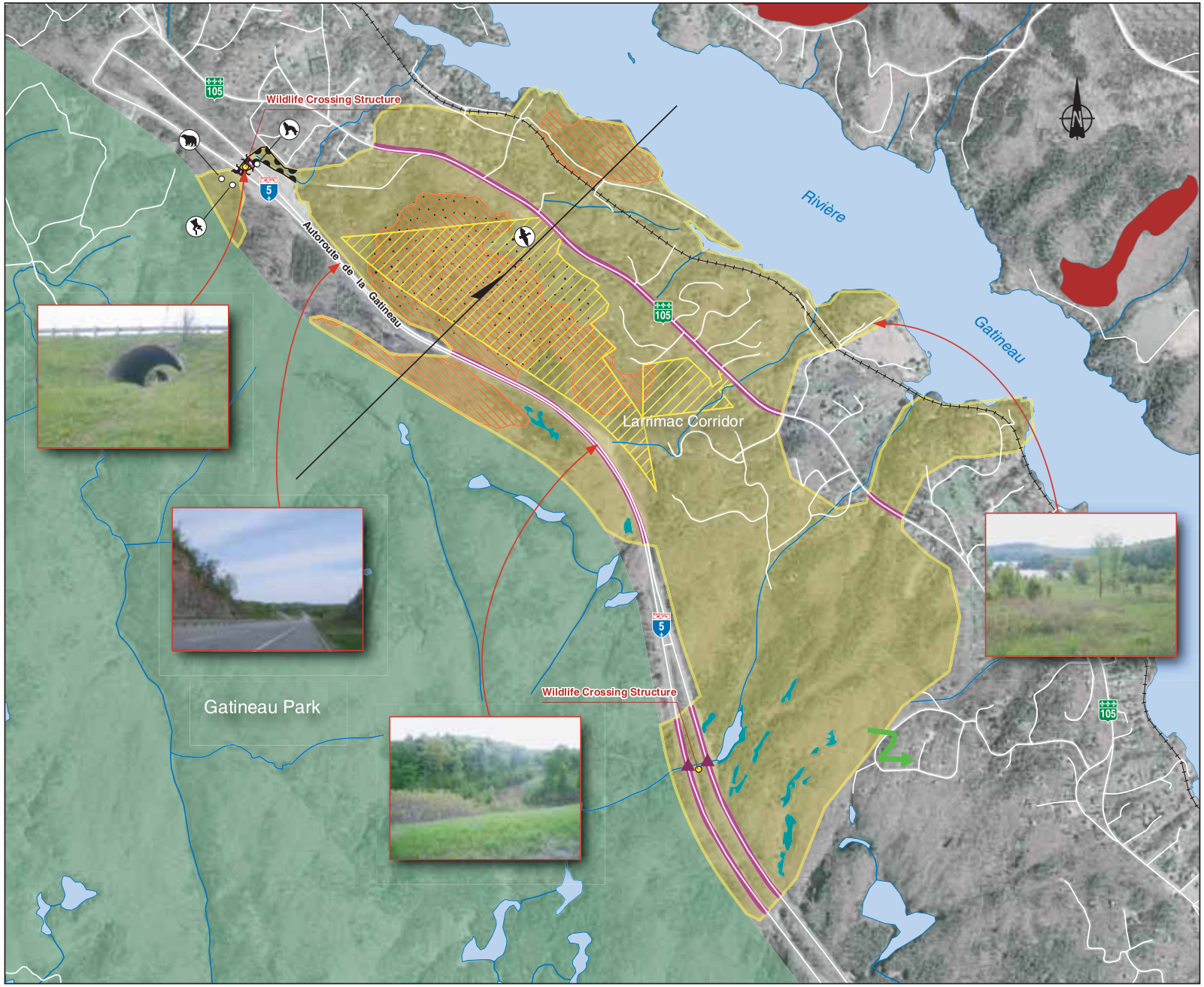
The main disturbance derives from the presence of roads, especially Highway 5, a heavily-used road that cuts across the connector corridors. The main issue for the Larrimac corridor would be to promote the use of the two wildlife crossings under Highway 5 by making them more attractive, among other things by reforestation of the surrounding areas and naturalization of their surface (i.e. removing the asphalt).



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Asplenium rhizophyllum*	X		
	Pterospora andromedea	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
Birds	*Falco peregrinus*	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Canis lupus lycaon	X	X	
	Lynx canadensis		X	X
	Martes americana			X
	Lontra canadensis			X
	Ursus americanus			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).



CCN NCC

Canada

LARRIMAC CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 14

October 2012

DDM Del Degan, Massé Experts-conseils

4.4.12 Chelsea Creek Corridor

The Chelsea Creek corridor is characterized by two creeks that originate in the southeastern portion of Gatineau Park, near Pink Lake. The creeks and their tributaries collect water from the drainage basin and carry it to the Gatineau River. Most of the corridor is located in the Chelsea municipality, and the remainder in the Gatineau municipality. It is bordered to the south by residential neighbourhoods and a golf course alongside Highway 5, and to the north by St. Joseph Boulevard (Figure 15).

The corridor covers an area of 438 ha, slightly over 80% of which is woodland. It is longitudinal in shape, measuring an average of 6 km long and 500 metres wide. Because of its structure and composition, it is suitable for aquatic species.

CONNECTION WITH THE PARK

The Chelsea Creek corridor can connect to Gatineau Park via five connectors in the form of creeks and their associated riparian strips. The connectors vary in size, measuring an average of 100 metres wide, and are composed of woodlands, most of which are approaching maturity. The creeks flowing through the woods are in generally good health, and are surrounded by wide and more or less unbroken riparian strips in all cases. All five connectors are situated opposite Gatineau Park's extensive forests.

Notch Road and Mine Road run alongside Gatineau Park and cut across four of the five connectors. Both roads are average in terms of width (> 15 m), with moderate traffic travelling at moderate speeds. The creeks flow under the roads through structures of varying sizes, including culverts. A number of residential neighbourhoods are located around the connectors, limiting the potential for wildlife mobility. The riparian strips in two connectors are significantly reduced due to the proximity of homes, and their wildlife movement potential is therefore diminished.

BIODIVERSITY CONCENTRATION AREA

The Chelsea Creek corridor has one biodiversity concentration area that would benefit from being connected to Gatineau Park. It is located at the confluence of two main creeks, and covers an area of more than 100 ha. The creeks lie within and are surrounded by mature mixed forest stands. There are some meander belts and small areas of marshland. The core of the biodiversity concentration area is characterized by regenerating agricultural old fields, creating habitats ranging from prairie grassland to tree clusters.

The creeks are in good condition, and this, combined with the range of adjacent ecosystems, allows the area to host many different species, especially those associated with wetlands. Amphibians are present throughout the area, and forest-dwelling species including birds were also observed. Because of their topography, the woodland areas adjacent to the creeks contain small depressions where water accumulates. These, too, are used by species such as the spotted salamander *(Ambystoma maculatum*), and clutches of eggs were observed.

HUMAN FOOTPRINT

The human footprint in the Chelsea Creek corridor is variable and limited to specific sectors. There are a few informal hiking and ATV trails, along with a 20-metre zone of influence from the homes in the northern sector. The creeks have wide, unbroken riparian strips that protect them from outside pressures.

However, the width of the eastern portion of the corridor is significantly reduced and the riparian strips are virtually non-existent in the last few metres before the mouth of the creek. Residential and commercial development has taken place in the vicinity, and St. Joseph Boulevard (Route 105) cuts across the sector. Traffic is heavy (especially at peak times) and fast.

Highway 5 cuts across the northern section of the corridor. Because of the width of the road and its heavy traffic, it is difficult for terrestrial wildlife to cross. The watercourses run under the highway, but no wildlife crossings were observed. A hydro-electricity transmission line cuts across the central portion of the corridor, transecting the biodiversity concentration area.

PERIPHERAL AND ADJACENT AREAS

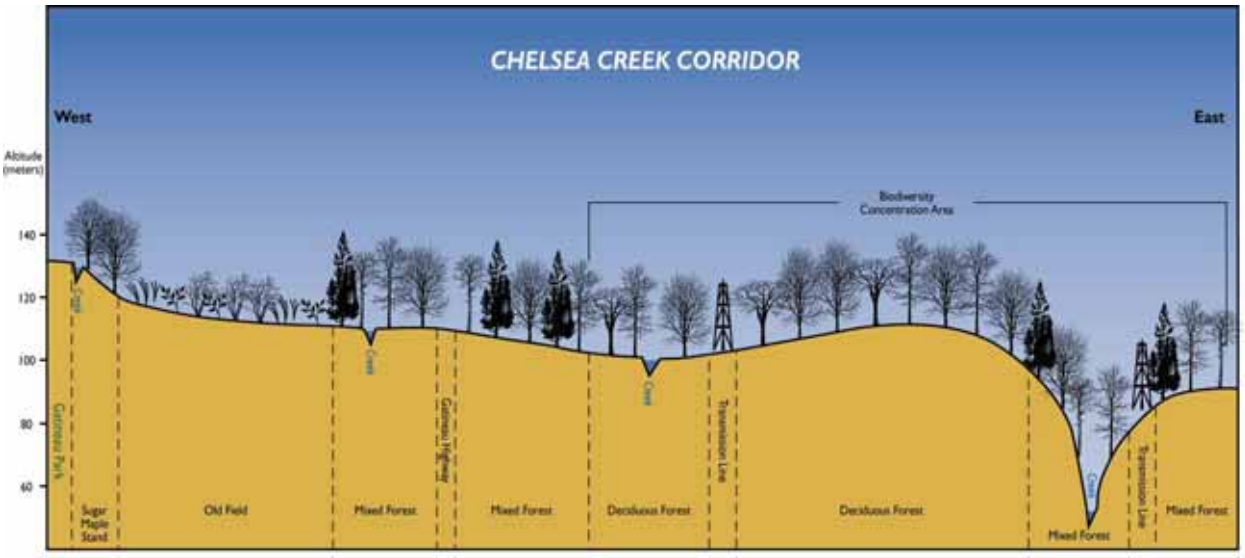
Chelsea Creek corridor is situated in an urban environment characterized by residential developments and road networks. The corridor is therefore surrounded by residential neighbourhoods, industrial zones and a golf course, although there are still a few fields and patches of agricultural old field to the west.

Chelsea Creek corridor is located slightly less than one kilometre from the Philémon-Lemay corridor, but the potential for connection seems small, given the number of homes in the area, and the presence of Highway 5. The mouth of Chelsea Creek is located not far from Farmer's Rapids, known to be the largest spawning ground in the Outaouais region. There would therefore be potential for connection between the southern portion of the corridor and this particular area, via the woodland area along the banks of the Gatineau River.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

In the Chelsea Creek corridor, watercourses are the sole travel corridors used by species. The two main watercourses in the corridor originate in Gatineau Park and flow into the Gatineau River. The corridor also contains several secondary creeks flowing into the main watercourses in the central section of the corridor. The biodiversity concentration area is in good condition, and the creeks provide a range of good quality habitats suitable for aquatic species.

However, the corridor is under pressure from the surrounding environment, which has encroached into certain sectors, including two connectors and the mouth of Chelsea Creek. The main issue for the Chelsea Creek corridor would be to restore the riparian strips in the vicinity of the mouth of the Creek and along the two connectors, to provide better conditions for the movement of aquatic species. It would also be useful to help species (amphibians) to cross the roads in the sector, especially Highway 5 and St. Joseph Boulevard (Route 105).



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Alliaria petiolata*			X
	Pterospora andromedea	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Pseudacris triseriata	X	X	
	Plethodon cinereus			X
	Ambystoma maculatum			X
Reptiles	*Lampropeltis triangulum triangulum*	X		
Birds	*Buteo lineatus*	X		
	Caprimulgus vociferus	X		
	Chordeiles minor	X		
	Bucephala islandica	X		
	Asio flammeus	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Vermivora chrysoptera	X		
	Dendroica cerulea	X	X	
	Wilsonia canadensis	X		
	Seiurus motacilla	X		
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X
	Ursus americanus			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).

CCN NCC

Canada

CHELSEA CREEK CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1 000 m

FIGURE 15

October 2012

Del Degan, Massé

4.4.13 Philémon-Leamy Corridor

The Philémon-Leamy corridor links the southern portion of Gatineau Park to the biodiversity concentration area composed of valued habitats in the Philémon-Wright corridor and Parc du Lac Leamy (Del Degan, Massé, 2005). It is situated in the City of Gatineau and borders part of Highway 5. It is connected to Gatineau by a connector near Pink Lake (Figure 16).

The corridor covers an area of roughly 380 ha, 90% of which is woodland. It is longitudinal in shape, measuring an average of 6 km in length and 500 metres in width. Because of its structure and composition, the Philémon-Leamy corridor is suitable for wetland species.

CONNECTION WITH THE PARK

The Philémon-Leamy corridor can connect to Gatineau Park via a single connector 200 metres in width and is composed of young mixed woodlands interspersed with homes. A new home was under construction in the central portion of the connector when the research team visited the corridor. The human footprint is significant on both sides (Gatineau Park and the connector), and is characterized by the presence of human infrastructure.

Boulevard de la Cité des Jeunes also cuts across the connector. This is a main road (more than 20 metres wide), on which traffic is constant. The increased presence of infrastructures on both sides of the road limits the potential for wildlife connectors. However, a watercourse in which the green frog was observed runs through the centre of the connector.

BIODIVERSITY CONCENTRATION AREA

The Philémon-Leamy corridor has one biodiversity concentration area that would benefit from being connected to Gatineau Park. It covers an area of roughly 1,500 m² of mostly wooded land. Leamy Creek cuts across the sector and runs down to the Gatineau River, surrounded on either side by a riparian strip of young mixed forest stands. The Creek is winding, with meander belts in several places. The area's topography, combined with beaver activity, has generated a number of small holes submerged in water. Because of this, the biodiversity concentration area is able to shelter several species associated with wetland environments, including amphibians.

The human footprint in the area is moderate. Past human activity and recent development have had a visible impact on the environment. A bicycle trail runs along the entire length of the corridor, and residential neighbourhoods to the south have generated a 10-metre zone of influence in which the environment has been disturbed (logging, garbage, human use). However, a variety of significant ecological elements have been conserved in the core of the biodiversity concentration area, providing conditions suited to various species.

HUMAN FOOTPRINT

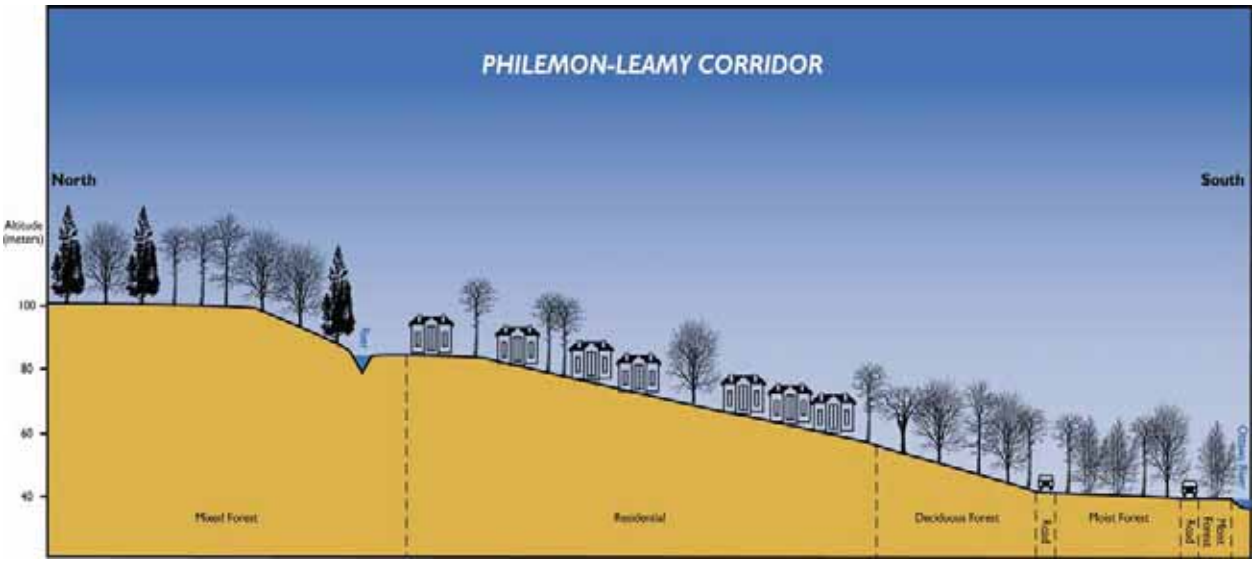
The human footprint in the Philémon-Leamy corridor is fairly high. The bicycle trail has led to other developments such as rainwater circulation ditches. Traffic on the trail appears to be limited, since there are few informal offshoots. However, disturbances in the sector have allowed exotic plants to become established, including some invasive species such as the common buckthorn (*Rhamnus cathartica*). Boulevard Fournier and Highway 5 cut through the southern portion of the corridor, near Lac Leamy, hindering wildlife mobility.

PERIPHERAL AND ADJACENT AREAS

The Philémon-Leamy corridor is located in a highly urbanized area, leading to increased pressure. Highway 5 runs along the northern section of the corridor and cuts across Leamy Creek upstream. The width of the road hinders wildlife mobility, in particular because there are no natural areas nearby to act as buffer zones. Residential neighbourhoods surround the corridor on all sides and have encroached into the woodland and vacant sites. Construction therefore takes place near the corridor and in the connector. Given the type of surrounding environment, there is little potential for connection between the Philémon-Leamy corridor and other natural environments of interest. Leamy Creek runs through the corridor and is subject to the same pressures. When it flows out of the corridor, it enters an urban environment with no riparian strip or natural buffer zone.

CORRIDOR FUNCTIONALITY AND MANAGEMENT ISSUES

There is very little potential for connection in the Philémon-Leamy corridor. Pressure from the surrounding environment and the many infrastructures located in the connector hinder terrestrial wildlife movement. However, some wetland species have been observed in both the connector and the biodiversity concentration area. The biodiversity concentration area is an environment of interest for wetland species, due to its features and location. Leamy Creek originates in Gatineau Park and may offer potential for aquatic and wetland species. Accordingly, the main issue for the Philémon-Leamy corridor would be to restore certain portions of Leamy Creek in order to allow species to travel to the Gatineau River, and to help enhance biological diversity in the biodiversity concentration area. The same issue would also apply upstream and downstream of Leamy Creek, outside the corridor's boundaries.



LIST (NON-EXHAUSTIVE) OF SPECIES AT RISK, TARGET SPECIES AND SPECIES OF INTEREST OBSERVED IN THE FIELD

GROUP	SCIENTIFIC NAME	SPECIES AT RISK	TARGET SPECIES	SPECIES OF INTEREST OBSERVED IN THE FIELD
Plants	*Allium tricoccum*	X		
	Botrychium rugulosum	X		
	Carya ovata var. ovata	X		
	Dryopteris clintoniana	X		
	Galearis spectabilis	X		
	Juniperus virginiana var. virginiana	X		
	Goodyera pubescens	X		
	Celtis occidentalis	X		
	Juglans cinerea	X		
	Panicum flexile	X	X	
	Polygala senega	X		
	Potamogeton vaseyi	X		
	Ranunculus flabellaris	X		
	Trillium grandiflorum	X		
	Solidago ptarmicoides	X		
	Wolffia borealis	X		
Amphibians	*Lithobates (Rana) clamitans melanota*		X	X
	Pseudacris triseriata	X	X	
Birds	*Histrionicus histrionicus*	X		
	Buteo lineatus	X		
	Chordeiles minor	X		
	Falco peregrinus	X		
	Bucephala islandica	X		
	Podiceps auritus	X		
	Chaetura pelagica	X		
	Contopus cooperi	X		
	Wilsonia canadensis	X		
	Ixobrychus exilis	X		
	Haliaeetus leucocephalus	X		
	Euphagus carolinus	X		
	Sterna caspia	X		
Mammals	*Castor canadensis*			X
	Odocoileus virginianus			X

Information derived from observations during field work period (May, 2010) and databases from MRNF (2009), CDPNQ (2010) et COO (2011).

CCN NCC

Canada

PHILEMON-LEAMY CORRIDOR

DESCRIPTIVE PROFILE

- Gatineau Park
- Potential Corridor
- Waterbody
- Watercourse
- Transect
- Potential Link
- Steep Slope
- NCC Land Outside Park

FAUNA - FLORA

FIELD OBSERVATIONS

- Canid
- Bear
- Amphibian
- Avifauna
- Turtle
- Snake
- Plant
- Invasive Plant

WILDLIFE HABITATS

- Aquatic Birds Concentration Area
- Heronry
- White-Tailed Deer Yard
- Wetland
- Mature Forest
- Biodiversity Concentration Area

HUMAN IMPACT

- Fracture
- Bottleneck
- Main Road
- Bridge
- Culvert

Source : Databases : NCC, 2010; MTQ, 2009; MRNF, 2009; CDPNQ, 2010; MDDEP, 2010
Orthophoto : NCC, 2007
Wetlands : Ducks Unlimited Canada, 2007

m 0 200 400 600 800 1000 m

FIGURE 16

October 2012

DDM Del Degan, Massé Experts-conseils

5. EVALUATION, MANAGEMENT ISSUES AND ACTION PROPOSALS FOR POTENTIAL ECOLOGICAL CORRIDORS

5.1 Evaluation

The corridors were evaluated in order to group together the information needed to identify the ones that offer the best conditions for conservation and enhancement. Key components of the selection process included ecological characteristics and participation by local participants.

Several sources of information were used to evaluate and characterize the corridors:

- Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010)
- Evaluation and Identification of Valued Natural Ecosystems and Habitats (Del Degan, Massé, 2005)
- List of Valued Habitats and Ecosystems in the Green Belt and on Urban Lands (Del Degan, Massé, 2007b)
- Literature review
- Fieldwork
- Municipal land use plans and zoning plans
- Consultations of local groups and municipal bodies
- Expert committee

The areas offering conditions conducive to species movement had already been identified in the Gatineau Park Ecosystem Conservation Plan (Del Degan, Massé, 2010) and its Addendum (Del Degan, Massé, 2007a). The 13 potential ecological corridors identified in the plan were addressed in this study. Twelve were evaluated; the Wakefield corridor was not evaluated because it is located on NCC land.

