



New Official Plan

Natural Ottawa

City of Ottawa
Planning, Infrastructure, and Economic Development

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Ecosystem services (ES), sometimes referred to as “nature’s benefits,” draw attention to the ways that people depend on a healthy environment. ES support life (e.g., by providing air, water, food, raw materials, medicines), security (e.g., by mitigating extreme weather events, spread of vector-borne diseases), and quality of life (e.g., by supporting mental and physical health, cultural identity, recreation), among many other things. Regardless of what they are called, nature’s benefits are the basis of human lives and economies.

-[Ecosystem Services Toolkit](#). 2012. Value of Nature to Canadians Study Taskforce; Federal, Provincial, and Territorial Governments of Canada, p. 2

Introduction

The [Beyond 2036](#) planning study identified the “Environment” as one of the four main themes of Ottawa’s strategy for the future. It encompasses:

- the effects of climate change on natural systems, public health, and city infrastructure;
- the impacts of urban growth on natural systems;
- the pressures on urban greenspace and the urban tree canopy;
- implications for stormwater management and energy demands.

The scenarios examined in [Beyond 2036](#) highlighted the interconnectedness of the natural environment with its other themes: economic development, quality of life, and urban form and mobility. They speak to the importance of the natural environment for:

- enhancing the City’s resiliency to climate change;
- supporting agriculture;
- reducing and capturing stormwater run-off;
- reducing illnesses and deaths due to air pollution and urban heat events;
- improving the quality of urban life;
- creating complete communities;
- raising Ottawa’s global profile as green, beautiful, and dynamic destination for talent and investment.

The table in Annex 1 summarizes the dependencies of the themes in [Beyond 2036](#) on the natural environment.

Although this discussion paper considers climate change and climate resiliency, those topics will have their own discussion paper. This paper focuses on the functions and importance of Ottawa’s natural systems in both the rural and urban area: its forests, wetlands, grasslands, rock barrens, lakes, rivers, parks, urban natural areas, and urban tree canopy. It identifies the current condition and discusses trends for these natural assets. It discusses the ecosystem services that these assets provide and it identifies the challenges and threats facing them. Finally, it looks at the opportunities ahead to

enhance the benefits and values provided by the City’s natural systems, and suggest questions for consideration moving forward.

Global Context

As Ottawa grows into the future, the only certainty is continued change in the face of substantial global challenges. Although we cannot predict long-term outcomes, many of these challenges are well studied and well documented in reports such as the Global Environment Outlook (GEO) assessments published by the United Nations Environment Program (UNEP). Significant global challenges include:

- Population growth and demographic changes;
- Increased mobility of people and of capital;
- Unsustainable consumption of resources and physical space;
- Aging infrastructure;
- Direct and indirect effects of climate change on security, health, infrastructure, migration, and catastrophic natural events.