The literature revealed several evaluation and characterization parameters for corridors, depending on the type of area. In most cases, spatial data series are used to identify the areas offering the best conditions for species mobility (Beier & coll., 2008; Bentrup, 2008). The authors noted that spatial data acquisition may be difficult in cases where little or no information is available on the area under study. In the case of the potential ecological corridors adjacent to Gatineau Park, however, spatial data, where available, were analyzed for all corridors.

Fieldwork was also an important step in acquiring information on the 12 corridors retained for the evaluation phase. The following information was obtained from the field:

- Presence or signs of target species and species at risk (summer and winter)
- The quality of the habitats within the corridor ecosystems
- The potential for connection between Gatineau Park and adjacent sites
- Stressor and factors causing fragmentation

Workshops were organized, at which the team met with local participants (municipalities, RCMs and environmental groups). The meetings generated additional information on the corridors, and also revealed the participants' interest in the corridors, as well as their commitment in some cases. The degree of interest of local participants in a particular corridor was a significant element in the decision process, since it could influence the scope of future management actions as well as the potential for recreational and tourism development.

An experts' committee was also set up for the study. Its contribution was extremely relevant to the analysis, since its members, through their experience and expertise, were able to ensure the scientific basis of the corridor characterization process. For example, the committee members supplied additional data and references relating to the methodology and choice of corridor evaluation criteria.

A number of criteria were developed, under three theme headings:

- Theme 1: Uniqueness (two criteria)
- Theme 2: Ecological value (seven criteria)
- Theme 3: Management potential, based on land use within the corridor and the ecological services that the corridor provides for the community (three criteria)

The criteria were used in an analysis designed to identify the corridors that best meet the needs of the study, based on the three theme headings. A scoring grid was developed, and shows the scores achieved for each theme and criterion (Table 2).

TABLE 2 SCORES BY CRITERION

CRITERION	SCORE	TOTAL
UNIQUENESS		90
Geographical	30	
Functional groups	60	
ECOLOGICAL VALUE		70
Connection potential	20	
Habitat diversity	10	
Habitat quality	10	
Species at risk	30	
Border effect	- 10	
Fragmentation	- 10	
Bottlenecks	- 10	
MANAGEMENT POTENTIAL		40
Presence of public land	20	
Zoning	10	
Ecological services	10	
TOTAL		200

5.2 Description of themes and criteria

5.2.1 Theme 1: Uniqueness of potential ecological corridors

The uniqueness criterion reflects a corridor's importance for connectivity between Gatineau Park and other major regional ecosystems, and its ability to meet the needs of target species, subdivided into functional groups (Appendix 2). Corridor uniqueness was assessed using two criteria, namely geographic uniqueness and uniqueness of functional groups.

This aspect was vital in the corridor selection process, due to the elements involved. The scores were therefore higher than those given for the other themes (ecological value and management potential).

The scores given to each corridor for the two criteria were added together, for a potential total of 90 points. The final score for each corridor reflects its uniqueness compared to the other corridors.

5.2.1.1 Criterion 1: Geographic uniqueness

Geographic uniqueness is established by considering regional connectivity. The major ecosystems adjacent to Gatineau Park that were considered for the study were: the Ottawa River and its riparian environments, the Gatineau River and its riparian environments, and the large tracts of forest to the north, including the Mont O'Brien Biodiversity Reserve located in the municipality of Alleyn-et-Cawood, in the Pontiac RCM.

Because of the large number of corridors around Gatineau Park, some inevitably connect the Park to the same neighbouring ecosystems, leading to duplication and diminishing the level of geographic uniqueness. On the other hand, if a corridor constitutes the only connector between the Park and a neighbouring ecosystem, its geographic uniqueness is high. This approach also allowed certain corridors not evaluated for the purposes of the study, such as the Wakefield corridor, to be taken into consideration. The Wakefield corridor serves as a conduit for aquatic species travelling between Gatineau Park and the Gatineau River. It was not evaluated for this study because it is located entirely on NCC land and is therefore already protected. However, its presence influenced the uniqueness scores of adjacent potential corridors.

The scores for geographic uniqueness were assessed based on how unique the corridor is in linking the Park to a neighbouring major ecosystem. In other words, the larger the number of corridors linking the Park to a given ecosystem, the lower the "uniqueness" score will be.

5.2.1.2 Criterion 2: Functional group uniqueness

Functional group uniqueness refers to the presence and requirements of target species. Target species were classified into functional groups that reflect the ecological characteristics of the corridors in different ways (Appendix 2). The six main functional groups are:

- Large predators
- Aquatic species
- Wetland species
- Closed forest species

- Open environment species
- Calcicole plants

Each functional group has its own requirements in terms of habitat, components and minimum corridor width. Research and analysis of target group requirements produced a summary of preferred habitats and minimum corridor widths for each functional group (Appendix 2).

For each corridor, the most common habitats and their average widths were combined and then compared to the main functional groups. The functional groups were weighted according to the number of corridors that met their needs. For example, many of the corridors meet the needs of the open environment group, which would therefore have a lower weighting than the calcicole plant group, for which few of the corridors are suited.

Functional group uniqueness covers all the groups identified in each corridor, taking into account their weighting. Most of the corridors met the needs of several groups, but some offered features specific to a given group, earning them additional points.

5.2.2 Theme 2: Ecological value of potential ecological corridors

Each corridor's ecological value was derived from the scores given to its ecological characteristics, measured using seven criteria. The first four criteria had a positive influence on its functionality as a corridor, while the last three had a negative influence:

- Connection with Gatineau Park
- Range of habitats of interest
- Habitat quality
- Presence of species at risk
- Edge effect
- Fragmentation
- Bottlenecks

Scoring varied according to the relative importance of each criterion. Scores were determined by the amount of information available, and the consequences of variations in the criterion, or its absence.

For each criterion, the score given to a corridor was proportional to the value obtained for the variable, as shown below.

Example: Theme 2 – Criterion 7 – Bottlenecks in potential ecological corridors

Corridor	Variable assessed = Total area of bottleneck (%) = A	Score out of ten, proportionally to the total area of bottlenecks in each corridor = -A/10
Aylmer	7	- 1
Bristol	0	0
Champlain-Voyageurs	3	0
North	0	0
Larrimac	5	- 1
Luskville	58	- 6
Masham	0	0
Northeast Park	3	0
Philémon-Leamy	18	- 2
Pontiac	1	0
Breckenridge Creek	12	- 1
Chelsea Creek	8	- 1

The scoring systems used for three "negative" criteria (edge effect, fragmentation and bottlenecks) were based on negative values. In other words, the more important these three criteria, the lower the corridor's overall ecological value score would be.

The scores awarded to a corridor for the seven criteria were summed to give a single final ecological value score out of a potential total of 70 points. The final score for each corridor reflects its ecological value and can be used for comparisons with other corridors.

5.2.2.1 Criterion 1: Connection with Gatineau Park

The connection potential between a corridor and Gatineau Park must be assessed to ensure that the corridor can be used by species to travel between different areas. The higher the number of connectors, the more likely the corridor will be used as a wildlife crossing (Birard, 2006). However, the corridor's width is also important in ensuring that species are able to travel between different areas (Kremsater and Bunnell, 1999; Beier et al., 2008; Bentrup 2008).

A ratio was calculated between the number of connectors and the cumulative width of all the corridor's connectors to the Park. The result was the score given for connection potential with Gatineau Park, expressed as the average width of the connection with the Park. The score was then compared to the minimum corridor widths required by the functional groups (see Theme 1). The greater the number of functional groups whose needs (in terms of average corridor width) are addressed by the corridor's connection potential with Gatineau Park, the higher its score will be.

5.2.2.2 Criterion 2: Range of habitats of interest

A corridor that offers a wide variety of habitats can meet the needs of many species and help maintain biodiversity. In other words, the greater the range of habitats in a corridor, the higher its ecological value and functionality will be (Freemark and Merriam, 1986 in Bennett 2003; Duchesne et al., 1999).

The table of functional groups contains a series of habitats of interest in attracting target species to a corridor (see Appendix 2). A list of 11 habitats of interest was drawn up from the available spatial data:

- Mature and overmature forest stands (120 years and +)
- Watercourses
- Wetlands
- Alvars
- Regulated wildlife habitats: heronries, waterfowl gathering areas, white-tailed deer yards and muskrat habitats
- Unprotected habitats of interest to certain target species: cedar groves, dry prairie land, and old fields

All these habitats were documented and quantified in each corridor. The percentage of the corridor's area covered by these habitats and the number of different habitats of interest within the corridor were the elements retained to evaluate the criterion. Corridors with the broadest range and biggest percentage of habitats received the best scores.

5.2.2.3 Criterion 3: Habitat quality

Habitat quality was assessed from information collected during fieldwork in the corridors. It was based on a professional analysis of several basic elements relating to general habitat quality and stressors, namely:

- Forest stand structure and quality
- Presence and quality of riparian strips
- General condition of wetlands and buffer zones
- Presence and extent of logging operations
- Presence and extent of informal trails and encroachments into zones of influence around residential neighbourhoods
- Presence and extent of drainage works
- Presence and extent of garbage and other human artefacts
- Presence and extent of human structures and their visible impact on the environment (e.g. roads, residential developments, quarries)

Each of these elements was assessed for all 12 corridors, and the cumulative results indicated general habitat quality. The corridors with the best habitat quality received the highest scores.

5.2.2.4 Criterion 4: Presence of species at risk

The presence of species at risk in a corridor is an indicator of corridor quality, since in many cases these species have specific habitat requirements or use habitats that are threatened (Beier et al., 2009). The higher the number of species at risk, the greater the corridor's ecological value will be. The list of species at risk was drawn up from the sources listed in Appendix 1.

Because some corridors are used more extensively than others by observers, the chances of observing species at risk are higher. This may have caused bias in the distribution of data within the territory.

Accordingly, the species at risk observed during fieldwork and those reported by environmental groups were all taken into consideration for the evaluation.

Different scores were given for each species at risk, based on:

- Legal status
- Presence in the corridor and in Gatineau Park
- Whether or not it belonged to a group of target species

The detailed scores for each species at risk can be found in Appendix 1.

The final score is the sum of the scores awarded for all species at risk identified in the corridor.

5.2.2.5 Criterion 5: Edge effect

Edges are strips that differ ecologically from other corridor habitats. They contain different vegetation and species, due to the edge effect (Forman and Godron, 1986 in Bennett, 2003). Edges enhance the wealth and diversity of habitats and species (Duchesne and Bélanger, 1997; Kremsater and Bunnell, 1999).

However, the edge effect may be too great, due to factors that are mostly of human origin (roads, residential developments, etc.) and generate negative impacts for species using interior habitats (Enviro Links Design, 1998; Fahrig, 2003). The edge effect can generate negative impacts over a distance of up to 300 metres for terrestrial systems and 50 metres for aquatic systems (Environmental Law Institute, 2003 in Beier et al., 2008; Bentrup 2008).

Habitat fragmentation exacerbates the edge effect and reduces the size of the habitat in the corridor (Fleury and Brown, 1996; Fahrig, 2003; Bentrup, 2008). A high ratio of interior habitat to edge habitat should be maintained.

The edge effect criterion was used to measure the degree of the edge effect in each corridor. To do this, a 300-metre zone of influence was drawn around each fragmentation element in each corridor. Fragmentation elements included all human structures, such as roads, railways, lanes, residential and other developments (e.g. quarries). A ratio was calculated between the total area of the zones of influence and the total area of the corridor. The higher the ratio, the lower the score awarded to the corridor.

5.2.2.6 Criterion 6: Fragmentation

Fragmentation in a corridor is a major factor that significantly affects its quality and functionality. In this study, a “fracture” is a road infrastructure cutting right across the corridor, making it difficult for wildlife to cross (Beier et al., 2008).

The impacts of fractures on a corridor, and hence on the mobility of wildlife and other living species, differ according to the road’s features (Jaeger and Holderegger, 2005 in Hlavàc, 2005). The main factors affecting species crossing capacity are road density and road width (Fleury and Brown, 1996; Gibbs and Shriver, 2002; Chruszcz et al., 2003; Eigenbrod et al., 2007). These two factors were therefore used to evaluate this criterion.

Road density is defined as the area of the corridor occupied by roads. The higher the density, the lower the score awarded to the corridor.

A distinction was also drawn between the different types of roads:

- Highways
- Collector roads
- Roads used for residential purposes
- Unpaved roads

A different score was awarded for each type of road. The wider and busier the road, the more negative its value will be.

Roads cutting right through corridors were counted and divided into types. The scores given for road density and total number of different road types were added to obtain the corridor fragmentation score. The most severely fragmented corridors had the lowest total scores.

5.2.2.7 Criterion 7: Bottlenecks

Bottlenecks in a corridor can also reduce its functionality. The impacts are not as severe as for fragmentation, but bottlenecks can still hinder the mobility of many species, especially large predators, which need wide corridors for travel (Hlavàc, 2005). Any reduction in the width of a corridor also exacerbates the edge effect. Hence, the wider a corridor, the more functional it will be (Beier et al., 2008; Bentrup 2008).

Generally speaking, a corridor should be at least 300 metres wide to fulfill its purpose and allow for travel by as many species as possible (Three Sisters Resorts Inc., 2002, Bond, 2003, Del Degan, Massé, 2007a). The 300-metre value was therefore taken as a threshold, and every portion of a corridor narrower than 300 metres was considered to be a bottleneck. A functional corridor must therefore be more than 300 metres wide, so that it has a buffer zone.

A ratio was calculated between the total area occupied by bottlenecks and the area of the corridor, indicating the bottleneck level. The greater the bottleneck level in the corridor, the lower its score will be.

5.2.3 Theme 3: Management potential of potential ecological corridors

A corridor's management potential is reflected in the potential for ecosystem conservation and enhancement. It was extremely important for management potential to be assessed during the corridor evaluation process. This was done using technical data and information obtained from consultations with local participants.

The technical data involved land use in the corridor, represented by the presence of public land and zoning in the land use plan, along with the ecological services provided by the ecosystems.

For the evaluation, corridor management potential was assessed using three criteria:

- Presence of public land

- Land zoning
- Ecological services

Restoration potential is also an important criterion for corridor management. The information currently available on this aspect is not sufficiently accurate to be reliable in an evaluation. However, restoration potential will be included in the corridor analysis during the next step of the process, the implementation phase.

A score was given to each corridor for each of the three criteria listed above. The total score for the theme, out of a maximum of 40 points, was obtained by adding the three criterion scores.

5.2.3.1 Criterion 1: Presence of public land

This criterion was calculated by estimating the percentage of public land in a corridor. The higher the percentage of public land, the more likely the corridor is to be protected, managed and restored.

For the purposes of the study, the term “public land” includes land belonging to municipalities, the NCC, the Nature Conservancy of Canada, and public and quasi public agencies (e.g. Hydro Québec (HQ), MTQ).

The greater the percentage of public land in a corridor, the higher its score will be.

5.2.3.2 Criterion 2: Land zoning

Like the previous criterion, municipal zoning shows how the land in the corridor is likely to be used. Land zoned for recreational, conservation and vacation resort purposes is considered to offer more potential for protection and management than land zoned for agricultural, residential and industrial construction purposes.

The corridors received scores based on the percentage of their total area with management potential. This criterion was given a lower weighting than the previous criterion due to the possibility of zoning changes during the corridor selection process.

5.2.3.3 Criterion 3: Ecological services

The term “ecological services” refers to the ecological functions of ecosystems that benefit humans either directly or indirectly (Limoges, 2009). Ecological services include products derived from the ecosystem (e.g. food, air, and water), benefits derived from its functions (e.g. water purification, climate regulation) and immaterial benefits (e.g. recreation, aesthetics) (Wilson, 2008). Landowners and municipalities can obtain many ecological benefits from the presence of an ecological corridor, and in addition the benefits add value to the corridor and enhance its worth.

The literature cites roughly 40 services that can be provided by ecosystems. Based on the ecosystems covered by the study, 14 services were retained as evaluation criteria.

Using the available information, each corridor was assessed for the services shown on the list. One point was awarded for each service. If a particular service was rare, it was given additional weighting, ensuring that the corridors providing it received extra points. Table 3 shows the ecological services retained for the study.

TABLE 3 SELECTED ECOLOGICAL SERVICES

TYPE OF ECOLOGICAL SERVICE	EXAMPLE OF APPLICATION
Regulation services	
Microclimate regulation	Windbreak hedges, cool patches
Air purification	Carbon capture, odour-break
Flood and drought regulation	Retention ponds
Erosion and landslide control	Shoreline maintenance through riparian strips
Pollinization and reduction of agricultural pests	Pollinization by beekeepers
Seed dispersal	Regeneration of valuable hardwoods in private woodlots under management
Noise	Vegetation barrier along highways
Supply services	
Food	From wild species (fish, plants, mushrooms, etc.)
Freshwater	Filtration, freshwater storage, irrigation
Raw materials	Wood, medicinal plants, textile fibres
Sociocultural services	
Recreation and tourism	Ecotourism, trails (hiking, cycling, cross-country skiing, etc.), recreation potential of site
Landscape aesthetics	Lookout points, increased land value
Education and social relations	Wildlife observation, family outings, spiritual site, inspirational site
Cultural heritage	Ancestral elements of biodiversity, sense of belonging

Sources: Taken from De Groot, 2002 in Wilson 2008; Limoges, 2009; Kennedy et Wilson, 2009.

5.3 Results of the evaluation of potential ecological corridors

The scores obtained for all the criteria used in the analysis were added in order to estimate the overall value of each corridor. The overall scores ranged from 64 to 119, out of a potential total of 200.

5.3.1 Presentation of results

The results of the corridor evaluation are set out in Table 4, which presents the scores obtained by each corridor for each evaluation criterion. The criteria are grouped together under the three theme headings (uniqueness, ecological value and management potential). Scores may be positive or negative, depending on the criterion definition (see section 5.2).

The overall classification under the three theme headings can be found in Table 5, where the corridors are classified in decreasing order, based on their final scores.

The corridors are presented in decreasing order, based on the combined results for the uniqueness and ecological value criteria in Table 6, and based solely on the results for the management potential theme in Table 7.

The detailed evaluation results for all the criteria can be found in Appendix 4.

5.3.2 Sensitivity analysis

A sensitivity analysis was carried out to see whether any of the criteria had a key impact on the evaluation results and corresponding corridor classification. The analysis was performed by awarding a score of 0 for each criterion in turn, to reveal its impact on the classification outcome. The results of this process can be seen in Appendix 4.

These results show that most of the criteria, taken individually, do not have a significant impact (very low to low sensitivity) on the overall classification. Generally speaking, only the criteria with the heaviest weighting were found to have a more substantial impact (average to high sensitivity). The effect of the weighting is justified by the fact that these criteria were regarded as being more important in the evaluation framework.

5.3.3 Interpretation of results

Based on the criteria assessments, the 12 potential ecological corridors were classified in terms of their conservation priority, according to their importance for the region's species. Based on the results from the uniqueness assessment, Gatineau Park has a unique connection with each corridor, forming a network of links between the region's various natural environments. The results from the ecological value assessment show that all the corridors make a contribution to local and regional biodiversity.

In light of these findings, it would appear that all the corridors identified in this study are of significant importance to Gatineau Park, and vice-versa. Their existence allows species to move throughout the region, thereby contributing to ecosystem functions. However, the criteria assessment results highlight not only the opportunities for corridor conservation, but also the challenges that arise from their specific attributes and current context. For example, the Larrimac corridor earned a high score for habitat quality and diversity, but its fragmentation score was also high. The Luskville corridor has many species at risk, but also many bottlenecks. And the Pontiac corridor provides a range of ecological services, but its management potential is limited due to the current local zoning by-laws.

By quantitatively assessing a series of criteria, it was possible to characterize each potential ecological corridor with a degree of precision. The results by criterion and by theme were broken down to highlight each corridor's benefits and attributes, and also any challenges that could, in the longer term, aggravate its current condition. A corridor's position in the general classification or theme classification highlights the difficulties encountered and its future management potential.

The results have been interpreted and presented in table form, as a decision-making tool to help identify management needs and the need for collaboration with other stakeholders. The classification also highlights the corridors' protection requirements.

TABLE 4 RESULTS OF THE EVALUATION OF POTENTIAL ECOLOGICAL CORRIDORS

CORRIDOR	THEME 1 – UNIQUENESS (OUT OF 90)		THEME 2 – ECOLOGICAL VALUE (OUT OF 70)							THEME 3 – MANAGEMENT POTENTIAL (OUT OF 40)			TOTAL (OUT OF 200)
	Geographic (out of 30)	Functional groups (out of 60)	Connection (out of 20)	Habitat diversity (out of 10)	Habitat quality (out of 10)	Species at risk (out of 30)	Edge effect (out of -10)	Fragmentation (out of -10)	Bottlenecks (out of -10)	Public land (out of 20)	Zoning (out of 10)	Ecological services (out of 10)	
Aylmer	13	27	20	5	8	13	- 5	- 3	- 1	4	4	5	89
Bristol	13	32	20	7	10	30	- 4	- 4	0	5	3	7	118
Champlain-Voyageurs	13	9	20	4	6	14	- 7	- 7	0	9	9	4	71
North	25	21	20	8	9	5	- 3	- 4	0	1	0	6	89
Larrimac	23	19	20	5	8	2	- 8	- 10	- 1	7	1	4	69
Luskville	13	12	20	7	7	13	- 3	- 4	- 6	0	0	6	65
Masham	25	14	20	3	9	10	- 3	- 6	0	1	5	6	85
Northeast Park	23	10	20	4	7	6	- 4	- 8	0	2	0	4	64
Philémon-Leamy	13	12	10	5	6	15	- 7	- 10	- 2	17	10	5	73
Pontiac	13	13	20	5	7	20	- 5	- 3	0	0	0	6	76
Breckenridge Creek	13	26	17	4	9	20	- 2	- 4	- 1	5	8	7	100
Chelsea Creek	23	12	10	5	8	10	- 2	- 4	- 1	2	1	5	69

Note: The corridors' scores and classifications indicate the level of effort and actions required to provide adequate protection.

TABLE 5 OVERALL CLASSIFICATION OF POTENTIAL ECOLOGICAL CORRIDORS

CORRIDOR (OVERALL CLASSIFICATION)	UNIQUENESS (OUT OF 90)	ECOLOGICAL VALUE (OUT OF 70)	MANAGEMENT POTENTIAL (OUT OF 40)	OVERALL TOTAL (OUT OF 200)
Bristol	45	59	14	118
Breckenridge Creek	39	42	19	100
North	46	36	8	89
Aylmer	40	36	14	89
Masham	39	34	12	85
Pontiac	26	44	6	76
Philémon-Leamy	25	17	32	73
Champlain-Voyageurs	22	28	21	71
Larrimac	42	16	11	69
Chelsea Creek	35	26	8	69
Luskville	25	34	7	65
Northeast Park	33	24	7	64

Note: The corridors' scores and classifications indicate the level of effort and actions required to provide adequate protection.

TABLE 6 POTENTIAL ECOLOGICAL CORRIDORS: ECOLOGICAL EVALUATION CLASSIFICATION (UNIQUENESS AND ECOLOGICAL VALUE)

CORRIDOR (BY ECOLOGICAL EVALUATION CLASSIFICATION)	THEME 1 – UNIQUENESS (OUT OF 90)		THEME 2 –ECOLOGICAL VALUE (OUT OF 70)							TOTAL (OUT OF 160)
	Geographic (out of 30)	Functional groups (out of 60)	Connection (out of 20)	Habitat diversity (out of 10)	Habitat quality (out of 10)	Species at risk (out of 30)	Edge effect (out of -10)	Fragmentation (out of -10)	Bottlenecks (out of -10)	
Bristol	13	32	20	7	10	30	-4	-4	0	104
North	25	21	20	8	9	5	-3	-4	0	82
Breckenridge Creek	13	26	17	4	9	20	-2	-4	-1	81
Aylmer	13	27	20	5	8	13	-5	-3	-1	75
Masham	25	14	20	3	9	10	-3	-6	0	73
Pontiac	13	13	20	5	7	20	-5	-3	0	69
Chelsea Creek	23	19	20	5	8	2	-8	-10	-1	58
Larrimac	23	12	10	5	8	10	-2	-4	-1	61
Luskville	13	12	20	7	7	13	-3	-4	-6	58
Northeast Park	23	10	20	4	7	6	-4	-8	0	56
Champlain-Voyageurs	13	9	20	4	6	14	-7	-7	0	50
Philémon-Leamy	13	12	10	5	6	15	-7	-10	-2	41

TABLE 7 POTENTIAL ECOLOGICAL CORRIDORS: MANAGEMENT EVALUATION CLASSIFICATION

CORRIDOR (BY MANAGEMENT CLASSIFICATION)	THEME 3 – MANAGEMENT POTENTIAL (OUT OF 40)			TOTAL MANAGEMENT (OUT OF 40)
	Public lands (out of 20)	Zoning (out of 10)	Ecological services (out of 10)	
Philémon-Leamy	17	10	5	32
Champlain-Voyageurs	9	9	4	21
Breckenridge Creek	5	8	7	19
Bristol	5	3	7	14
Aylmer	4	4	5	14
Masham	1	5	6	12
Larrimac	7	1	4	11
Chelsea Creek	2	1	5	8
North	1	0	6	8
Northeast Park	2	0	4	7
Luskville	0	0	6	7
Pontiac	0	0	6	6

5.4 Management issues for potential ecological corridors

All the corridors examined are important in helping to connect Gatineau Park with neighbouring areas, as noted earlier. Loss of a connector would increase the risk of diminishing regional and local biodiversity, and hence the main ecological attributes that shape the region. It is therefore essential to identify the management issues affecting the corridors in order to ensure that links are maintained with the Park. This exercise follows on from the corridor evaluation process (section 5.4.1), the results of which highlight potential sources of degradation and confirm the importance of taking various measures. The process is intended to provide suggestions only, and will serve to inform discussions with the managers of the areas in question. It consists in a brief evaluation, based on the information gathered, and covers four main principles, namely:

- The risk of losing connectivity if nothing is done in the short term (10 points).
- The difficulty of implementing conservation actions, given the extent of restoration, conservation or enhancement required (10 points). This criterion evaluates problems relating to corridor management, including the introduction of conservation measures, the scope of restoration actions, and the degree to which restoration or conservation is ambitious. The type of environment may also make it more difficult to implement conservation measures. For example, Chelsea Creek cuts across a very dense industrial estate and some sections flow underground. The effort required to implement conservation or restoration measures would therefore be very high. The higher the score, the greater the degree of difficulty (0-10).
- The type of land ownership in the corridor. The greater the percentage of public land, the easier it will be to conserve the corridor's integrity, and the easier the measures will be to implement (10 points).

- The quality of potential enhancement projects, in terms of impacts for the community (10 points). For example, the potential to install a look-out tower or create an interpretation trail will enhance the corridor's value. Corridors that already possess developed assets will receive a low score (e.g. the Champlain-Voyageurs corridor), while those with obvious enhancement potential will receive a high score (e.g. the Bristol corridor).

Ultimately, the corridor with the highest score:

- is likely to lose connectivity with Gatineau Park and the surrounding ecosystems in the short term (e.g. Park/Breckenridge Creek corridor/Ottawa River)
- would require complex and ambitious restoration measures (e.g. Chelsea Creek corridor)
- is located entirely on private land, meaning that the potential for direct intervention is limited (e.g. Pontiac corridor)
- offers the best potential for enhancement through the implementation of recreational and tourism projects (e.g. Bristol corridor)

All the corridors were reviewed based on these criteria, using a points grid. Table 8 presents the results of this process.

TABLE 8 MANAGEMENT ISSUES SCORES FOR THE POTENTIAL ECOLOGICAL CORRIDORS

CORRIDOR	MUNICIPALITIES	CONNECTIVITY (OUT OF 10)	MEASURE (OUT OF 10)	OWNERSHIP (OUT OF 10)	IMPACTS (OUT OF 10)	TOTAL (OUT OF 40)
Chelsea Creek	Gatineau Chelsea	10	10	10	5	35
Bristol	Pontiac Bristol	10	1	5	10	26
Breckenridge Creek	Pontiac Gatineau Chelsea	10	5	5	5	25
Aylmer	Gatineau	5	5	5	10	25
Northeast Park	La Pêche Chelsea	10	5	5	5	25
Pontiac	Pontiac	1	1	10	10	22
Luskville	Pontiac	5	1	10	5	21
Larrimac	Chelsea	5	5	5	1	16
Champlain-Voyageurs	Gatineau	10	1	1	1	13
Masham	La Pêche	1	1	10	1	13
North	Pontiac Bristol Clarendon Thorne La Pêche	1	1	10	1	13
Philémon-Leamy	Gatineau	1	10	1	1	13

The following three categories of management issues were identified:
Category 1:

- Chelsea Creek corridor
  High risk of losing connectivity, extremely difficult to implement measures, almost completely under private ownership.
- Breckenridge Creek corridor
  High risk of losing connectivity, extremely difficult to implement measures, high level of private ownership, possibility of potential good quality development project.
- Bristol corridor
  High risk of losing connectivity, easy to implement measures, high level of private ownership, possibility of good quality enhancement project.

Category 2:

- Aylmer corridor
  Lower risk of losing connectivity, difficult to implement measures, high level of private ownership, possibility of good quality enhancement project.
- Northeast Park corridor
  High risk of losing connectivity, easy to implement measures, high level of private ownership, possibility of good quality enhancement project.
- Pontiac corridor
  Very low risk of losing connectivity, easy to implement measures, almost completely under private ownership, possibility of good quality enhancement project.
- Luskville corridor
  Lower risk of losing connectivity, difficult to implement measures, almost completely under private ownership, little possibility of good quality enhancement project.

Category 3:

- Larrimac corridor
  Low risk of losing connectivity, easy to implement measures, very low level of private ownership, no limitations on potential enhancement projects. If this were the case, the score would be higher because the risk of losing connectivity would increase.
- Champlain-Voyageurs corridor
  High risk of losing connectivity, easy to implement measures, no private ownership, no limitations on potential enhancement projects.
- Masham corridor
  Low risk of losing connectivity, easy to implement measures, almost completely under private ownership, no limitations on potential enhancement projects.

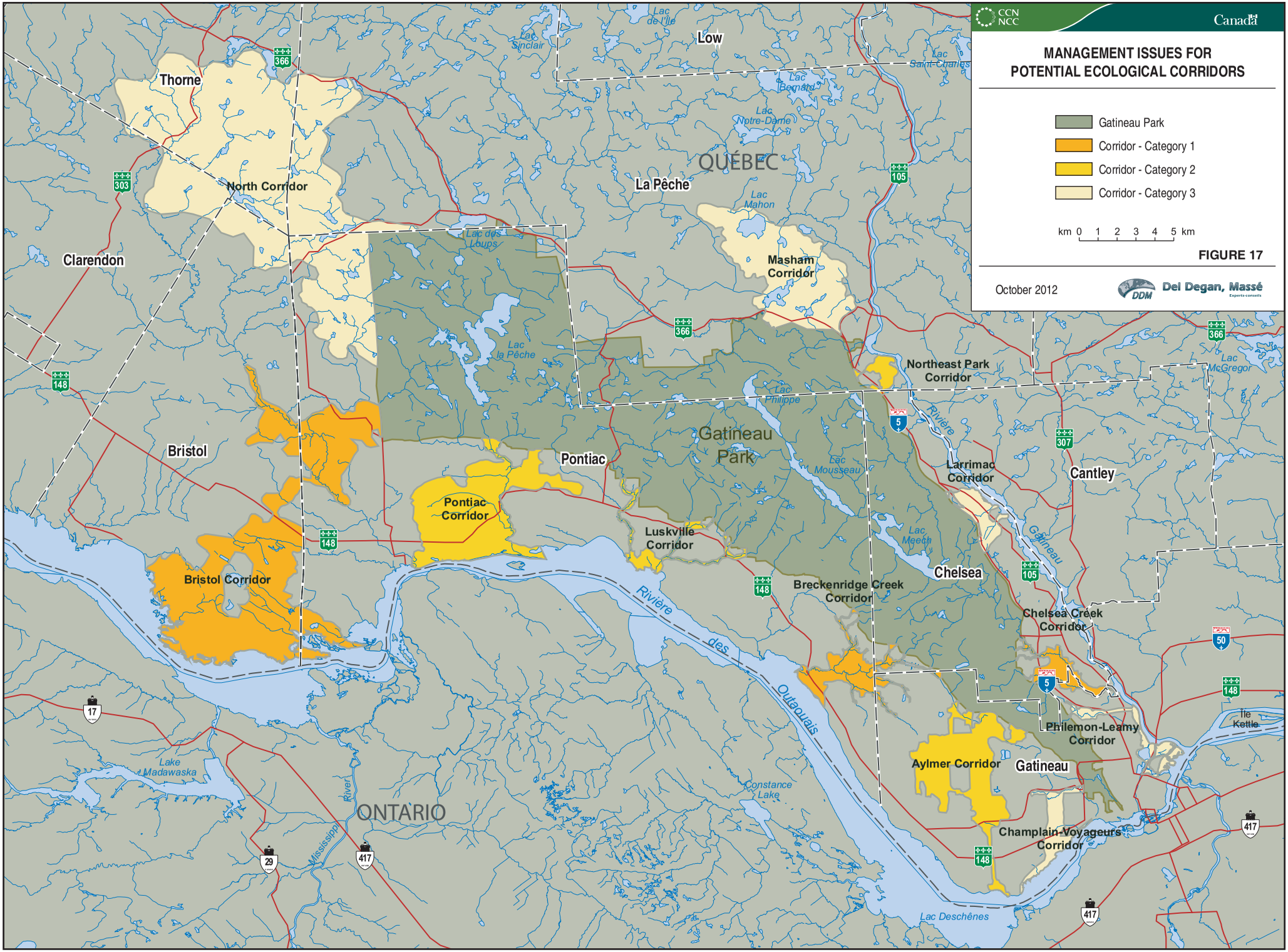
North corridor

Very low risk of losing connectivity, easy to implement measures, high level of private ownership, no limitations on potential enhancement projects.

- Philémon-Leamy corridor

  Very low risk of losing connectivity, difficult to implement measures, no private ownership, no limitations on potential enhancement projects.

Figure 17 presents the corridors spatially, by category. The categories are linked to the risk of losing connectivity. The information provided in the figure can serve as a tool for partners, to help them establish their conservation priorities. It enriches the preceding evaluation (section 5.3) and can be compared to the results for uniqueness, ecological value and management potential.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Canada
MANAGEMENT ISSUES FOR POTENTIAL ECOLOGICAL CORRIDORS
Gatineau Park
Corridor - Category 1
Corridor - Category 2
Corridor - Category 3
km 0 1 2 3 4 5 km
FIGURE 17
October 2012
DDM Dei Degan, Massé Experts-conseils
Thorne
Low
North Corridor
QUÉBEC
La Pêche
Clarendon
Masham Corridor
Lac la Pêche
Lac des Loups
Lac Sinclair
Lac de l'Île
Lac Saint-Charles
Lac Bernard
Lac Notre-Dame
Lac Mahon
Northeast Park Corridor
Lac Philippe
Lac McGregor
Rivière
Gatineau Park
Bristol
Pontiac
Pontiac Corridor
Luskville Corridor
Lac Mousseau
Larrimac Corridor
Cantley
Lac Meech
Gatineau
Chelsea
Breckenridge Creek Corridor
Chelsea Creek Corridor
Bristol Corridor
Rivière des Outaouais
Philemon-Leamy Corridor
Île Kettle
Aylmer Corridor
Gatineau
Lake Madawaska
Mississippi River
ONTARIO
Constance Lake
Champlain-Voyageurs Corridor
Lac Deschênes
366
303
148
105
5
307
50
17
29
417

5.5 Use of potential ecological corridors

This section presents the uses currently authorized within the corridors, along with those that may eventually be compatible. The information was obtained from a study of zoning by-laws in the municipalities concerned. It is followed by an analysis of potentially desirable uses for each corridor. The tables below show current uses and extent of use for each corridor, by municipality. The corridors are zoned differently, and usage for the same zoning category varies from one municipality to the next. Several uses are authorized for each corridor, and a more rigorous analysis will be needed when courses of action are chosen.

Desired uses fall into two categories: those affecting the biodiversity concentration area and those to be carried out in peripheral areas. Generally speaking, the biodiversity concentration areas are more vulnerable and sensitive, and therefore require less intrusive uses than is the case for the other sections of the corridors. For example, recreational observation, interpretation activities, and hiking would be compatible with biodiversity concentration areas, while recreational activities involving motorized vehicles (ATVs, motorcycles, etc.) and vacation resort development would be more compatible with the other sections of the corridors. In some cases, zoning and authorized usage needs to be reviewed.

CHAMPLAIN-VOYAGEURS CORRIDOR

Most of the Champlain-Voyageurs corridor is zoned for recreation and tourism uses, which increases the level of protection. In this case, priority could be given to conservation uses, to protect the biodiversity concentration area.

CHAMPLAIN-VOYAGEURS CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Gatineau	Commercial	4	▪ Retail sales and services ▪ Commercial entertainment, lodging and restaurants
	Residential	55	▪ Family-type housing with one or more dwellings ▪ Collective housing
	Recreation and tourism	401	▪ Extensive recreation: activities relating to sailing, space-intensive recreational activities (e.g. golf, horseback riding, hunting, fishing, etc.) ▪ Recreation: Outdoor developments used for relaxation, leisure and sport
	Other authorized uses in certain zones		▪ Institutions (religious, health, educational, cultural, sports) ▪ Public services (security and defence, major transportation infrastructures, other public utility services)

AYLMER CORRIDOR

Almost 40% of the Aylmer corridor is used for purposes compatible with corridor protection (recreation and tourism). As for the rest, the authorized uses are more intrusive, and more activities that are recreational in nature would be desirable, including a component associated with environmental conservation in order to protect the biodiversity concentration area.

AYLMER CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Gatineau	Agricultural	337	▪ Non-cattle farming: no animal husbandry or breeding, except for personal pet animals ▪ Cattle farming: the primary purpose of the activities is animal husbandry or breeding
	Commercial	57	▪ Retail sales and services ▪ Commercial entertainment, lodging and restaurants ▪ Automobile services: retail sales of goods or products, or sales of services relating to automobiles or recreational vehicles ▪ Heavy commercial areas, retail companies and para-industrial services ▪ Distinctive stores and services: guaranteed credit services, drinking and dancing, stores and services of a sexual nature, nighttime or daytime dance rooms
	Industrial	216	▪ Industrial production: production (design and development) of finished or semi-finished goods and products through processing of raw materials, mixing of ingredients or assembly of semi-finished products ▪ Raw material operations: extraction, handling or primary processing of raw materials
	Residential	541	▪ Family-type housing with one or more dwellings
	Recreation and tourism	728	▪ Extensive recreation: activities relating to sailing, space-intensive recreational activities (e.g. golf, horseback riding, hunting, fishing, etc.) ▪ Recreation: Outdoor developments used for relaxation, leisure and sport
	Other authorized uses in certain zones		▪ Institutions (religious, health, educational, cultural, sports) ▪ Public services (security and defence, major transportation infrastructures, other public utility services)

BRECKENRIDGE CREEK CORRIDOR

This corridor is situated in three municipalities, and is used mainly for agricultural and residential purposes. Only a small part of its area is zoned for conservation, although there is potential to increase the conservation zones with a view to protecting the biodiversity concentration area and ensuring the corridor's functionality.

BRECKENRIDGE CREEK CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Gatineau	Agricultural	84	▪ Non-cattle farming: no animal husbandry or breeding, except for personal pet animals ▪ Cattle farming: the primary purpose of the activities is animal husbandry or breeding
	Recreation and tourism	9	▪ Extensive recreation: activities relating to sailing, space intensive recreational activities (e.g. golf, horseback riding, hunting, fishing, etc.) ▪ Recreation: Outdoor developments used for relaxation, leisure and sport
Chelsea	Conservation	< 1	▪ Natural space
	Public	37	▪ Zone subject to a comprehensive development program*
	Residential	23	▪ Isolated single-family homes.
	Agricultural	33	▪ Agriculture (cattle farming, sugar bush, display for sale of products grown on site, agricultural farm, farm with forestry operations, arable farm, mixed cattle farm)
	Commercial	1	▪ Stores and commercial services ▪ Retail sales outlets
Pontiac	Agricultural	< 1	▪ Includes all activities and uses allowed by the Act to protect agricultural land and agricultural activities (uses relating to horticultural production, forestry activities and all other uses related to or affecting agriculture in general)
	Conservation	691	▪ Information not available.

*Refers to the by-law respecting comprehensive development program no. 640-05. For most of the zones governed by this by-law, the main authorized use is for isolated single-family dwellings.

LUSKVILLE CORRIDOR

The entire Luskville corridor is zoned for agricultural use, which does not allow for protection of biodiversity concentration areas. Protection and conservation actions could be taken to protect the corridor's biodiversity concentration area.

LUSKVILLE CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Pontiac	Agricultural	439	▪ Includes all activities and uses allowed by the Act to protect agricultural land and agricultural activities (uses relating to horticultural production, forestry activities and all other uses related to or affecting agriculture in general)

PONTIAC CORRIDOR

The entire Pontiac corridor is zoned for agricultural use. The uses permitted in the zone are not always compatible, and once again, protection and conservation actions may be required, especially in the biodiversity concentration areas.

PONTIAC CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Pontiac	Agricultural	2 852	▪ Includes all activities and uses allowed by the Act to conserve agricultural land and agricultural activities (uses relating to horticultural production, forestry activities and all other uses related to or affecting agriculture in general)

BRISTOL CORRIDOR

Most of the Bristol corridor is currently zoned for agricultural, recreational and tourism use. Conservation uses could be increased, especially in the biodiversity concentration areas.

BRISTOL CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Bristol	Agricultural	2 599	▪ Agricultural ▪ Forestry
	Industrial	537	▪ Light industrial (requires storage spaces) ▪ Heavy industrial (processing, repairs or recycling of products)
	Recreation and tourism	1 729	▪ Recreational, tourism and craft trades (related to recreation, restaurants, crafts and lodging) ▪ Recreational, community, cultural and service equipment
	Other uses authorized in certain zones		▪ Single-dwelling housing ▪ Mobile homes ▪ Extraction
Pontiac	Agricultural	1 693	▪ Includes all activities and uses allowed by the Act to protect agricultural land and agricultural activities (uses relating to horticultural production, forestry activities and all other uses related to or affecting agriculture in general)

NORTH CORRIDOR

Most of the North corridor is zoned for recreational and tourism uses, which are compatible, generally speaking. These types of use, along with agricultural use, could be clarified in order to reflect the conservation component.

CORRIDOR NORTH			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Bristol	Agricultural	185	▪ Agricultural ▪ Forestry
	Recreation and tourism	544	▪ Recreational, tourism and craft trades (related to recreation, restaurants, crafts and lodging)
	Other uses authorized in certain zones		▪ Single-dwelling housing ▪ Mobile homes ▪ Extraction
Clarendon	Recreation and tourism	< 1	▪ Recreational tourism (inns, outdoor centres, summer camps, outfitters, bed-and-breakfast establishments, golf courses, recreational trails, etc.) ▪ Major tourism (hotels, motels, major attractions, amusement parks) ▪ Parks and green spaces
	Other uses permitted in certain zones		▪ Neighbourhood (public or semi-public uses serving the entire community) ▪ Single-family housing ▪ Seasonal housing ▪ Neighbourhood trades and services ▪ Extraction industry ▪ Semi-industrial establishments
Pontiac	Agricultural	< 1	▪ Includes all activities and uses allowed by the Act to protect agricultural land and agricultural activities (uses relating to horticultural production, forestry activities and all other uses related to or affecting agriculture in general)
	Recreation and tourism	< 1	▪ Includes all commercial uses for recreational and tourism purposes. Outdoor storage is permitted
Thorne	Recreation and tourism	< 2	▪ Information not available

MASHAM CORRIDOR

The entire Masham corridor is located in the municipality of La Pêche, and part of the corridor's area is zoned for conservation purposes (29 ha). In fact, 80% of the corridor is set aside for very low-density vacation and residential use, which is compatible with the corridor, provided the biodiversity concentration areas are protected.

MASHAM CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
La Pêche	Agricultural	377	▪ Agriculture and commercial cattle farming/cattle and arable farms, various specializations, abattoirs, breeding of fur animals ▪ Soil cultivation ▪ Horticulture and greenhouse cultivation (for horticultural purposes) ▪ Small-scale animal husbandry (keeping of certain animal species) ▪ Forest operations
	Conservation	29	▪ Neighbourhood park ▪ Agglomeration park
	Vacation	1 457	▪ Seasonal housing (cottages) ▪ Rustic housing (hunting camps) ▪ Camp grounds ▪ Recreation and tourism centre ▪ Hiking trail ▪ Motor vehicle trail
	Residential	1 048	▪ Isolated single-family homes ▪ Isolated duplexes ▪ Isolated triplexes
	Other uses authorized in certain zones		▪ Electricity and telecommunications networks ▪ Public utility network ▪ Outdoor sand and gravel depot

NORTHEAST PARK CORRIDOR

Very little of the Northeast Park corridor is zoned for conservation or protection. Most of its area is used for residential and commercial purposes. More extensive recreational, tourism and conservation uses could be introduced to protect the biodiversity concentration area and ensure the corridor's sustainability.

Corridor Northeast Park			
Municipality	Zoning	Area concerned (ha)	Authorized uses
La Pêche	Conservation	< 1	▪ Neighbourhood park ▪ Agglomeration park
	Residential	139	▪ Isolated single-family homes ▪ Semi-detached single-family homes ▪ Isolated duplexes ▪ Rooming houses
	Commercial	56	▪ Wholesale trade of common consumer products and equipment ▪ Sales of construction machinery ▪ Sales of heavy vehicle equipment ▪ Storage of petroleum products, gas, paint and various chemical products ▪ General retail sales ▪ Sales of landscape development materials ▪ Retail sales of petroleum products and gas ▪ Sale and rental of passenger vehicles ▪ Sale, rental, repair and maintenance of various equipment and light vehicles (motorized and other) ▪ Repair and maintenance of passenger vehicles ▪ Body repair and paint shop ▪ Financial institutions, insurance, property businesses ▪ Private health services other than hospitals and institutions ▪ Professional, administrative and commercial services ▪ Personal services ▪ Child care services ▪ Commercial lodging ▪ Restaurants ▪ Snack bars, milk bars ▪ Private outdoor entertainment and leisure ▪ Taxi and ambulance services ▪ Urban and interurban transportation ▪ Building contractors
	Industrial	4	▪ Timber mills ▪ Metal product manufacturing ▪ General non-restrictive manufacturing ▪ Outdoor storage ▪ Indoor storage
	Other uses authorized in certain zones		▪ Hiking trail ▪ Motor vehicle trail ▪ Public utility network ▪ Religious institution ▪ Government services ▪ Social services ▪ Cultural and leisure services ▪ Recreation and tourism centre
Chelsea	Conservation	7	▪ Nature conservation: designed to conserve natural spaces, which will not be developed, and natural processes will be conserved or gradually reintroduced.

LARRIMAC CORRIDOR

Almost the entire Larrimac corridor is located in a low-density public or residential zone, used for isolated single-family homes (most sites of one acre or more). This type of use is compatible only outside the biodiversity concentration area. A higher percentage of conservation, recreational and tourism uses could be considered, to protect the biodiversity concentration area.

LARRIMAC CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Chelsea	Conservation	< 1	▪ Nature conservation: designed to conserve natural spaces, which will not be developed, and natural process will be conserved or gradually reintroduced.
	Public	174	▪ Zone subject to a comprehensive development program*.
	Vacation	35	▪ Recreational and tourism activities (community park, golf course, ski centre, recreational centre, marina and recreational harbour)
	Residential	182	▪ Isolated single-family homes

*Refers to the by-law respecting comprehensive development program no. 640-05. For most of the zones governed by this by-law, the main authorized use is for isolated single-family dwellings.

CHELSEA CREEK CORRIDOR

Several types of zoning are found in the Chelsea Creek corridor, which is situated in two separate municipalities. Most of the corridor is used for residential purposes, and very little for recreational, tourism or conservation purposes. Desired uses could increase conservation, recreational and tourism zoning, to conserve the biodiversity concentration area and ensure the connection with the Gatineau River.

CHELSEA CREEK CORRIDOR			
MUNICIPALITY	ZONING	AREA CONCERNED (HA)	AUTHORIZED USES
Gatineau	Industrial	9	▪ Research and development (research and design of products or processes)
	Public	83	▪ Institutions (religious, health, educational, cultural, sports)
	Residential	24	▪ Family-type housing with one or more dwellings
	Recreation and tourism	49	▪ Extensive recreation: activities relating to sailing, space intensive recreational activities (e.g. golf, horseback riding, hunting, fishing, etc.) ▪ Recreation: Outdoor developments used for relaxation, leisure and sport

Corridor du Chelsea Creek (cont.)			
Municipality	Zoning	Area concerned (ha)	Authorized uses
Chelsea	Conservation	2	▪ Natural space
	Public	250	▪ Zone subject to a comprehensive development program*
	Residential	86	▪ Isolated single-family homes ▪ Mobile homes
	Commercial	< 1	▪ Professional trades and services ▪ Retail sale stores ▪ Personal, financial and administrative services ▪ Restaurants and lodging ▪ Tourism and craft businesses ▪ Erotic supplies and services
	Industrial	5	▪ Light industrial (factories, manufacturing, workshops) ▪ Environmental-focused industrial activities (recycling sorting centre, solid waste salvage centre, recycling and processing centre) ▪ Para-industrial (construction service, transportation service, storage service, sale of bulk materials, retail sale of construction products with lumber yard, retail sale of prefabricated cottages)
	Recreation and tourism	7	▪ Recreational or tourism activities (community park, golf course, ski centre, recreational centre, marine and recreational harbour) ▪ Cultural activities (entertainment building, theatre, cinema, museum)

Philémon-Leamy Corridor

Virtually the entire Philémon-Leamy corridor is zoned for recreational and tourism purposes, which are compatible with desired uses. However, conservation uses could be added, especially in the biodiversity concentration areas.

Philémon-Leamy Corridor			
Municipality	Zoning	Area concerned (ha)	Authorized uses
Gatineau	Recreation and tourism	374	▪ Extensive recreation: activities relating to sailing, space intensive recreational activities (e.g. golf, horseback riding, hunting, fishing, etc.) ▪ Recreation: Outdoor developments used for relaxation, leisure and sport
	Residential	6	▪ Family-type housing with one or more dwellings

To ensure the sustainability of the corridors and protect their biodiversity concentration areas, some specific practices should be adopted, depending on the environment concerned (biodiversity concentration area, residential area, agricultural area, recreational and tourism area). To clarify the proposed actions, some principal guidelines have been set out for each of these areas, and the descriptions apply to all the corridors. Detailed management plans for each area could be drawn up in the next phase of the project (implementation of corridor protection). It would be preferable for all the partners concerned to be involved in the plan preparation process.

PROTECTION OF BIODIVERSITY CONCENTRATION AREAS

Biodiversity concentration areas, because of their specific ecological features, constitute areas of interest for resident or migrant species. Although not usually precised bounded, they contain a significant part of the sector's natural heritage and can be used to guide proposed actions in a corridor, especially where there are certain ramifications. Protection and conservation actions are preferable in this portion of a corridor. Among other things, they may involve zoning amendments or land purchases by conservation organizations. The involvement of municipalities and the general public is vital in maintaining and enhancing biodiversity in the concentration areas. The following references provide instructions and examples of best practices.

Guide de bonnes pratiques sur la planification territoriale et le développement durable (Québec):

http://www.mamrot.gouv.qc.ca/grands-dossiers/developpement-durable/#c2856

This guide (available in French only) presents and describes a series of best practices conducive to environmentally friendly urban development. It refers to strategies that foster eco-mobility, sustainable management of rainwater, design of sustainable buildings, and the protection and enhancement of biodiversity in urban environments. Examples of real-life applications by municipalities are given for each theme.

Interpretation Guide - Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (Québec):

http://www.mddep.gouv.qc.ca/eau/rives/#guide

This guide presents a brief review of the legal framework governing interventions on lakeshores, river banks, littoral zones and flood plains. It focuses mainly on delimitation of the high water mark and explains different ways of doing this. It also gives instructions on the establishment of riparian strips of 10 or 15 metres, depending on the characteristics of the area.

Guide d'élaboration d'un plan de conservation des milieux humides (Québec):

http://www.mddep.gouv.qc.ca/eau/rives/milieuxhumides.htm

This guide (available in French only) proposes a method for selecting wetlands of interest, based on the design and weighting of a series of indicators. It also presents recommendations for desired wetland uses, including the introduction of conservation priorities, evaluation of space requirements for development, reconciliation of conservation priorities with municipal development, and public consultations.

HABITAT CONSERVATION IN AGRICULTURAL AREAS

In addition to its role as a food producer, the agricultural community also provides an environment that is suitable for certain leisure and recreational activities. The agricultural and rural community has historically been one of the foundations of society, and maintains its role as a community and social point of reference, as well as providing a rich collective heritage. Agricultural land is an element of, and is sometimes responsible for, a patchwork of environments, including habitats of interest to wildlife. It would be therefore appropriate to encourage cultural practices adjusted to the conservation of natural environments of interest.

Guide technique d'aménagement et protection des ruisseaux en forêt privée (Québec):

http://www.fondationdelafaune.qc.ca/documents/x_guides/204_fascicule8.pdf

This guide (available in French only) presents a series of watercourse protection practices, including protection of riverbanks and lakeshores, reconstitution of shoreline areas using different materials (rock, sand, roots, etc.), and watercourse crossings for machinery. It also describes potential watercourse managements for different purposes (e.g. spawning grounds), and lists the materials required.

Guide technique d'aménagement des boisés et terres privées pour la faune (Québec):

http://www.fondationdelafaune.qc.ca/initiatives/guides_pratiques

This guide (available in French only) describes implementation techniques for dedicated wildlife managements in forests and on private land. It also lists the parameters that landowners should consider to understand and guide their management choices.

Guide d'élaboration d'un plan de conservation des milieux humides (Québec):

http://www.mddep.gouv.qc.ca/eau/rives/milieuxhumides.htm

This guide (available in French only) presents a method that can be used to select wetlands of interest, based on the design and weighting of a series of indicators. It also makes recommendations concerning the desired use of wetland areas, such as the definition of conservation priorities, evaluation of spatial requirements for management, reconciliation of conservation priorities with municipal development, and public consultations.

Manuel d'accompagnement pour la mise en valeur de la biodiversité des cours d'eau en milieu Agricultural (Québec):

http://www.coursdeauagricoles.ca/

This manual (available in French only) sets out various agro-environmental cultivation practices for riparian strips and other similar environments. It then suggests ways to enhance biodiversity (preventing erosion, stabilizing shorelines, habitats for fish, birds, amphibians and mammals) and lists a number of environments requiring protection, including wetlands, meander belts, and old fields.

Haies brise-vent (Québec):

http://www.agrireseau.qc.ca/agroenvironnement/documents/Haies%20brise%20vent_OIFQ.pdf

This document (available in French only) presents educational material on the definition, operation, implementation and maintenance of windbreak plantations. It describes the role and benefits of windbreaks in scientific terms, and presents the characteristics required for them to function properly (location, soil preparation, choice of plant species, protection from pests, and tree size).

http://www.abcduconseiller.qc.ca/default.aspx?ID=172

This text (available in French only) gives references to online documents addressing the concept of windbreaks, including descriptions, cost-benefit analyses, and implementation and maintenance methods.

HABITAT CONSERVATION IN RECREATIONAL AND TOURISM ENVIRONMENTS

Recreation and tourism areas are spaces set aside for outdoor activities, sport and relaxation. They generally require the presence of significant natural elements. When organizing or practising this type of activity, it is important to understand the characteristics of the natural area. Habitat conservation should be a priority, and any alterations should be minor. The following documents present examples of low-impact activities, along with others that use existing human infrastructure to enhance the environment.

Entreprises et biodiversité, exemples de bonnes pratiques (France):

http://www.medef.com/fileadmin/www.medef.fr/documents/Biodiversite/Entreprisesetbiodiversite.pdf

This document (available in French only) presents a series of best practices designed to protect biodiversity on private land. Different themes are addressed in a series of separate technical information sheets. Real-life examples are given, such as the construction of an educational trail to raise public awareness of the wildlife heritage on the site of a former quarry, redevelopment of mining sites in wetland areas, and construction of a biodiversity observatory by a company, jointly with stakeholders.

Guide d'aménagement et d'entretien des sentiers de quad au Québec (Québec):

http://www.fondationdelafaune.qc.ca/initiatives/guides_pratiques/31

This guide (available in French only) presents techniques and steps for the planning and application of quad bike (ATV) trail development work. It also contains a kit comprising a series of checklists, lists and forms that can be used to organize projects in compliance with current legislation.

PROTECTING BIODIVERSITY IN RESIDENTIAL AREAS

The biodiversity of Québec's residential areas differs from that found in undeveloped zones. The way we occupy an area, the characteristics of our cities, and our lifestyles, have all helped to shape unique ecosystems to which biological diversity has adjusted. As towns and villages have developed, some species have disappeared and others have emerged. It is important to enhance existing biodiversity in these areas, and also to oversee the possible impacts on peripheral natural areas, including biodiversity concentration areas. Invasive exotic species are one of the problems to emerge from this dynamic. It would be useful to rethink the structure and layout of residential sectors, regardless of scale, for each corridor, in order to ensure sustainable corridor management. Involvement of municipalities and local residents is vital to maintain and enhance biodiversity in these areas. Many examples of management methods are available at different levels, involving everything from urban architecture to human lifestyle habits.

Guide technique d'aménagement des boisés et terres privées pour la faune (Québec):

http://www.fondationdelafaune.qc.ca/initiatives/guides_pratiques

This guide (available in French only) sets out implementation techniques for dedicated wildlife management in forests and on private land. It also lists the parameters that landowners should consider in order to understand and apply their management choices.

Healthy Yards

http://athome.audubon.org/healthy-yards

This guide presents a three-step process that can be used to develop back yards in order to encourage biodiversity. The first step involves identifying existing species (native and exotic) and practices, and then drawing up a plan of action that identifies ranks and schedules the actions to be taken. The guide proposes a schedule, along with a list of best backyard practices for each month of the year (compost, planting, bird feeders, etc.).

Les jardins de Noé: comment jardiner responsable? (France):

http://www.jardinsdenoe.org/fiche/index/id/2

This interactive website (in French) offers a series of tools that can be used to promote biodiversity in public and private gardens. It presents a list of gardening practices for biodiversity, such as leaving a corner of the garden in its natural state, sowing a field of flowers, planting local species, and limiting night time lighting. It also offers a number of technical worksheets on animals, wild plants, and garden environments and habitats.

5.6 Logging and forestry

Provided it is carried out in accordance with best practices, forestry, such as logging in a corridor, can have a positive impact on ecosystems by fostering regeneration and habitat biodiversity. However, inappropriate interventions on sensitive sites can do irreparable damage to habitats and species. This section reviews the municipal provisions applicable to the cutting of trees in the corridors under study. The provisions take the form of specific by-laws that will affect any future management decisions. Appendix 5 sets out the by-laws in detail, by municipality, based on the available information.

Generally speaking, the by-laws examined for the study do not permit clearcutting, but do allow for cuts that remove between 30% and 50% of the trees. Some municipalities require logging conditions to be set out in a management plan submitted when the necessary permits are issued. Others require protective strips to be maintained along watercourses, roads and trails, and certain municipalities also regulate the circulation of machinery, stacking areas, and road construction. Generally speaking, all of the municipalities distinguish between different types of woodland areas and the types of work allowed in each type, depending on its potential and sensitivity.

There are therefore a number of regulatory tools that govern forestry. Depending on the municipality, they vary in terms of the range of interventions covered. It will therefore be necessary to examine each corridor separately, to ensure that the current by-laws provide adequate environmental protection. In addition, areas requiring special protection should be identified, so that their integrity can be maintained. As for logging zones, it would be preferable to identify and implement a form of sylviculture that will allow the land in the corridor to be managed sustainably. The definition of sylvicultural practices can either be included in the municipal by-laws, or be set out in an independent, comprehensive collaborative document. It would also be useful to review the regulatory frameworks applicable to forestry work in each corridor, and to harmonize them so that the same level of protection is available in every municipality.

5.7 Recreation, tourism and general management potential

By analyzing data from the literature, along with discussions with municipal authorities and field observations, it was possible to identify the potential for recreation and tourism, along with the general management potential, in each corridor. Overall, corridor conservation objectives were not incompatible with most of the recreation and tourism activities currently or likely to be practised in these areas. What was needed was an assessment of the activities' impacts on the environment, and identification of the sectors best suited to each activity. Table 9 (below) sets out the management potential identified for each corridor, with a view to enhancing the recreational offer in the municipalities while promoting sustainable corridor management. These proposals could be reviewed with the municipalities and partners concerned. The process of creating ecological corridors also provides an opportunity to diversify the region's recreational offer outside of Gatineau Park. For example, some activities not authorized in the Park may be suitable in the corridors, provided they are low-density and take place outside the biodiversity concentration areas.

TABLE 9 RECREATION, TOURISM AND GENERAL MANAGEMENT POTENTIAL IN POTENTIAL ECOLOGICAL CORRIDORS

CORRIDOR	RECREATION, TOURISM AND GENERAL MANAGEMENT POTENTIAL
Champlain-Voyageurs	Potential fully developed, existing cycle trail. More links to the river.
Aylmer	Conservation of Boucher Forest. Very low density residential development (isolated), possible Interpretation trail in the Boucher Forest sector. Educational trips (schools) in wetlands. Amphibian evenings (listening stations).
Breckenridge Creek	Potential interpretation trails and activities. Nature outings, natural heritage interpretation (especially birds and reptiles), in partnership with associations. Awareness activities for general public and informed public. Demonstrations of turtle conservation techniques in urban areas (e.g. roadside infrastructure for turtles). Program to reintroduce the loggerhead shrike.
Luskville	Interpretation project in the biodiversity concentration area. Interpretation trail from the falls to the Ottawa River. Interpretation of different ecosystems, which range from dry to wetlands due to the presence of the escarpment and the Ottawa River. Observation post for peregrine falcon on the escarpment (nest), and for birds in riparian areas (migratory birds, waterfowl).
Pontiac	Controlled low-density (isolated) cottage/resort development. Disused railway that could be converted into a bicycle trail. Would also provide a link to the Luskville corridor. Low-density (isolated) residential development.
Bristol	Nature outings for general public and informed public. Creation of a reptile (turtles and frogs) counting and listening station. Public demonstrations of turtle monitoring methods (shell tags, GPS monitoring), in partnership with the MRNF

CORRIDOR	RECREATION, TOURISM AND GENERAL MANAGEMENT POTENTIAL
Bristol (cont.)	Interpretation trail in the southern portion of the corridor, running across the wetland area and ending at a bird observation point (herons, waterfowl, migratory birds, south bank of river if possible). Very low impact water-based activities (e.g. sea kayak) to explore the shoreline and observe wildlife. Interpretation and observation centre.
North	Cross-country skiing and mountain biking trails in the forests. Possibility of canoe-camping to create a link with the La Pêche sector of Gatineau Park.
Masham	Cross-country skiing and mountain biking trails in the forests.
Northeast Park	Existing development of the disused quarry in the southeastern portion of the corridor, with school trips, introduction to scuba diving and bungee jumping. Creation of a cycling trail between the former quarry and the corridor, to take advantage of the hilly relief in the wooded areas.
Larrimac	Wildlife observation and listening station (mammals such as bears and wolves), with a camera installed at wildlife crossings. Night time outings and interpretation activities for schools (tracking, feeding). Naturalize the asphalt surface of the wildlife crossings under the highway. Interpretation trails.
Chelsea Creek	Multi-use trail along the Creek, with interpretation panels. Possibility of connecting the Pink Lake sector in Gatineau Park and the Philémon-Wright corridor. Educational (school) tours of the corridor's various natural areas (forest, riparian, regenerating old fields): insect trapping, creek microfauna, amphibians, botanical aspects of old-growth forests, mammal tracks. Interpretation trails.
Philémon-Leamy	Bicycle trail (existing). Installation of interpretation stations along the bicycle trail.

5.8 Strategies and proposed actions

The corridors can be protected, conserved, and managed through strategies and proposed actions based on their individual attributes. A number of programs and fiscal measures already exist to fund habitat and natural environment conservation and protection initiatives. Table 10, below, sets out the proposed main strategies and actions, under five headings:

- Regulatory review
- Partnerships
- Acquisitions and donations
- Conservation
- Awareness and communication

TABLE 10 ACTION STRATEGIES FOR THE CONSERVATION OF POTENTIAL ECOLOGICAL CORRIDORS

ACTION STRATEGY	ORGANIZATION RESPONSIBLE FOR APPLICATION OR IMPLEMENTATION	BENEFICIARY OF MEASURE	POTENTIAL FINANCIAL CONTRIBUTION AND TYPE OF ACTION
Regulatory review strategies			
▪ Land use plans and urban plans ▪ Integrated regional land and natural resource development plans (PRDIRT)	Towns/RCMs/CREs (Regional Committee of Elected Officials)	General public	N/A
Partnership strategies			
▪ Partners for Nature Program (protected area servitude)	MDDEP	Organizations/towns	Acquisition funding/Tax exemption
▪ Hydro-Québec Foundation	Hydro-Québec	Organizations/towns	Land acquisition and management
▪ Wildlife in Danger Program (FFQ)	MRNF	Landowners	Technical expertise
▪ Acquisition by the Canadian Nature Protection Fund	Canadian Fund	Organizations/towns	Fund for land purchase
Acquisition and donation strategies			
▪ Ecological donation program	Environment Canada	Landowners	Charitable receipt/tax credit
▪ Partners for Nature Program (acquisition)	MDDEP	Landowners	Acquisition funding
▪ Natural Environment Protection Program (acquisition of private land)	MRNF	Landowners	Acquisition funding, tripartite MRNF/CIC/CNC agreement
▪ Voluntary declaration of intention by the landowner	-	Landowners	Voluntary declaration
▪ Transfer of ownership for conservation purposes (fiscal measure)	Revenue Canada/Revenu Québec	Landowners	Tax incentives
▪ Right of first refusal	Any organization interested in purchase	Landowners	Purchase of a right
Conservation strategies			
▪ Stewardship Program for Species at Risk	Government of Canada	Landowners	Preparation of technical information
▪ Private Forest Development Program	MRNF	Landowners	Technical advice and sylvicultural work
▪ Real Estate Tax Refund Program for Conservation	MRNF Revenu Québec	Landowners	Credit of up to 85% of real estate taxes
▪ Deer Yard Development Support Program (PAAR)	MRNF	Landowners	Sylvicultural work/deer yards
▪ Forest conservation and non-development servitude	Environment Canada	Landowners	Program development underway
▪ Nature reserve on private land	MDDEP	Landowners	Program development underway
Awareness and communication strategies			
▪ Promote the benefits of the various programs for conservation and taxation ▪ Raise awareness of the importance of conservation	Towns/Conservation organizations/NCC/MRNF/MDDEP/ Environment Canada	Landowners/ society in general	N/A

The strategies as presented are supported by budgets at the Québec and Canadian government levels, which provide financial support for conservation efforts. Many people are unaware of most of these programs, and a communication campaign is required to raise landowners' awareness of the various conservation options available to them. The NCC has a role to play in raising awareness of the range of resources that are available to support conservation efforts.

To develop the strategies for each individual corridor, analyses were carried out to identify possible conservation actions. The proposals set out below in Table 11 include suggested new regulatory tools and concrete measures for each corridor, to ensure connectivity with the Park, protect biodiversity concentration areas and restore ecosystems. These actions will be assessed, reviewed, completed and described in more detail, in conjunction with partners, when the project is implemented.

TABLE 11 PROPOSED ACTIONS

CORRIDOR	PROPOSED ACTIONS
Champlain-Voyageurs	Increase the woodland areas on each side of the golf course, through planting. Landscape the sides of Chemin d'Aylmer and Boulevard de Lucerne, to improve connectivity (e.g. wooded strips, small crossings for wildlife). Try to create an additional connection with the Aylmer corridor, via Boulevard de l'Outaouais and Chemin Vanier. Enhance the potential for species movement in the connector by creating wildlife crossings and upgrading culverts when roads are repaired. Involve the municipality and inhabitants of residential sectors adjacent to the corridor in environmental and biodiversity protection (cf. section 5.5). Continue and enhance the NCC's environmental management measures (Table 9). Review permitted uses to include more "recreation and tourism" uses, limit other usage classes (residential, commercial and others), and adjust permitted uses so that they correspond to the desired vocation of corridor land.
Aylmer	Enhance the connection potential between the southern portion of the corridor and the Ottawa River, e.g. by increasing the wooded area of the bottleneck, or by carrying out an ecological characterization of the Deschenes Rapid sector. Work with the municipality and private landowners to adopt a form of sylviculture that is respectful of corridor conservation objectives. Focus on the connectors and the biodiversity concentration area. Try to connect Boucher Forest and the Champlain-Voyageurs corridor by promoting the creation of travel corridors (hedges, riparian strips, riparian protection). Protect the biodiversity concentration area by allowing only "conservation" uses. In addition, the authorized uses of corridor lands could be reviewed to limit all except "recreation and tourism" uses, and especially "residential", "industrial" and "commercial" uses. Promote land acquisition by conservation organizations and by raising private landowners' awareness of funding programs (Table 10). Involve residential sector populations in the protection of corridor land and biodiversity (e.g. Eco-Citizenship Charter, best practices (cf. section 5.5).

CORRIDOR	PROPOSED ACTIONS
Aylmer (cont.)	Draw up a corridor wetland management plan (environmental characterization, ecological sensitivity assessment, protection and restoration measures, environmental education program, accommodations for wildlife). Identify compensation measures relating to quarry operations, in partnership with the construction company.
Breckenridge Creek	Explore the potential for an agreement between the municipalities (Gatineau, Chelsea, Pontiac) to harmonize authorized land uses by usage type (agricultural, recreation, conservation). Increase the percentage of land to be used for conservation, recreation and tourism. Continue land acquisitions by conservation organizations. Enhance the potential for species movement in the connectors by through landscaping and restoration: hedges, woodland areas; develop an awareness program for private landowners (cf. section 5.5). Improve the size of and access to wildlife crossings between Chemin de la Montagne and Vipond Lake, and along Route 148, based on what has already been done (MTQ's compensatory infrastructure along Route 148). Prepare a corridor wetland management plan, taking past actions into account (Nature Conservancy of Canada management, monitoring of amphibians and reptiles, birds). Give priority to the protection of riparian strips to the north and the banks of the Ottawa River to the south, and to the management of exotic invasive species.
Luskville	Prepare a protection and restoration program for watercourses flowing through the corridor (water quality, riparian strips, wildlife habitats, exotic invasive species). Draw up a Best Practices Charter in partnership with farmers (cf. section 5.5.). Protect the biodiversity concentration area: acquisition of land by conservation organizations, funding programs for private landowners (Table 10). Ask the Commission de protection du territoire et des activités agricoles du Québec (CPTAQ) to set aside land in the biodiversity concentration for purposes other than agriculture (e.g. conservation). Create a new class of agricultural-type uses in order to limit so-called intensive agricultural uses (e.g. cattle farming, fish farming, family sawmills, etc.) of corridor land. Improve crossings along Route 148, especially at the junction with Chemin Thérien, by upgrading culverts when roads are repaired, and by creating wildlife crossings.
Pontiac	Create a new class of agricultural-type uses in order to limit so-called intensive agricultural uses (e.g. cattle farming, fish farming, family sawmills, etc.) of corridor land. Ask the CPTAQ for permission to set aside land in the biodiversity concentration area for purposes other than agriculture (e.g. conservation). Draw up recommendations for a form of sylviculture that reflects corridor conservation objectives (cf. section 5.5), in partnership with the municipality and private landowners. Draw up compensatory measures for losses of sensitive environments when creating development projects (e.g. the air-park project).

CORRIDOR	PROPOSED ACTIONS
Pontiac	Draw up protective measures for certain environments, especially wetlands. Ensure their connectivity (watercourses) and functionality (mineral inputs), and restore them where necessary (riparian strips). Improve the conditions of crossings along Route 148, and more specifically in the western portion of the corridor, to connect the biodiversity concentration areas. Focus on modifications specifically for amphibians and reptiles: culverts, wildlife crossings, fences.
Bristol	Redefine the authorized uses in the "recreation and tourism" class, to reflect corridor conservation objectives. Keep "industrial" uses of corridor land to a minimum. Draw up a management plan for the corridor's south sector (quarry, biodiversity concentration area, riparian areas), setting out target conservation actions, along with restoration and management work, which gives priority consideration to: - Existing or future conservation measures (wildlife sanctuary project, Nature Conservancy of Canada acquisitions) - Reducing tortoise mortality in the biodiversity concentration area (e.g. road and railway installations, protection of egg-laying sites - Regulatory protection for the biodiversity concentration area - Harmonization with the proposed Sault-des-Chats regional park if applicable. Increase the width of the bottleneck by promoting forestation and encourage private landowners to do this, among other things by using available funding programs (Table 10). Involve the local population, especially in cottage sectors, in environmental protection and biodiversity maintenance (e.g. Eco-Citizenship Charter, best practices (cf. section 5.5).
North	Continue the connector conservation process by acquiring land adjacent to the Park (NCC, Nature Conservancy of Canada) and preparing a regulatory framework adjusted to conservation needs. Make recommendations regarding a form of sylviculture adjusted to corridor conservation objectives (cf. section 5.5), in partnership with the municipality and private landowners. Promote collaboration with community stakeholders (hunting associations and clubs) to help conserve wildlife habitats (harvesting, hunting zones). Study Eastern wolf population movements in the corridor to identify regional management issues for the species. Clarify authorized uses in the "agricultural" and "recreation and tourism" usage classes, to make them compatible with proposed uses in the corridor.

CORRIDOR	PROPOSED ACTIONS
Masham	Involve residents of cottage areas and the homes alongside Route 366, along with the municipality, in environmental protection and biodiversity maintenance (e.g. Eco-Citizenship Charter, best practices (cf. section 5.5). Increase the percentage of land located in areas where the dominant usage classification is “conservation”, especially in large forests and riparian areas around bodies of water. Ensure conservation of the wooded strip between Gatineau Park and Route 366: special agreements, land acquisition (NCC and Nature Conservancy of Canada).
Northeast Park	Review the zoning by adding a “conservation” usage class for land in the corridor, and especially in the biodiversity concentration area. Limit the percentage of areas classified as “residential”, “commercial” and “industrial”. Draw up a management plan for the disused quarry site, taking existing installations and practices into account (cf. section 5.5). Study the connection potential with the Wakefield corridor and start action to achieve connection (reforestation, hedges). Involve the municipality and residents in environmental protection and biodiversity maintenance (e.g. Eco-Citizenship Charter, best practices (cf. section 5.5). Target the biodiversity concentration area sector among others. Regulate the practice of specific leisure activities in the biodiversity concentration area, in partnership with the associations (motor vehicles, informal trails). Focus on infrastructures improving the corridor connectors.
Larrimac	Improve the efficiency of the two wildlife crossings under Highway 5 (naturalize asphalted sections). Make sure land in the biodiversity concentration area is protected (urban planning by-law and provincial programs). Continue studies of species movement, especially large wildlife, and identify a protection process for associated wildlife habitats. Work with the municipality and community stakeholders to draw up a corridor conservation plan. Identify different priority zones and initiate management actions for each zone. Ensure connection with the wetlands to the south of the corridor; among other things, establish which types of use will be authorized in the area (zoning plan).
Chelsea Creek	Harmonize the definition of authorized usage types on corridor land in both municipalities (Gatineau and Chelsea) and amend the zoning by-law to increase the percentage of land within a given zone where only “conservation” uses are authorized. Carry out an ecological assessment of ecosystems in the biodiversity concentration area, in partnership with community stakeholders, and consider potential recreation and tourism developments (Table 9). Involve residents of sectors adjacent to the corridor in environmental protection and biodiversity maintenance (e.g. Eco-Citizenship Charter, best practices (cf. section 5.5). Work with the user-group associations to regulate the practise of specific leisure activities in the biodiversity concentration area (motor vehicles, informal trails).

CORRIDOR	PROPOSED ACTIONS
Chelsea Creek (cont.)	Help species to get across Highway 5 and Route 105: wildlife crossings and upgrading of culverts during road repairs. Give priority to amphibians and reptiles. Draw up a bottleneck restoration plan (connectors and extreme south of the corridor) to increase the corridor's width and enhance its quality: reforestation, restoration of riparian strips, land acquisition.
Philémon-Leamy	Encourage recreation and tourism activities, with due regard for existing and potential developments (cf. section 5.5 and Table 9). Draw up a restoration plan for environments in the biodiversity concentration area, the connector and the corridor linking the valued natural habitats in the Philémon-Wright corridor and Lac Leamy Park (Del Degan, Massé, 2005), including but not limited to: reforestation, hedge planting, land acquisition, zoning amendments, riparian strips, watercourse quality. Involve residents of sectors adjacent to the corridor in environmental protection and biodiversity maintenance (e.g. Eco-Citizenship Charter, best practices (cf. section 5.5). Ensure that species are able to cross the main roads (Highways 5 and 50, Boulevard Fournier): wildlife crossings and upgrading of culverts during road repairs. Focus on amphibians and reptiles. Redefine the classes of authorized uses in areas adjacent to the corridor, to reflect conservation objectives.

6. CONCLUSION

The purpose of identifying, characterizing and assessing the potential ecological corridors adjacent to Gatineau Park is to maintain long-term ecosystem integrity and biodiversity in both Gatineau Park and Canada's Capital Region, while contributing to the connectivity of major regional and national ecosystems.

Twelve potential ecological corridors, all with rich and diversified ecosystems, were characterized and mapped, using available information and data collected from site visits, in order to describe existing natural resources and any elements likely to fragment the ecosystems or alter their functions, now or in the future.

The corridors were then assessed to identify the ones that offered the best conditions for conservation and enhancement. The key components for this process were the ecological characteristics and information obtained from local participants.

To complete the study, management issues were identified, revealing the corridors that would require more attention in the longer term to address the risk of losing essential ecological functions. In addition to existing provincial and municipal regulations and by-laws, which provide a certain level of environmental protection (e.g. protection of riparian strips), numerous other strategies and actions could be introduced to help protect natural environments, including the ecological corridors. In addition, Canada offers a number of tax-related, legislative and regulatory instruments and government programs to protect natural areas of interest.

The report presents a number of proposed actions for the corridors, suggesting compatible land uses and eco-tourism opportunities. These proposals should not be regarded by landowners as being coercive. They are simply tools, based on scientific information, which are intended to help inform land planning processes with a view to achieving sustainable development.

The study provides a description and analysis of potential ecological corridors adjacent to Gatineau Park. It was carried out in consultation with municipalities, RCMs and environmental groups, and was also overseen by a committee of scientific experts. It reveals the existence of several functional corridors connecting the Park to surrounding natural environments, and shows that these corridors can still be protected. The information provided for each corridor is that which was available at the time of the study, and will clearly evolve over time, as the project is implemented.

This report terminates Phase One of the identification of potential ecological corridors adjacent to Gatineau Park. The second phase of the project will involve consultation with of all the partners concerned, in order to develop an implementation plan and assess the support and means available to implement corridor protection measures. Working committees will be formed, with members drawn all interested parties. The implementation phase will take place over the next few years, and will require close collaboration with all stakeholders that wish to be involved.

The NCC hopes this innovative study will result in a valuable local and regional management, planning and partnership tool, to ensure that the region's natural spaces can continue to provide essential services for harmonious regional development, and maintain regional biodiversity for future generations.

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8. DATABANKS

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APPENDIX 1

EVALUATION OF SPECIES AT RISK CRITERION

Espèces en péril

Pour les besoins de l'étude, les espèces présentant un statut particulier au niveau provincial et fédéral sont regroupées sous le terme « espèces en péril ». Selon la définition élaborée dans le Plan de conservation des écosystèmes du parc de la Gatineau (Del Degan, Massé, 2010), une espèce en péril réfère aux espèces animales et végétales possédant une protection légale au niveau fédéral, en vertu de la *Loi sur les espèces en péril*, et provincial, en vertu de la *Loi sur les espèces menacées ou vulnérables*, ainsi qu'à celles figurant sur la liste du COSEPAC et la liste provinciale des espèces susceptibles d'être désignées menacées ou vulnérables.

La liste des occurrences d'espèces en péril énoncées dans le présent rapport provient de plusieurs sources, soit :

- le Centre de données sur le patrimoine naturel du Québec (CDPNQ);
- le ministère des Ressources naturelles et de la Faune (MRNF);
- le ministère du Développement durable, de l'Environnement et des Parcs (MDDEP);
- le ministère des Ressources naturelles de l'Ontario (OMNR);
- la base de données de la CCN (2011);
- Conservation de la nature Canada (CNC);
- les espèces recensées lors de la prospection au terrain (été 2010 et hiver 2010-2011).

Les informations provenant des diverses sources ont été regroupées puis ajustées (vérification des doublons, uniformisation et mise à jour des noms d'espèces). Par la suite, les espèces présentes à l'intérieur de chaque corridor et du parc de la Gatineau ont été sélectionnées pour constituer une liste de 178 espèces, dont 107 uniquement dans les corridors (tableau A2).

Définition des colonnes du tableau

- **Statut** : situation de l'espèce en vertu de la *Loi sur les espèces en péril* au niveau fédéral, et de la *Loi sur les espèces menacées ou vulnérables* au niveau provincial. La liste du COSEPAC et la liste provinciale des espèces susceptibles d'être désignées menacées ou vulnérables sont également considérées. Un pointage différent est accordé selon le degré de protection de l'espèce :
  - **Provincial** : Susceptible d'être désignée menacée ou vulnérable : 1 point/Menacée ou vulnérable : 2 points
  - **Fédéral** : Préoccupante : 1 point/Menacée ou en voie de disparition : 2 points
- **Corridor** : réfère aux espèces ayant été observées sur au moins un des douze corridors écologiques potentiels à l'étude.
- **Parc de la Gatineau** : réfère aux espèces ayant été observées dans le parc de la Gatineau.
- **Espèce cible :** espèce identifiée dans le processus de définition des groupes fonctionnels (annexe 2). Ces espèces sont particulièrement visées pour l'évaluation des corridors écologiques potentiels.

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Acer nigrum	Érable noir	Susceptible (1)	-	1	1	-	3
Adiantum pedatum	Adiante du Canada	Vulnérable (2)	-	1	1	-	4
Adlumia fungosa	Adlumie fongueuse	Susceptible (1)	-	1	1	-	3
Allium tricoccum	Ail des bois	Vulnérable (2)	-	1	1	-	4
Amelanchier amabilis	Amélanchier gracieux	Susceptible (1)	-	-	1	-	2
Arethusa bulbosa	Aréthuse bulbeuse	Susceptible (1)	-	-	1	-	2
Asarum canadense	Asaret gingembre (Gingembre sauvage)	Vulnérable (2)	-	-	1	-	3
Asclepias tuberosa var. interior	Asclépiade tubéreuse	Menacée (2)	-	1	1	-	4
Asplenium platyneuron	Doradille ébène	Susceptible (1)	-	-	1	-	2
Asplenium rhizophyllum	Doradille ambulante	Susceptible (1)	-	1	1	-	3
Botrychium lineare	Botryche linéaire	Susceptible (1)	-	-	1	-	2
Botrychium oneidense	Botryche d'Oneida	Susceptible (1)	-	-	1	-	2
Botrychium rugulosum	Botryche à limbe rugueux	Susceptible (1)	-	1	-	-	2
Bromus kalmii	Brome de Kalm	Susceptible (1)	-	1	-	-	2
*Calypso bulbosa var. americana**	Calypso bulbeux	Susceptible (1)	-	-	1	-	2
Cardamine concatenata	Cardamine découpée	Susceptible (1)	-	-	1	-	2
Cardamine diphylla	Dentaire à deux feuilles	Vulnérable (2)	-	-	1	-	3
Carex appalachica	Carex des Appalaches	Susceptible (1)	-	-	1	-	2
Carex argyrantha	Carex argenté	Susceptible (1)	-	-	1	-	2

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Carex cephalophora	Carex porte-tête	Susceptible (1)	-	1	1	2	5
Carex folliculata	Carex folliculé	Susceptible (1)	-	-	1	-	2
Carex laxiculmis var. laxiculmis	Carex à tiges faibles	Susceptible (1)	-	-	1	-	2
Carex molesta	Carex dérangeant	Susceptible (1)	-	1	-	-	2
Carex muehlenbergii var. muehlenbergii	Carex de Mühlenberg	Susceptible (1)	-	-	1	-	2
Carex oligocarpa	Carex à fruits clairsemés	Susceptible (1)	-	-	1	-	2
Carex sartwellii	Carex de Sartwell	Susceptible (1)	-	1	-	-	2
Carex siccata	Carex sec	Susceptible (1)	-	1	1	-	3
Carex sparganioides	Carex faux-rubanier	Susceptible (1)	-	1	1	-	3
Carex sychnocephala	Carex compact	Susceptible (1)	-	1	1	-	3
Carya ovata var. ovata	Caryer ovale	Susceptible (1)	-	1	-	-	2
Ceanothus americanus	Céanothe d'Amérique	Susceptible (1)	-	1	1	-	3
Ceanothus herbaceus	Céanothe à feuilles étroites	Susceptible (1)	-	1	1	-	3
Celtis occidentalis	Micocoulier occidental	Susceptible (1)	-	1	1	-	3
Cerastium nutans	Céraiste penché	Susceptible (1)	-	1	1	-	3
Chenopodium foggi	Chénopode de Fogg	Susceptible (1)	-	-	1	-	2
Cirsium muticum var. monticolum	Chardon mutique	Susceptible (1)	-	-	1	-	2
*Claytonia virginica**	Claytonie de Virginie	Susceptible (1)	-	-	1	-	2

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Conopholis americana	Conopholis d'Amérique	Susceptible (1)	-	1	1	-	3
Corallorhiza striata var. striata	Corallorhize striée	Susceptible (1)	-	-	1	-	2
Corydalis aurea ssp. aurea	Corydale dorée	Susceptible (1)	-	1	1	-	3
Cyperus odoratus	Souchet odorant	Susceptible (1)	-	-	1	-	2
Cypripedium arietinum	Cypripède tête-de-bélier	Vulnérable (2)	-	1	1	2	6
Cypripedium reginae	Cypripède royal	Susceptible (1)	-	1	1	-	3
Desmodium nudiflorum	Desmodie nudiflore	Susceptible (1)	-	-	1	-	2
Draba nemorosa	Drave des bois	Susceptible (1)	-	1	-	-	2
Dryopteris clintoniana	Dryoptère de Clinton	Susceptible (1)	-	1	1	-	3
*Elaeagnus commutata**	Chalef argenté	Susceptible (1)	-	-	1	-	2
*Elymus riparius**	Elyme des rivages	Susceptible (1)	-	-	1	-	2
Fimbristylis autumnalis	Fimbristyle d'automne	Susceptible (1)	-	-	1	-	2
Fissidens exilis	Fissident pygmée	-	Préoccupante (1)	-	1	-	2
Galearis spectabilis	Galéaris remarquable	Susceptible (1)	-	1	1	-	3
Galium circaezans	Gaillet fausse-circée	Susceptible (1)	-	1	1	-	3
Gentianopsis crinita	Gentiane frangée	Susceptible (1)	-	1	-	-	2
Geum macrophyllum var. perincisum	Benoîte à folioles incisées	Susceptible (1)	-	-	1	-	2
Goodyera pubescens	Goodyérie pubescente	Susceptible (1)	-	1	1	-	3
Gratiola aurea	Gratiole dorée	Susceptible (1)	-	1	-	-	2

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Helianthus divaricatus	Hélianthe à feuilles étalées	Vulnérable (2)	-	1	1	-	4
Hypericum kalmianum	Millepertuis de Kalm	Susceptible (1)	-	1	-	-	2
Juglans cinerea	Noyer cendré	Susceptible (1)	En voie de disparition (2)	1	1	-	5
Juniperus virginiana var. virginiana	Genévrier de Virginie	Susceptible (1)	-	1	1	-	3
Lathyrus ochroleucus	Gesse jaunâtre	Susceptible (1)	-	1	-	-	2
Lilium canadense	Lis du Canada	Vulnérable (2)	-	-	1	-	3
Matteuccia struthiopteris	Matteuccie fougère-à-l'autruche	Vulnérable (2)	-	1	1	-	4
*Melica smithii**	Mélique de Smith	Susceptible (1)	-	-	1	-	2
Minuartia michauxii	Minuartie de Michaux	Susceptible (1)	-	1	-	-	2
Muhlenbergia sylvatica	Muhlenbergie des bois	Susceptible (1)	-	1	-	-	2
Myriophyllum humile	Myriophylle menu	Susceptible (1)	-	-	1	-	2
Panax quinquefolius	Ginseng à cinq folioles	Menacée (2)	En voie de disparition (2)	1	1	-	6
Panicum flexile	Panic flexible	Susceptible (1)	-	1	1	2	5
Panicum philadelphicum	Panic de Philadelphie	Susceptible (1)	-	1	1	-	3
Pellaea atropurpurea	Pelléade à stipe pourpre	Menacée (2)	-	-	1	-	3
*Pellaea glabella subsp. glabella**	Pelléade glabre	Susceptible (1)	-	-	1	-	2
Persicaria robustior	Renouée robuste	Susceptible (1)	-	1	-	-	2
Platanthera flava var. herbiola	Platanthère petite-herbe	Susceptible (1)	-	1	-	-	2

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Platanthera macrophylla	Platanthère à grandes feuilles	Susceptible (1)	-	-	1	-	2
Polygala polygama	Polygale polygame	Susceptible (1)	-	1	1	-	3
Polygala senega	Polygale sénéca	Susceptible (1)	-	1	-	-	2
Polygonella articulata	Polygonelle articulée	Susceptible (1)	-	-	1	-	2
Polygonum douglasii	Renouée de Douglas	Vulnérable (2)	-	-	1	-	3
*Potamogeton illinoensis**	Potamot de l'Illinois	Susceptible (1)	-	-	1	-	2
Potamogeton vaseyi	Potamot de Vasey	Susceptible (1)	-	1	1	-	3
Prunus susquehanae	Cerisier de la Susquehanna	Susceptible (1)	-	1	-	-	2
Pterospora andromedea	Ptérospore andromède	Menacée (2)	-	1	1	-	4
Pycnanthemum virginianum	Pycnanthème de Virginie	Susceptible (1)	-	1	-	-	2
Quercus alba	Chêne blanc	Susceptible (1)	-	1	1	-	3
Quercus bicolor	Chêne bicolore	Susceptible (1)	-	-	1	-	2
Ranunculus flabellaris	Renoncule à éventails	Susceptible (1)	-	1	1	-	3
Rhus aromatica var. aromatica	Sumac aromatique	Vulnérable (2)	-	1	1	-	4
Rhynchospora capitellata	Rhynchospore à petites têtes	Susceptible (1)	-	-	1	-	2
Rubus flagellaris	Ronce à flagelles	Susceptible (1)	-	1	1	-	3
Sanguinaria canadensis	Sanguinaire du Canada	Vulnérable (2)	-	-	1	-	3
Scirpus pendulus	Scirpe pendant	Susceptible (1)	-	1	1	-	3
Selaginella eclipes	Sélaginelle cachée	Susceptible (1)	-	1	-	-	2

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Sisyrinchium angustifolium	Bermudienne à feuilles étroites	Susceptible (1)	-	1	1	-	3
Solidago ptarmicoides	Verge d'or faux-ptarmica	Susceptible (1)	-	1	-	-	2
Sparganium androcladum	Rubanier branchu	Susceptible (1)	-	-	1	-	2
Spiranthes casei var. casei	Spiranthe de Case	Susceptible (1)	-	-	1	-	2
Spiranthes lucida	Spiranthe lustrée	Susceptible (1)	-	1	1	-	3
Sporobolus compositus var. compositus	Sporobole rude	Susceptible (1)	-	1	-	-	2
Sporobolus heterolepis	Sporobole à glumes inégales	Susceptible (1)	-	1	-	-	2
Sporobolus vaginiflorus var. vaginiflorus	Sporobole engainé	Susceptible (1)	-	1	-	-	2
Symphyotrichum lanceolatum subsp. lanceolatum var. interior	Aster continental	Susceptible (1)	-	-	1	-	2
*Torreyochloa pallida var. pallida**	Glycérie pâle	Susceptible (1)	-	1	1	-	3
Triadenum virginicum	Millepertuis de Virginie	Susceptible (1)	-	1	1	-	3
Trichostema brachiatum	Trichostème à sépales égaux	Susceptible (1)	-	1	-	-	2
Trillium grandiflorum	Trille blanc	Vulnérable (2)	-	1	1	-	4
Ulmus thomasii	Orme liège	Menacée (2)	-	1	1	-	4
Utricularia geminiscapa	Utriculaire à scapes géminés	Susceptible (1)	-	-	1	-	2

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Plantes vasculaires							
Utricularia gibba	Utriculaire à bosse	Susceptible (1)	-	-	1	-	2
Utricularia resupinata	Utriculaire à fleur inversée	Susceptible (1)	-	-	1	-	2
Uvularia grandiflora	Uvulaire à grandes fleurs	vulnérable à la cueillette commerciale (1)	-	1	1	-	4
Vicia americana	Vesce d'Amérique	Susceptible (1)	-	1	-	-	2
Viola affinis	Violette affine	Susceptible (1)	-	1	-	-	2
Wolffia borealis	Wolffie boréale	Susceptible (1)	-	1	1	-	3
Woodsia obtusa	Woodsie à lobes arrondis	Menacée (2)	Menacée (2)	-	1	2	7
Woodwardia virginica	Woodwardie de Virginie	Susceptible (1)	-	-	1	-	2
Invertébrés							
Danaus plexippus	Monarque	-	Préoccupante (1)	-	1	-	2
Erythemis simplicicollis	Érythème des étangs	Susceptible (1)	-	-	1	-	2
Lestes vigilax	Leste matinal	Susceptible (1)	-	-	1	-	2
Nasiaeschna pentacantha	Aeschne Cyrano	Susceptible (1)	-	-	1	-	2
Ophiogomphus anomalus	Ophiogomphe bariolé	Susceptible (1)	-	-	1	-	2
Pompeius verna	Hespérie à taches vitreuses	Susceptible (1)	-	-	1	-	2
Vertébrés							
Ameiurus natalis	Barbotte jaune	Susceptible (1)	-	-	1	-	2
Ammodramus nelsoni	Bruant de Nelson	Susceptible (1)	-	1	-	-	2
Ammodramus savannarum	Bruant sauterelle	Susceptible (1)	-	1	1	2	5
Apalone spinifera	Tortue-molle à épines	Menacée (2)	Menacée (2)	1	-	-	5
Aquila chrysaetos	Aigle royal	Vulnérable (2)	-	1	1	-	4

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Vertébrés							
Asio flammeus	Hibou des marais	Susceptible (1)	Préoccupante (1)	1	1	-	4
Bucephala islandica	Garrot d'Islande	Vulnérable (2)	Préoccupante (1)	1	-	-	4
Buteo lineatus	Buse à épaulettes	-	Préoccupante (1)	1	-	-	2
Calidris canutus	Bécasseau maubèche	Susceptible (1)	-	1	-	-	2
Canis lupus lycaon	Loup de l'Est	-	Préoccupante (1)	1	1	2	5
Caprimulgus vociferus	Engoulevent bois-pourri	Susceptible (1)	Menacée (2)	1	-	-	4
Catharus bicknelli	Grive de Bicknell	Vulnérable (2)	Préoccupante (1)	1	-	-	4
Chaetura pelagica	Martinet ramoneur	Susceptible (1)	Menacée (2)	1	1	-	5
Chelydra serpentina	Tortue serpentine	-	Préoccupante (1)	1	1	2	5
Chordeiles minor	Engoulevent d'Amérique	Susceptible (1)	Menacée (2)	1	1	-	5
Cistothorus platensis	Troglodyte à bec court	Susceptible (1)	-	1	1	-	3
Contopus cooperi	Moucherolle à côtés olive	Susceptible (1)	Menacée (2)	1	1	-	5
Coturnicops noveboracensis	Râle jaune	Menacée (2)	Préoccupante (1)	1	1	-	5
Dendroica cerulea	Paruline azurée	Menacée (2)	Préoccupante (1)	1	1	2	7
Diadophis punctatus	Couleuvre à collier	Susceptible (1)	-	-	1	-	2
Emydoidea blandingii	Tortue mouchetée	Menacée (2)	Menacée (2)	1	1	2	8
Euphagus carolinus	Quiscale rouilleux	Susceptible (1)	Préoccupante (1)	1	1	-	4
Falco peregrinus anatum	Faucon pèlerin de la sous-espèce *anatum*	Vulnérable (2)	Menacée (2)	1	1	-	6
Glaucomys volans	Petit polatouche	Susceptible (1)	-	-	1	2	4

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Vertébrés							
Glyptemys insculpta	Tortue des bois	Vulnérable (2)	Menacée (2)	-	1	2	7
Graptemys geographica	Tortue géographique	Vulnérable (2)	Préoccupante (1)	-	1	-	4
Haliaeetus leucocephalus	Pygargue à tête blanche	Vulnérable (2)	-	1	1	-	4
Hemidactylium scutatum	Salamandre à quatre orteils	Susceptible (1)	-	1	1	2	5
Histrionicus histrionicus	Arlequin plongeur	Vulnérable (2)	Préoccupante (1)	1	-	-	4
Hybognathus hankinsoni	Méné laiton	Susceptible (1)	-	-	1	-	2
Ixobrychus exilis	Petit blongios	Vulnérable (2)	Menacée (2)	1	1	-	6
Lampropeltis triangulum	Couleuvre tachetée	Susceptible (1)	Préoccupante (1)	1	1	-	4
Lanius ludovicianus migrans	Pie-grièche migratrice de la sous-espèce *migrans*	Menacée (2)	En voie de disparition (2)	1	1	2	8
Lasionycteris noctivagans	Chauve-souris argentée	Susceptible (1)	-	1	1	-	3
Lasiurus borealis	Chauve-souris rousse	Susceptible (1)	-	1	1	-	3
Lasiurus cinereus	Chauve-souris cendrée	Susceptible (1)	-	1	1	-	3
Liochlorophis vernalis	Couleuvre verte	Susceptible (1)	-	-	1	-	2
Lithobates palustris	Grenouille des marais	Susceptible (1)	-	-	1	-	2
Melanerpes erythrocephalus	Pic à tête rouge	Menacée (2)	Menacée (2)	1	1	2	8
Mustela nivalis	Belette pygmée	Susceptible (1)	-	-	1	-	2
Myotis leibii	Chauve-souris pygmée de l'est	Susceptible (1)	-	-	1	-	2
Nerodia sipedon	Couleuvre d'eau	Susceptible (1)	-	1	1	-	3
Notropis bifrenatus	Méné d'herbe	Vulnérable (2)	Préoccupante (1)	-	1	2	6

Tableau A1 Espèces en péril recensées dans les corridors et le parc de la Gatineau (suite)

Espèce		Statut légal		Observation			
Nom scientifique	Nom commun	Provincial	Fédéral	Corridor	Parc de la Gatineau	Espèce cible	Note totale
Notation		(1 :S; 2 : M, V)	(1 :P; 2 : M, D)	1	1	2	
Vertébrés							
Noturus flavus	Barbotte des rapides	Susceptible (1)	-	-	1	2	4
Noturus insignis	Chat-fou liséré	Susceptible (1)	-	-	1	2	4
Pipistrellus subflavus	Pipistrelle de l'Est	Susceptible (1)	-	-	1	-	2
Podiceps auritus	Grèbe esclavon	Menacée (2)	-	1	-	-	3
Pseudacris triseriata	Rainette faux-grillon de l'Ouest	Vulnérable (2)	Menacée (2)	1	1	2	8
Puma concolor couguar	Couguar (population de l'est)	Susceptible (1)	-	-	1	2	4
Seiurus motacilla	Paruline hochequeue	Susceptible (1)	Préoccupante (1)	1	1	-	4
Sterna caspia	Sterne caspienne	Menacée (2)	-	1	-	-	3
Sternotherus odoratus	Tortue musquée	Menacée (2)	Menacée (2)	1	-	-	5
Synaptomys cooperi	Campagnol-lemming de Cooper	Susceptible (1)	-	-	1	-	2
Thamnophis sauritus	Couleuvre mince	Susceptible (1)	Préoccupante (1)	1	-	-	3
Vermivora chrysoptera	Paruline à ailes dorées	Susceptible (1)	Menacée (2)	1	1	-	5
Wilsonia canadensis	Paruline du Canada	Susceptible (1)	Menacée (2)	1	1	-	5

*****Plantes dont la localisation reste à confirmer.

APPENDIX 2

TARGET SPECIES AND FUNCTIONAL GROUPS

Espèces cibles et groupes fonctionnels

La présence d'espèces en péril représente un critère essentiel dans la sélection des corridors, car elle renseigne sur la présence des habitats et leur santé et donc sur la valeur écologique d'un corridor. En effet, dans la plupart des cas, la précarité de l'espèce est due à la disparition de son habitat.

Les espèces en péril ont des besoins et préférences variés quant à leur domaine vital, leur type d'habitat, leur mode de reproduction, etc. Les informations à ce sujet ne sont pas toujours disponibles et complètes, mais il est possible de dresser un portrait de la plupart des espèces en péril recensées dans le cadre de cette étude.

Le choix des espèces cibles a été réalisé à partir de la liste des espèces en péril recensées dans les corridors (tableau A1) ainsi que de la liste des espèces en péril recensées au parc de la Gatineau (CCN, 2009). L'identification des espèces cibles repose sur différents critères liés aux besoins de caractérisation et de sélection des corridors :

- **Mode de vie de l'espèce** (alimentation, reproduction, territorialité) implique une certaine mobilité, avec des déplacements allant d'un à plusieurs centaines de kilomètres. Les déplacements sont effectués à l'aide de corridors terrestres ou aquatiques. Ainsi, les déplacements aériens dans le cas des rapaces ne sont pas considérés pour ce critère.
- **Degré de connaissance** : de par leur statut, certaines espèces font l'objet de suivis et d'études; leurs déplacements sont suivis et plusieurs données sont donc disponibles à ce sujet.
- **Espèces prioritaires au parc de la Gatineau** : dans son Plan de protection des espèces de la flore et de la faune en péril du parc de la Gatineau (tableau A1; CCN, 2009), la CCN a élaboré des mesures de conservation pour 37 espèces en péril recensées au Parc et protégées par les lois fédérale et provinciale. Ces espèces sont donc prioritaires dans le processus de sélection.
- **Espèces parapluies** : espèces dont la niche écologique est assez large ou les habitudes assez semblables pour que leur protection assure celle des autres appartenant à la même communauté. L'intégration d'espèces parapluie dans la liste des espèces cibles est donc privilégiée.

Les espèces en péril recensées dans les corridors et dans le parc de la Gatineau ont été évaluées en regard de ces critères. L'analyse a fait ressortir 24 espèces cibles, présentées dans le tableau A2. La liste des espèces cibles n'est pas exhaustive, mais leur diversité permet de couvrir les besoins de la grande majorité des espèces en péril recensées dans le parc de la Gatineau et dans les corridors.

Les occurrences des espèces cibles et la connaissance scientifique de leurs besoins permettent d'orienter le processus de sélection des corridors et de statuer sur la fonctionnalité de ces derniers. Plusieurs espèces cibles possèdent des caractéristiques similaires quant à l'utilisation d'un corridor, d'où l'intérêt de les regrouper en les classant par « groupe fonctionnel ». En effet, la détermination de groupes fonctionnels, unités élémentaires de la diversité fonctionnelle, est indispensable à la compréhension du fonctionnement des écosystèmes (François et coll., 1999). L'intérêt récent d'une formalisation de nouvelles classifications réside dans une meilleure compréhension du rôle de la biodiversité dans le fonctionnement des écosystèmes et en particulier pour prédire les effets de changements de facteurs environnementaux (Vassiliki, 2009).

Les espèces cibles sont donc classées sous l'angle de la diversité fonctionnelle via la définition de groupes fonctionnels répondant de diverses façons aux facteurs écologiques présents dans les différents

corridors. Ainsi, certains traits fonctionnels permettront de prédire la réponse positive ou négative d'une espèce vis-à-vis d'un corridor en particulier.

Les espèces cibles ont été subdivisées en six groupes fonctionnels, soit :

- les grands prédateurs;
- les espèces aquatiques;
- les espèces de milieux humides;
- les espèces de forêts fermées;
- les espèces de milieux ouverts;
- les plantes calcicoles.

Pour chaque groupe fonctionnel, les besoins en termes d'habitats, de largeur de couloir de passage et d'utilisation du corridor sont énoncés, selon la disponibilité des informations (tableau A2). La largeur minimale du corridor exprimée pour chaque groupe fonctionnel est basée sur des données fournies à l'échelle du taxon et non de l'espèce en particulier, car non disponibles dans la plupart des cas. Les largeurs évoquées dans le tableau A2 ont donc été définies pour les besoins de l'étude et représentent des mesures déductives. Enfin, les principaux obstacles au bon fonctionnement du groupe fonctionnel sont également évoqués.

Tableau A2 Caractérisation des groupes fonctionnels

Groupe fonctionnel	Espèce cible	Statut provincial	Statut fédéral	Habitat principal	Largeur min. du corridor	Obstacle potentiel	Motifs d'utilisation
Grands prédateurs	**Loup de l'Est** *(Canis lupus lycaon)*	-	Préoccupante	Boisés peu fréquentés, cédrières, forêts surannées	350 m	Grande densité d'infrastructures anthropiques et activités humaines.	Déplacement à l'intérieur d'un grand domaine vital pour l'alimentation, l'appariement ou la dispersion
	Couguar *(Puma concolor)*	Susceptible	-				
	Pékan *(Martes pennanti)*	-	-				
Espèces aquatiques	**Chat-fou liséré** *(Noturus insignis)*	Susceptible	Données insuffisantes	Rivières avec courant de modéré à rapide, ruisseaux permanents et bande riveraine, lacs, étangs	50 m	Barrages, digues, zones d'étiage sévère, pollution, routes	Dispersion post-reproductive et migration
	Barbotte des rapides *(Noturus flavus)*	Susceptible	-				
	Grenouille verte *(Lithobates (Rana) clamitans melanota)*	-	-				
	Mené d'herbe *(Notropis bifrenatus)*	Vulnérable	-				
	Physe de la Gatineau *(Physella parkeri latchfordi)*	Intérêt régional	Données insuffisantes				
	Tortue serpentine *(Chelydra serpentina)*	-	Préoccupante				
Espèces de milieux humides	**Tortue des bois** (*Glyptemys insculpta*)	Vulnérable	Préoccupante	Mosaïque de milieux humides de divers types, présence de végétation arbustive ou arborescente	150 m	Vastes zones xériques ou agricoles, pollution de l'eau, endiguement et assèchement des milieux humides	Déplacements pour l'appariement, dispersion post-reproductive
	Tortue mouchetée *(Emydoidea blandingii)*	Menacée	Menacée				
	Salamandre à quatre orteils (*Hemidactylium scutatum*)	Susceptible	-				
Espèces de forêts fermées	**Petit polatouche** (*Glaucomys volans*)	Susceptible	-	Forêts denses et matures, arbres hauts, voûte fermée	100 m	Coupe totale ou sévère, forêt secondaire, regain	Déplacement à l'intérieur du territoire à des fins alimentaires
	Paruline azurée (*Dendroica cerulea*)	Menacée	Préoccupante				
	Lynx du Canada *(Lynx canadensis)*	-	-				
	Grand pic *(Dryocopus pileatus)*	-	-				

Tableau A2 Caractérisation des groupes fonctionnels (suite)

Groupe fonctionnel	Espèce cible	Statut provincial	Statut fédéral	Habitat principal	Largeur min. du corridor	Obstacle potentiel	Motifs d'utilisation
Espèces de milieux ouverts	**Pic à tête rouge** (*Melanerpes erythrocephalus*)	Menacée	Menacée	Friches, lisières, bosquets, prairies	150 m	Intensification de l'agriculture, boisement des milieux ouverts, urbanisation	Déplacement à l'intérieur du territoire à des fins alimentaires
	Bruant sauterelle (*Ammodramus savannarum*)	Susceptible	-				
	Pie-grièche migratrice de la sous-espèce *migrans* (*Lanius ludovicianus migrans*)	Menacée	En voie de disparition				
	Rainette faux-grillon de l'ouest *(Pseudacris triseriata)*	Vulnérable	Menacée				
Plantes calcicoles	**Carex porte-tête** *(Carex cephalophora)*	Susceptible	-	Substrat calcaire, milieux ouverts, rocheux, cédrières	30 m	Grande distance entre les habitats propices, acidification des sols	Colonisation de nouvelles aires de distribution
	Panic flexible *(Panicum flexible)*	Susceptible	-				
	Woodsie à lobes arrondis *(Woodsia obtusa ssp. obtusa)*	Menacée	Menacée				
	Cypripède tête-de-bélier *(Cypripedium arietinum)*	Vulnérable	-				

APPENDIX 3

WILDLIFE OBSERVATION DATA (WINTER 2010-2011)

Espèce	Corridor														Nombre de présence de l'espèce dans les corridors (sur un total de 7 corridors)		
	Luskville		Pontiac		Bristol		Du Nord		Masham		Nord-Est		Larrimac				
	Date (2011)																
	Janvier	Mars	Janvier	Mars	Janvier	Mars	Janvier	Mars	Janvier	Mars	Janvier	Mars	Janvier	Mars	Janvier	Mars	Janvier - Mars
	Signe de présence																
Castor			A(V)					T(R)					A(V) - H - B	T (R) - H	2	2	3
Cerf de Virginie	T(R+V) - B(V)	T(R+V) - O(5)	T(R+V)	T(R+V)	T+C+F(R+V)	T(R+V)	T(R+V)		T(R+V)	T(V)	T(V)		T(V)	T(V)	7	5	7
Chien	T(V)							T(R)	T(R+V)		T(R+V)		T(V)		4	1	5
Chouette lapone						O(1)									0	1	1
Coyote	T(V)*	T(R)*			T(V)*		T(R)*			T+F(R)*					3	2	4
Dindon sauvage		T(R+V)		T(R+V)											0	2	2
Gélinotte	T(R+V) - O(4)	O(1)			T+F(R)	T(R)	T(V)	T(R)	T(V)	T(R)		T(R)	T(R)		5	5	5
Hermine			T(V)	T(R)	T(V)					T(V)					2	2	3
Lièvre	T(R+V)	T(R+V)			T(R)	T(R)	T(R+V)	T(R+V)	T(R+V)	T(V)	T(R+V)	T(V)	T(R+V)	T(V)	6	6	6
Loup													T(V)*		1	0	1
Loutre	T(R)*	T(R)		T(R)					T+G(V)*						2	2	3
Lynx						T(R)*		T(R)*			T(V)*		T(R+V)*		2	2	4
Martre					T(V)*	T(R)*	T(R)*	T(R)*			T(V)*	T(R)*	T(V)*		4	3	4
Moufette		T(V)				T(R)									0	2	2
Orignal								T(V)							0	1	1
Porc-épic		O(1)						T(V)		T(R)					0	3	3
Rat musqué				T(R)											0	1	1
Raton laveur												T(R)		T(R)	0	2	2
Renard	T(R+V)	T(R)	T(V)		T(R+V)	T(R+V)	T(R+V)	T(R)	T(V)		T(R)	T(R)	T(R+V)	T(V)	7	5	7
Vison		T(R)					T(V)			T(R)			T(R+V)		2	2	4

Nombre d'espèces présentes par corridor (sur un total de 20 espèces)														
7	10	4	5	7	8	7	9	6	7	6	5	10	5
11		7		10		12		10		8		11	
Principaux obstacles observés													
Route		Chemin		Chemin								Autoroute	
Habitation		Habitation		Clôture								Habitation	
Clôture		Escarpement										Clôture	
		Clôture											

Signe de présence
A = Arbre rongé (castor)
B = Barrage (castor)
C = Couche (chevreuil)
F = Fèces
G = Glissade (loutre)
H = Hutte (castor)
O = Observation d'individus (nombre entre parenthèse)
T = Trace

Datation du signe de présence
R = Récent
V = Vieux

Autre
* = Géoréférencé et photographié

Remarque
La trace de loup observée était très vieille et demanderait confirmation

APPENDIX 4

RESULTS OF THE EVALUATION OF THE POTENTIAL ECOLOGICAL CORRIDORS

La série de tableaux suivants présente le détail de l'évaluation des corridors écologiques potentiels pour chacun des 12 critères, répartis selon les thèmes « Unicité », « Évaluation écologique » et « Potentiel de gestion ».

Thème 1 Unicité des corridors écologiques potentiels

Critère 1 Unicité géographique

Corridor	Grand écosystème (GE)			Note finale (sur 30) = Somme C pour chaque GE
	Rivière des Outaouais	Rivière Gatineau	Forêts du nord	
Aylmer	1			13
Bristol	1			13
Champlain-Voyageurs	1			13
Du Nord			1	25
Larrimac		1		23
Luskville	1			13
Masham			1	25
Nord-est du Parc		1		23
Philémon-Leamy	1			13
Pontiac	1			13
Ruisseau Breckenridge	1			13
Ruisseau Chelsea		1		23
Total (nb)	**7**	**3**	**2**	
Total (ratio) = A[(1)]	0,6	0,3	0,2	
1-A = B	0,4	0,8	0,8	
B*30 = C	13	23	25	

(1) Total (ratio) = A = Total (nb)/Nombre total de corridors (12)

Critère 2 Unicité par rapport aux groupes fonctionnels

Corridor	Groupe fonctionnel						Nb de groupes fonctionnels par corridor		Corridor optimal pour chaque groupe fonctionnel		Note finale (sur 60) = D+E
	Grands prédateurs (GP)	Espèces de forêts fermées (EFF)	Espèces de milieux humides (EMH)	Espèces aquatiques (EA)	Espèces de milieux ouverts (EMO)	Plantes calcicoles (PC)					
	Pondération = C (arrondi à la valeur supérieure)[1]										
	6	5	5	4	3	7	Nombre	Somme des pondérations (sur 30) = D[3]	Groupe fonctionnel	Somme des pondérations (sur 30) = E[4]	
Aylmer		1	1		1	1	4	20	PC	7	27
Bristol	1	1	1	1		1	5	27	EMH	5	32
Champlain-Voyageurs			1	1			2	9			9
Du Nord	1	1		1			3	15	GP	6	21
Larrimac	1	1			1		3	14	EFF	5	19
Luskville			1	1	1		3	12			12
Masham	1	1			1		3	14			14
Nord-est du Parc					1	1	2	10			10
Philémon-Leamy			1	1	1		3	12			12
Pontiac	1			1	1		3	13			13
Ruisseau Breckenridge			1	1	1	1	4	19	EA+EMO	7	26
Ruisseau Chelsea		1		1	1		3	12			12
Nb total de corridors par groupe fonctionnel	5	6	6	8	9	4	-	-	-	-	-
Nb total de corridors par groupe fonctionnel (ratio) = A[2]	0,4	0,5	0,5	0,7	0,8	0,3	-	-	-	-	-
1-A = B	0,6	0,5	0,5	0,3	0,3	0,7	-	-	-	-	-
B*10 = C	5,8	5,0	5,0	3,3	2,5	6,7	-	-	-	-	-

(1) Voir dernière ligne du tableau pour le calcul de la pondération de chaque groupe fonctionnel.

(2) Nb total de corridors par groupe fonctionnel (ratio) = A = Nb total de corridors par groupe fonctionnel/Nb total de corridors (12).

(3) Exemple : Corridor d'Aylmer : Somme des pondérations pour les groupes fonctionnels présents dans le corridor (EFF, EMH, EMO et PC) = 5 + 5+ 3 +7 = 20.

(4) Exemple : Le corridor optimal pour les groupes fonctionnels EA et EMO est le corridor du ruisseau Breckenridge, ce corridor se voit donc attribuer la somme des pondérations associées à ces groupes fonctionnels : E = Pondération EA + Pondération EMO = 4 + 3 = 7.

Thème 2 Valeur écologique des corridors écologiques potentiels

Critère 1 Connexion avec le parc de la Gatineau

Corridor	Largeur moyenne (m)	Nb de groupes fonctionnels associés (max. de 6) = A	Groupes fonctionnels associés (ratio) = A/6 = B	Note finale (sur 20) = B*20
Aylmer	504	6	1,0	20
Bristol	1 764	6	1,0	20
Champlain-Voyageurs	359	6	1,0	20
Du Nord	9 752	6	1,0	20
Larrimac	774	6	1,0	20
Luskville	444	6	1,0	20
Masham	5 442	6	1,0	20
Nord-est du Parc	774	6	1,0	20
Philémon-Leamy	132	3	0,5	10
Pontiac	933	6	1,0	20
Ruisseau Breckenridge	304	5	0,8	17
Ruisseau Chelsea	146	3	0,5	10

Critère 2 Diversité des habitats d'intérêt

Corridor	Superficie corridor (ha)	Superficie des habitats d'intérêt (ha)	Superficie habitats d'intérêt (%) = A	Nb d'habitats (max. de 11) = B	Note (sur 111) = A+B = C	Note finale (sur 10) = (C/111)*10
Aylmer	1 882	854	45	7	52	5
Bristol	6 558	4 483	68	11	79	7
Champlain-Voyageurs	460	164	36	6	42	4
Du Nord	11 684	9 408	81	6	87	8
Larrimac	394	202	51	3	54	5
Luskville	439	300	68	7	75	7
Masham	2 913	927	32	5	37	3
Nord-est du Parc	208	84	40	3	43	4
Philémon-Leamy	381	186	49	4	53	5
Pontiac	2 852	1 300	46	9	55	5
Ruisseau Breckenridge	882	373	42	6	48	4
Ruisseau Chelsea	438	252	58	3	61	5

Critère 3 Qualité des habitats

Corridor	Élément d'évaluation								Somme des éléments d'évaluation (sur 16) = A	Note finale (sur 10) = (A/16)*10
	Structure et qualité des peuplements forestiers	Présence et qualité des bandes riveraines	Condition générale des milieux humides et de leur zone tampon	Coupes forestières	Sentiers informels et de piétinement	Ouvrages de drainage	Déchets et autres artefacts humains	Structures d'origine anthropique		
Aylmer	2	2	2	2	1	1	1	1	12	8
Champlain-Voyageurs	1	1	1	2	1	1	1	1	9	6
Du Nord	2	2	2	1	2	2	2	2	15	9
Larrimac	2	0	0	2	2	2	2	2	12	8
Luskville	2	0	1	2	2	1	2	1	11	7
Masham	2	2	2	1	2	2	2	2	15	9
Nord-est du Parc	2	0	2	1	1	2	2	1	11	7
Philémon-Leamy	1	1	1	2	1	1	1	1	9	6
Pontiac	1	2	2	1	1	1	2	1	11	7
Ruisseau Breckenridge	1	2	2	2	2	2	2	2	15	9
Ruisseau Chelsea	1	2	1	2	1	1	2	2	12	8
Bristol	2	2	2	2	2	2	2	2	16	10

0 = Nul ou absent; 1 = Acceptable; 2 = Très bon

Critère 4 Présence d'espèces en péril

Corridor	Nb d'espèces	Somme pondérée = A	Classement	A/Classement #1 = B	Note finale (sur 30) = B*30
Aylmer	23	91	7	0,4	13
Bristol	65	218	1	1,0	30
Champlain-Voyageurs	23	100	5	0,5	14
Du Nord	8	38	11	0,2	5
Larrimac	4	18	12	0,1	2
Luskville	21	95	6	0,4	13
Masham	17	74	8	0,3	10
Nord-est du Parc	10	41	10	0,2	6
Philémon-Leamy	29	110	4	0,5	15
Pontiac	36	148	2	0,7	20
R. Breckenridge	32	142	3	0,7	20
R. Chelsea	16	74	8	0,3	10

Critère 5 Effet de bordure

Corridor	Superficie corridor (ha)	Superficie zone d'influence (ha)	Proportion zone d'influence (%) = A	- A = B	Note finale (sur -10) = B/10
Aylmer	1 882	999	53	- 53	- 5
Bristol	6 558	2 314	35	- 35	- 4
Champlain-Voyageurs	460	339	74	- 74	- 7
Du Nord	11 684	2 864	25	- 25	- 3
Larrimac	394	316	80	- 80	- 8
Luskville	439	135	31	- 31	- 3
Masham	2 913	909	31	- 31	- 3
Nord-est du Parc	208	86	41	- 41	- 4
Philémon-Leamy	381	267	70	- 70	- 7
Pontiac	2 852	1 503	53	- 53	- 5
Ruisseau Breckenridge	882	203	23	- 23	- 2
Ruisseau Chelsea	438	90	21	- 21	- 2

Critère 6 Fragmentation

Corridor	Densité routière (km/km²) = A	Classement	A/Classement #1 = B	Note (sur -5) = -B*5 = D	Cumul du pointage des types de route (sur -5) = C	Note finale (sur -10) = D+C
Aylmer	1,5	5	0,4	- 2	- 1	- 3
Bristol	0,9	10	0,2	- 1	- 3	- 4
Champlain-Voyageurs	3,0	3	0,8	- 4	- 3	- 7
Du Nord	0,9	8	0,3	- 1	- 3	- 4
Larrimac	3,5	1	1,0	- 5	- 5	- 10
Luskville	0,8	12	0,2	- 1	- 3	- 4
Masham	0,9	9	0,2	- 1	- 5	- 6
Nord-est du Parc	2,1	4	0,6	- 3	- 5	- 8
Philémon-Leamy	3,4	2	1,0	- 5	- 5	- 10
Pontiac	1,4	7	0,4	- 2	- 1	- 3
Ruisseau Breckenridge	0,9	5	0,3	- 1	- 3	- 4
Ruisseau Chelsea	0,8	11	0,2	- 1	- 3	- 4

Pointage des différents types de route : autoroutes = -2, routes collectrices = -1,5, routes à usage résidentiel = -1, chemins non pavés = -0,5.

Critère 7 Étranglements

Corridor	Superficie corridor (ha)	Superficie étranglements (ha)	Proportion étranglements (%) = A	Note finale (sur -10) = - A/10
Aylmer	1 882	125	7	- 1
Bristol	6 558	16	0	0
Champlain-Voyageurs	460	13	3	0
Du Nord	11 684	0	0	0
Larrimac	394	20	5	- 1
Luskville	439	254	58	- 6
Masham	2 913	0	0	0
Nord-est du Parc	208	7	3	0
Philémon-Leamy	381	67	18	- 2
Pontiac	2 852	18	1	0
Ruisseau Breckenridge	882	105	12	- 1
Ruisseau Chelsea	438	36	8	- 1

Thème 3 Potentiel de gestion des corridors écologiques potentiels

Critère 1 Présence des terres publiques

Corridor	Superficie corridor (ha)	Terres publiques (ha)	Terres publiques (%) = A	Note finale (sur 20) = (A/100)*20
Aylmer	1 882	394	21	4
Bristol	6 558	1 606	24	5
Champlain-Voyageurs	460	211	46	9
Du Nord	11 684	728	6	1
Larrimac	394	131	33	7
Luskville	439	1	0	0
Masham	2 913	163	6	1
Nord-est du Parc	208	25	12	2
Philémon-Leamy	381	331	87	17
Pontiac	2 852	31	1	0
Ruisseau Breckenridge	882	209	24	5
Ruisseau Chelsea	438	42	10	2

Critère 2 Zonage des terres

Corridor	Superficie corridor (ha)	Zonage d'intérêt (ha)	Proportion zonage d'intérêt (%) = A	Note finale (sur 10) = (A/100)*10
Aylmer	1 882	729	39	4
Bristol	6 558	1 730	26	3
Champlain-Voyageurs	460	402	87	9
Du Nord	11 684	545	5	0
Larrimac	394	37	9	1
Luskville	439	0	0	0
Masham	2 913	1 487	51	5
Nord-est du Parc	208	7	4	0
Philémon-Leamy	381	374	98	10
Pontiac	2 852	0	0	0
Ruisseau Breckenridge	882	701	79	8
Ruisseau Chelsea	438	60	14	1

Zonage d'intérêt : récréatif, conservation et villégiature.

Critère 3 Services écologiques possibles des corridors écologiques potentiels

Corridor	Service écologique[1]														Nb de services écologiques par corridor		Note finale (sur 10) = (D/51)*10
	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
	Pondération = C (arrondi à la valeur supérieure)[2]																
	1	5	2	1	5	3	4	5	1	4	1	3	7	9	Nombre	Somme des pondérations (sur 51) = D[4]	
Aylmer	1	1	1	1		1	1		1		1	1	1		10	28	5
Bristol	1	1	1	1	1	1		1	1	1	1		1		11	35	7
Champlain-Voyageurs	1		1	1			1	1	1		1	1			8	18	4
Du Nord	1	1	1	1	1	1		1	1	1	1	1			11	31	6
Larrimac	1			1		1	1		1	1	1	1			8	18	4
Luskville	1	1	1	1	1			1	1	1				1	9	33	6
Masham	1	1	1	1	1	1		1	1	1	1	1			11	31	6
Nord-est du Parc	1			1	1	1	1			1	1	1			8	22	4
Philémon-Leamy	1		1	1		1	1		1		1	1	1		9	23	5
Pontiac	1	1	1	1	1	1	1	1	1	1	1				11	32	6
Ruisseau Breckenridge	1		1	1	1		1		1		1	1	1	1	10	34	7
Ruisseau Chelsea	1	1	1	1		1	1		1	1	1	1			10	25	5
Nb total de corridors par service écologique	**12**	**7**	**10**	**12**	**7**	**9**	**8**	**6**	**11**	**8**	**11**	**9**	**4**	**2**			
Nb total de corridors par service écologique (ratio) = A[3]	1,0	0,6	0,8	1,0	0,6	0,8	0,7	0,5	0,9	0,7	0,9	0,8	0,3	0,2			
1-A = B	0,0	0,4	0,2	0,0	0,4	0,3	0,3	0,5	0,1	0,3	0,1	0,3	0,7	0,8			
B*10 = C	0,0	4,2	1,7	0,0	4,2	2,5	3,3	5,0	0,8	3,3	0,8	2,5	6,7	8,3			

(1) Services de régulation
1) Régulation du microclimat
2) Purification de l'air
3) Régulation des inondations et sécheresse
4) Contrôle de l'érosion et des glissements de terrain
5) Pollinisation et réduction des ravageurs agricoles
6) Dispersion des semences
7) Bruit

Services d'approvisionnement
8) Nourriture
9) Eau douce
10) Matières premières

Services socioculturels
11) Récréation et tourisme
12) Esthétique du paysage
13) Éducation et relations sociales
14) Patrimoine culturel

(2) Voir dernière ligne du tableau pour le calcul de la pondération de chaque service écologique.
(3) Nb total de corridors par service écologique (ratio) = A = Nb total de corridors par service écologique/Nb total de corridors (12).
(4) Exemple : Corridor d'Aylmer : Somme des pondérations pour les services écologiques présents dans le corridor (1 à 4, 6 et 7, 9, 11 à 13) = 1 + 5 +2 +1 + 3+ 4+ 1 + 1 + 3 + 7 = 28.

Analyse de sensibilité de l'influence des critères sur l'évaluation

Corridor (par ordre de l'évaluation)	Évaluation	Critère												
		Unicité géographique	Unicité groupes fonctionnels	Connexion	Diversité des habitats	Qualité des habitats	Présence d'espèces en péril	Effet de bordure	Fragmentation	Étranglements	Présence des terres publiques	Zonage des terres	Services écologiques
	Sensibilité - Classement global													
Bristol	1	1	1	1	1	1	1	1	1	1	1	1	1
R. Breckenridge	2	2	2	2	2	2	3	2	2	2	2	2	2
Du Nord	3	4	4	3	4	4	2	4	3	3	3	3	3
Aylmer	3	3	6	3	3	3	4	3	4	3	4	4	4
Masham	5	7	3	5	4	5	5	5	5	5	5	5	5
Pontiac	6	5	5	8	6	6	11	6	7	6	6	6	6
Philémon-Leamy	7	6	8	6	7	7	8	7	6	7	12	10	8
Champlain-Voyageurs	8	8	6	9	8	8	10	8	9	8	9	12	7
Larrimac	9	10	9	7	9	9	6	9	7	10	7	7	9
R. Chelsea	9	10	12	10	10	9	7	10	10	11	9	8	9
Luskville	11	9	11	11	12	11	12	11	12	8	8	9	12
Nord-est du Parc	12	12	10	12	11	12	8	11	11	12	11	10	11
Nombre de changement de position dans le classement	-	7	8	5	5	1	10	3	8	3	6	7	3
Sensibilité du classement global	-	Moyen	Moyen	Faible	Faible	Très faible	Forte	Très faible	Moyen	Très faible	Faible	Moyen	Très faible

APPENDIX 5

ZONING REGULATIONS

CHELSEA (RÈGLEMENT DE ZONAGE NUMÉRO 636-05)

Les dispositions concernant l'abattage d'arbres à l'extérieur du périmètre d'urbanisation s'appliquent sur des propriétés de 10 ha et plus et définit les prélèvements autorisés selon le type de peuplement forestier.

Pour les peuplements de la catégorie 1 (comportant un minimum de 30 % de la surface terrière avant coupe d'arbres de la catégorie 1) :

- La surface résiduelle après l'abattage ne doit pas être inférieure à 20 m²/ha par peuplement. Dans le cas d'érablières à sucre, la majorité des arbres composant la surface terrière devra être composée de tiges d'érable à sucre en santé.

Pour les peuplements de la catégorie 2 (comportant un minimum de 60 % de la surface terrière avant coupe d'arbres de la catégorie 2) :

- Seul l'abattage d'arbres ayant un DHS de 16 cm et plus est autorisé. Le bloc de récolte doit s'effectuer d'un seul tenant d'un maximum d'un hectare et être entouré d'une lisière boisée de 100 m minimum. La récolte est interdite sur les pentes de 30 % et plus.

Les sentiers de débusqueuses, de débardages et chemins forestiers doivent être aménagés de manière à prévenir l'érosion.

Aucune aire d'empilement n'est autorisée à moins de 30 m de l'emprise d'un chemin public ou privé, des limites de la propriété faisant l'objet d'un chemin forestier, de la ligne des hautes eaux d'un lac, d'une zone humide ou d'un cours d'eau permanent. Après les travaux, les aires d'empilement devront être reboisées.

Dispositions relatives aux lacs, cours d'eau et milieux humides :

- Aucune machinerie lourde ou machinerie forestière ne peut circuler ou être utilisée dans une bande de protection mesurant 20 m autour d'un lac ou d'un cours d'eau;
- Aucune action d'abattage d'arbres et aucune intervention ne sont permises dans les milieux humides et dans les zones de protection fixées au présent règlement.

GATINEAU (RÈGLEMENT DE ZONAGE NUMÉRO 502-2005)

La Ville de Gatineau identifie trois types de boisés à l'intérieur de son règlement de zonage, soit le boisé de conservation, le boisé de protection et d'intégration, et les autres boisés.

À l'intérieur d'un **boisé de conservation**, la coupe sanitaire et d'assainissement est permise, de même que la coupe d'un arbre dans le cadre de la construction d'un ouvrage ou d'une construction autorisée en vertu des règlements de la municipalité.

Dans les **boisés de protection et d'intégration**, les actions permises sont :

- la coupe de jardinage et d'assainissement;
- la coupe à blanc pour la mise en culture d'un boisé situé en zone agricole permanente;
- les travaux d'éclaircie et de jardinage des boisés situés en zone agricole permanente;

- l'abattage d'un arbre dans un boisé situé en zone agricole permanente pour l'aménagement d'un chemin forestier ou récréatif ou pour la construction d'un abri forestier de 20 m²;
- l'abattage d'un arbre qui n'est pas en zone agricole dans le but d'ériger un ouvrage ou une construction autorisée en vertu des règlements de la municipalité.

Pour les « **autres boisés** », les actions autorisées sont les mêmes, mais leur encadrement est moins sévère.

PONTIAC (RÈGLEMENT DE ZONAGE 177-01)

Sont autorisés :

- la coupe d'assainissement ou la coupe d'arbres nécessaire à la construction d'une route, la construction d'un bâtiment principal et des installations s'y rattachant;
- la coupe d'assainissement définie comme étant la coupe des arbres ayant 10 cm et plus de diamètre, constituée à 50 % des tiges, à condition de préserver un couvert forestier d'au moins 50 %;
- la coupe d'arbres de bois de chauffage effectuée par un particulier pour ses fins personnelles si aucune activité commerciale ne résulte de cette coupe.

Pour toute autre coupe d'arbres en milieu forestier ou agricole, un plan simple de gestion forestière préparé et signé par un ingénieur forestier doit être soumis à la municipalité.

LA PÊCHE (RÈGLEMENT DE ZONAGE NUMÉRO 03-429)

Selon le règlement de zonage, un certificat d'autorisation d'abattage d'arbres est nécessaire pour :

- une coupe commerciale;
- une coupe de récupération visant un peuplement dégradé (endommagé par le feu, vent, verglas, épidémie d'insectes, etc.);
- une coupe commerciale d'érable dans une zone agricole désignée, sauf s'il s'agit d'une intervention sylvicole de sélection ou d'éclaircie.

La demande de certificat doit comprendre une description des travaux sylvicoles projetés.

Un certificat d'autorisation d'abattage d'arbres n'est pas nécessaire pour :

- une coupe d'assainissement sur 20 % et moins de la surface terrière concernée, à distinguer de la coupe de récupération visant un peuplement endommagé;
- une coupe de bois de chauffage dont le volume prélevé est moins important qu'une coupe commerciale;
- un agrandissement d'une exploitation agricole en zone agricole désignée;
- une coupe de sélection ou d'éclaircie dans une érablière en zone agricole désignée.

Dans tous les cas, sont proscrites les coupes totales dans les zones de « résidences riveraines » identifiées au règlement de zonage. Des lisières boisées doivent également être préservées dans certains milieux :

- Conservation d'une lisière boisée, d'une largeur de 30 m, en bordure d'un lac ou d'un cours d'eau;
- Conservation d'une lisière boisée de 30 m en bordure d'une route provinciale, de 20 m en bordure d'un chemin municipal et de 10 m en bordure d'un chemin privé;
- Conservation d'une lisière boisée de 60 m à proximité de certaines occupations du sol ou sites d'intérêt énumérés dans le règlement (base de plein air, centre récréotouristique, terrain de camping, centre d'hébergement ou de restauration, halte routière ou aire de pique-nique, belvédère, observatoire, habitation permanente ou saisonnière, institutions publiques et communautaires ou tout autre usage, construction, occupation du sol ou site d'intérêt de même nature).

Les activités autour des aires de protection du grand héron identifiées au règlement de zonage sont également restreintes, et cela, sur une bande de 500 m autour du site selon la division suivante :

- Le site d'une héronnière de même que les 200 m qui entourent le site doivent être laissés intacts;
- Dans les 300 m suivants, la plupart des travaux d'aménagement forestiers sont interdits entre le 1er avril et le 31 juillet de chaque année.

Les sentiers de débardage et de débusquage ne doivent pas représenter plus de 20 % de l'aire de coupe totale. Les aires d'empilement, d'ébranchage et de tronçonnage doivent être localisées à une distance de 30 m d'un lac ou cours d'eau, 30 m d'une route provinciale, 20 m d'un chemin municipal et 15 m d'un chemin privé et doivent être nettoyées dans les trente jours suivant la fin des travaux.

BRISTOL (RÈGLEMENT DE ZONAGE NUMÉRO 264)

Les normes d'abattage d'arbres vont différer dans le Règlement de zonage en vigueur de Bristol selon que ce soit un lot à être développé, une terre du domaine public et une terre du domaine privé.

Lots à être développés

Dans le cas de lots à être développés, les arbres ayant un DHP de 20 cm et plus doivent être conservés. Lorsque le lot en question est adjacent à un lac ou à un cours d'eau, la bande de protection riveraine ne permet pas de couper plus du deux-tiers des arbres.

Terres du domaine public

Sur les terres du domaine public, la Loi sur les forêts et ses règlements d'usages s'appliquent.

Terres du domaine privé

De manière générale, l'obtention d'un certificat d'autorisation quant à l'abattage d'arbres est obligatoire pour récolter un volume de bois de 175 m³ solides ou plus par année, valide pour l'ensemble des lots d'un même propriétaire. Par ailleurs, des normes plus précises sont édictées selon le type de peuplement forestier concerné.

Peuplement de feuillus tolérants, peuplement mélangés à feuillus tolérant et peuplements de pins blancs

- Un prélèvement maximal de 30 % du volume avant la coupe, distribué dans toutes les classes de diamètre supérieur à 10 cm, ou 15 cm à la souche, est permis. La surface terrière résiduelle doit être de 16 m² à l'hectare uniformément répartie afin d'éviter la création de trouées. La rotation, qui doit être proportionnelle à l'intensité de la coupe, doit être de 20 ans en moyenne, sans toutefois être inférieure à 15 ans.

Peuplement perturbé de feuillus tolérants ou mélangé à feuillus tolérants

- Lorsque le peuplement de ces essences est perturbés, c'est-à-dire, lorsque 25 à 50 % de sa surface terrière a été enlevée ou détruite par des chablis, le feu, les insectes ou la maladie, il peu faire l'objet d'une coupe totale. À cette fin, la demande de certificat d'autorisation doit être accompagnée par une prescription sylvicole signée par un ingénieur forestier membre de l'Ordre des ingénieurs forestiers du Québec. Cette prescription doit aussi contenir des mesures de remise en production de la superficie coupée.

Peuplement immature (lorsque la majorité des tiges ont un diamètre de 36 cm et plus)

- Seuls les travaux d'éducation sont permis.

Peuplements de résineux, de peupliers et mélangés à dominance résineuses sur une superficie maximale de 10 ha d'un seul tenant

- Les coupes avec protection de la régénération et des sols sont permises associé aux conditions suivantes :
    - Le peuplement doit avoir atteint sa maturité;
    - La régénération de la superficie ayant fait l'objet d'une telle coupe doit être d'au moins 1 500 semis d'essences commerciales distribués uniformément à l'hectare avant même d'entreprendre de nouveau ce type de coupe sur une même propriété foncière;
    - Entre deux aires de coupe, une lisière boisée d'une largeur minimale de 50 m doit séparer l'ancienne aire de coupe de la nouvelle;
    - Un prélèvement maximal de 30 % du volume, distribué dans toutes les classes de diamètre supérieures à 10 cm, ou 15 cm à la souche, est permis dans les lisières boisées;
    - Les dispositions précédentes s'appliquent également aux peuplements provenant des plantations.

Les coupes de récupération font exception aux règles énoncées précédemment. Elles peuvent donc couvrir toute la superficie atteinte. Une prescription sylvicole, comprenant des mesures de remises en production pour la superficie coupée, signée par un ingénieur forestier membre de l'Ordre des ingénieurs forestiers du Québec devra accompagner la demande de certificat d'autorisation.

Par ailleurs, des normes spécifiques à la protection des lacs et cours d'eau sont énoncées :

- Il est interdit d'utiliser tous cours d'eau comme voie d'accès ou de débusquage. Des ponts, des pontages ou des ponceaux adéquats permettant l'écoulement naturel de l'eau doivent être mis en place chaque fois qu'un chemin ou un sentier de débusquage ou de débardage traverse un cours d'eau;
- Les arbres doivent être abattus de façon à éviter qu'ils ne tombent dans les lacs et les cours d'eau. Lorsque cette situation se produit, les lacs et les cours d'eau doivent être nettoyés de tous les débris provenant de l'exploitation en être retirés.

Finalement, les aires de tronçonnage et d'empilement doivent être nettoyées et remises en production après leur utilisation, sauf dans le cas des coupes partielles réalisées dans les peuplements de feuillus tolérants, les peuplements mélangés à feuillus tolérants et les peuplements de pins blancs.

CLARENDON (RÈGLEMENT DE ZONAGE NUMÉRO 2003-216)

Le règlement de zonage en vigueur de la municipalité de Clarendon prévoit des dispositions s'appliquant seulement aux peuplements tolérants, d'autres aux peuplements intolérants et finalement des dispositions s'appliquant à tous les types de peuplements. Un peuplement est considéré comme tel lorsqu'il occupe plus de 2 ha. Précisons que ces mesures s'appliquent lorsqu'un certificat d'autorisation relatif à l'abattage d'arbres est obligatoire, c'est-à-dire, lorsque la récolte de tout volume de bois s'effectue sur une superficie de plus de 2 ha.

De manière générale, les articles concernant l'abattage d'arbre contenus à l'intérieur du règlement de zonage 2003-216 font référence à deux termes particuliers soit le « diamètre à hauteur de souche » ci-après appelé DHS et la trouée qui y est définie comme étant :

« Une superficie ne présentant pas une distribution uniforme de 500 tiges d'espèces commerciales à l'hectare (approximativement 1 tige au 20 m² ou 1 tige tous les 4,5 m) d'un DHS de 16 cm et plus et d'une hauteur minimale de 7 m. »

Dispositions s'appliquant aux peuplements intolérants (résineux, feuillus intolérants, peuplements mélangés à dominance résineuse et mélangés à dominance de feuillus intolérants).

Les seules récoltes possibles dans les peuplements intolérants doivent répondre à au moins un des critères suivants :

- Sur une surface terrière résiduelle uniforme de 16 m² et plus;
- Récolte uniforme, sur une rotation de 20 ans, d'un tiers des tiges de chacune des espèces commerciales dont le DHS est de 16 cm et plus;
- Coupe à diamètre limite uniforme basée sur un DHS de 20 cm jusqu'à une récolte maximale de 35 % des tiges.

La récolte par bloc de toutes les tiges d'un DHS de 20 cm et plus permise selon les conditions suivantes :

- Sur un bloc d'un seul tenant ne dépassant pas quatre hectares et dont leur ensemble couvre au maximum 20 % de la superficie forestière du lot;
- Sur un bloc d'un seul tenant ne dépassant pas quatre hectares dont leur ensemble couvre au maximum 40 % de la superficie forestière du lot.

Ces blocs doivent être entourés d'une lisière boisée d'une largeur minimale de 60 m ou les trois premiers types de récoltes énoncés ci-haut peuvent être pratiqués sans faire de trouées à l'intérieur de la lisière boisée. Avant de procéder à d'autres prélèvements de tiges dans ces lisières boisées ou par bloc dans les peuplements intolérants du lot, les blocs coupés doivent répondre à l'un des critères suivants :

- Distribution uniforme de plus de 1 500 tiges d'espèces commerciales à l'hectare dont la hauteur atteint plus de 4 m;
- Distribution uniforme de plus de 500 tiges d'espèces commerciales à l'hectare dont la hauteur atteint plus de 7 m;
- Distribution uniforme de plus de 300 tiges d'espèces commerciales à l'hectare dont le DHS est de 16 cm et plus;
- Une période de 5 ans s'est écoulée depuis la récolte.

Dispositions s'appliquant aux peuplements tolérants (pins blancs, pruches, cèdres, feuillus tolérants et mélangés à dominance de feuillus tolérants)

Ces peuplement comportent soit une majorité de tiges d'espèces considérées tolérantes soit plus de 75 % de tiges feuillus dont la proportion de tiges feuillues d'espèces considérées tolérantes est plus forte que celle de tiges feuillues considérées intolérantes et, à ce titre, ces peuplements sont considérés comme des peuplements tolérants.

Pour les peuplements tolérants, seule une récolte de tiges répondant à l'un des critères suivants est permise:

- Surface terrière résiduelle uniforme de 16 m² et plus;
- Au moins 60 % des tiges résiduelles doivent être d'espèces commerciales tolérantes;
- Récolte uniforme, sur une rotation de 20 ans, d'un tiers des tiges de chacune des espèces commerciales dont le DHS est de 16 cm et plus;
- Coupe à diamètre limite uniforme basée sur un DHS de 36 cm pour le pin blanc, le chêne et l'érable à sucre, et de 26 cm pour toutes les autres espèces commerciales.

Lorsque plus de 70 % des tiges commerciales du peuplement ont un DHS de 36 cm et plus, la récolte maximale ne doit pas excéder 35 % des tiges.

Par ailleurs, la récolte par trouée de toutes les tiges d'un DHS de 16 cm et plus est permise. Un maximum de 2 trouées à l'hectare d'une superficie n'excédant pas 400 m² est permis. Les trouées doivent être entourées d'une lisière boisée d'une largeur minimale de 25 m où les trois premiers types de coupe énoncés ci-haut doivent être appliqués sans faire de trouées à l'intérieur de celle-ci.

Sur cette même aire de coupe, les trouées doivent être régénérées avant de procéder à d'autres prélèvements de tiges par trouée ou dans les lisières boisées qui les entourent. Une trouée est considérée régénérée lorsqu'elle répond au critère suivant:

- Distribution uniforme de plus de 500 tiges d'espèces commerciales à l'hectare dont le DHS est de 16 cm et plus et la hauteur atteint plus de 7 m.

Des arbres pare-chocs devraient être utilisés le long des sentiers de débusquage.

Dispositions s'appliquant à tous les types de peuplements

Milieux en pente et sites très humides ou très secs

Sur les sommets des collines, dans les pentes de plus de 30 % et dans les sites très humides ou très secs, seule une récolte des tiges répondant à l'un des critères suivants est permise :

- Surface terrière résiduelle uniforme de 16 m² et plus, dans les peuplements tolérants, au moins 60 % des tiges résiduelles doivent être d'espèces commerciales tolérantes d'un DHS de 16 cm et plus;
- Récolte uniforme, sur une rotation de 20 ans, d'un tiers des tiges de chacune des espèces commerciales présentes dont le DHS est de 16 cm et plus;
- Coupe à diamètre limite uniforme basée sur un DHS de 36 cm pour le pin blanc, le chêne et l'érable à sucre et de 26 cm pour toutes les autres espèces commerciales.

Si plus de 70 % des tiges commerciales du peuplement ont un DHS de 36 cm et plus, la récolte ne doit pas excéder 35 % des tiges et aucune trouée n'est permise.

Dans la mesure du possible, la récolte des tiges sur des sols minces ou humides doit se faire lorsque le sol est suffisamment gelé ou de toute autre manière apte à supporter la machinerie d'exploitation sans produire des ornières en un nombre démesuré et sans scalper le sol ou le compacter indûment.

Bordure des rives, lacs et cours d'eau

En plus des dispositions concernant les interventions en bordure des rives, des lacs et des cours d'eau, les dispositions de la page suivante s'appliquent :

- En bordure des lacs et des cours d'eau à débit permanent, une bande boisée d'une largeur minimale de 30 m mesurée à partir de la ligne des hautes eaux doit être conservées. Seule la récolte des tiges selon les modalités prévues pour les sommets des collines, les pentes de plus de 30 % et les sites très humides ou très secs est permise. La circulation de machinerie lourde y est interdite dans les 20 premiers mètres, sauf pour la construction et l'entretien d'un chemin d'accès au lac ou au cours d'eau et la mise en place d'un équipement ou d'une infrastructure;
- En bordure des cours d'eau à débit intermittent, une lisière boisée d'une largeur minimale de 10 m doit être conservées à partir de la ligne des hautes eaux. Seule la récolte des tiges selon les modalités prévues pour les sommets des collines, les pentes de plus de 30 % et les sites très humides ou très secs est permise. La circulation de la machinerie lourde y est interdite, sauf pour la construction et l'entretien d'un chemin d'accès au lac ou au cours d'eau et la mise en place d'un équipement ou d'une infrastructure;
- Il est interdit de détourner ou de creuser un cours d'eau, d'empiéter dans un cours d'eau ou un lac, d'abaisser ou de rehausser le niveau de l'eau d'un lac, à moins d'en avoir obtenu l'autorisation de la municipalité locale, de la municipalité régionale de comté et du ministère de l'Environnement du Québec;
- Il est interdit de déverser de la terre, des déchets de coupe ou toute autre matière dans les lacs et les cours d'eau. Il est interdit de laver la machinerie dans les lisières boisées en bordure des lacs et des cours d'eau, d'y déverser de l'huile, des produits chimiques ou tout autre matière polluante;

- Les arbres doivent être abattus de façon à éviter qu'ils ne tombent dans les lacs et cours d'eau; lorsque cette situation se produit, les lacs et les cours d'eau doivent être nettoyés et tous les débris provenant de l'exploitation en être retirés dès que possible;
- Dans la mesure du possible, les traverses de cours d'eau doivent être construites à angle droit par rapport aux cours d'eau;
- Il est interdit d'utiliser tout cours d'eau comme voie d'accès ou de débusquage; des ponts, des pontages ou des ponceaux adéquats permettant l'écoulement naturel de l'eau en période de cru doivent être mis en place chaque fois qu'un chemin ou un chemin de débusquage ou de débardage traverse un cours d'eau; l'installation d'un pont, d'un pontage ou d'un ponceau ne doit pas réduire de plus de 20 % la largeur du cours d'eau prise à la ligne des hautes eaux; l'ouvrage final doit être stabilisé et pouvoir supporter le trafic sans sédimenter l'eau, sans éroder les rives et sans affecter les frayères présentes; le diamètre des ponceaux à installer doit être d'au moins 45 cm ou son équivalent et ses extrémités doivent dépasser le remblai sans excéder une largeur de 30 cm.

La municipalité est responsable de définir les termes adéquats et équivalents employés dans le paragraphe précédent. Lorsque le cours d'eau et le sol à proximité sont gelés à une profondeur supérieure à 35 cm, les obligations émises dans le paragraphe précédent n'ont pas cours.

Routes et chemins forestiers

La superficie forestière devant être mis à nu pour l'établissement des routes, de chemins forestiers, d'aires d'empilement et de tronçonnage nécessaires à son aménagement forestier ne doit pas excéder 20 % de la superficie forestière du lot.

Pour prévenir l'érosion, les sentiers de débusquage et les routes devraient, dans la mesure du possible, ne pas être parallèle à la pente sur l'ensemble de leur trajet de descente. Ils devraient avoir, à des intervalles réguliers, de légers changements de direction pour diriger la majorité de l'eau qui tombe sur leur surface de roulement, en dehors de celle-ci.

Dans les lisières boisées en bordure des voies de transport publiques, des corridors et des sites et des territoires d'intérêt esthétique, des sources d'approvisionnement en eau potable, des sites d'élimination des boues usées et des sites d'élimination des déchets les mesures suivantes devraient s'appliquer :

- Seule la récolte des tiges est permise selon les mêmes modalités que celles prévues pour les sommets des collines, les pentes de 30 % et plus et les sites très humides ou très secs.

Une lisière boisée d'une largeur minimale de 30 m doit être conservée en bordure des voies de transport publiques.

Aires d'empilement et de tronçonnage

Les aires d'empilement et de tronçonnage doivent être nettoyées de tout matériel inorganique dans les plus brefs délais après la coupe forestière sans toutefois excéder six mois. Ces aires ne sont pas permises dans les lisières boisées entourant les trouées et les blocs dans les aires de coupe.

Outre cette condition, les aires d'empilement et de tronçonnage doivent répondre aux critères suivants :

- Les aires d'empilement et de tronçonnage doivent être nettoyées de tout matériel inorganique dès que possible après les opérations forestières sans excéder un délai de six mois;
- Les aires d'empilement et de tronçonnage ne sont pas permises dans les lisières boisées en bordure des voies de transport publiques, des corridors, des sites et des territoires d'intérêt esthétique, des sources d'approvisionnement en eau potable, des sites d'élimination des boues usées et des sites d'élimination des déchets;
- Nonobstant le paragraphe précédent, les aires d'empilement et de tronçonnage ne peuvent empiéter dans les lisières boisées le long des voies de transport publiques, des lacs et des cours d'eau ou celles entourant les trouées ou les blocs, à moins d'avoir obtenu l'autorisation de la municipalité qui, en regard de la topographie des lieux, en établira la nécessité.

Sources d'approvisionnement en eaux potable, sites d'élimination des boues usées et sites d'élimination des déchets

Une lisière boisée d'une largeur minimale de 30 m doit être conservée en bordure des sources d'approvisionnement en eau, des sites d'élimination des boues usées et des sites d'élimination des déchets. Seule la récolte des tiges selon les modalités prévues à l'article 2.5.2 est permise.

La municipalité peut appliquer des mesures additionnelles de protection de ses sources d'approvisionnement afin de limiter les atteintes à la qualité de l'eau potable. Tout propriétaire de lot doit se conformer à ces mesures additionnelles de protection lors de la récolte de la matière ligneuse.

Terrains à construire

Pour tout terrain boisé déjà construit à des fins résidentielles ou en voie de l'être, au moins le tiers des tiges d'un DHS de 16 cm et plus doivent être conservées :

- Lorsque le terrain est situé en bordure d'un lac ou d'un cours d'eau, la lisière boisée n'est pas incluse dans la règle du tiers des tiges
- Cette disposition ne s'applique pas à l'intérieur du périmètre d'urbanisation de Shawville/Clarendon

Transport du bois

Lors de travaux d'aménagement forestier, le propriétaire du lot boisé et l'exploitant forestier assument la responsabilité encourue selon la réglementation en vigueur lorsqu'un dommage survient à une voie de transports publics dont la juridiction relève de la municipalité.

Lors de la période de dégel ou de toute autre période de l'année où la capacité de charge des routes est affaiblie, la municipalité se réserve le droit de réglementer le transport du bois sur les routes qui relève de sa juridiction.

Exceptions et dérogations

- Les dispositions précédentes ne s'appliquent pas dans le périmètre d'urbanisation de Shawville/Clarendon;

- Les peuplements perturbés en volume ou en qualité par des causes naturelles peuvent faire exception à ces règles et peuvent faire l'objet de mesures d'intervention particulière pour la superficie affectée. Une prescription sylvicole signée par un ingénieur forestier membre de l'Ordre des ingénieurs forestiers du Québec pour ces mesures particulières doit être soumise à la municipalité. Cette prescription doit aussi contenir des mesures de remise en production pour la superficie affectée;
- Pour toute dérogation aux normes citées précédemment, il est nécessaire de soumettre à la municipalité une prescription sylvicole signée par une ingénieur forestier membre de l'Ordre des ingénieurs forestiers du Québec dans laquelle il explique la nécessité de déroger aux dispositions précédentes et les modalités d'application de ces mesures particulières depuis l'intervention jusqu'à la remise en production de la superficie affectée;
- L'abattage d'arbres pour la construction d'un bâtiment ou pour tout autre usage conforme au règlement de zonage de la municipalité pour des fins publiques ou pour l'entretien d'emprises publiques n'est pas visé par les dispositions précédentes;
- Une coupe totale est permise lorsqu'elle vise à permettre l'utilisation des sols à des fins de production ou de mise en valeur agricole. Pour ce faire, la demande de certification d'autorisation doit être accompagnée d'une évaluation écrite faite par un agronome membre de l'ordre des agronomes du Québec et d'une autorisation de la municipalité en ce qui a trait à la zone forestière;
- Nonobstant les paragraphes précédents, l'inspecteur municipal peut approuver la localisation des aires d'empilement et de tronçonnage le long des voies de transport publiques et des chemins d'accès au lot, et faire l'application conforme des termes adéquat et équivalent en ce qui a trait aux traverses de cours d'eau.

THORNE (RÈGLEMENT DE ZONAGE NON DISPONIBLE)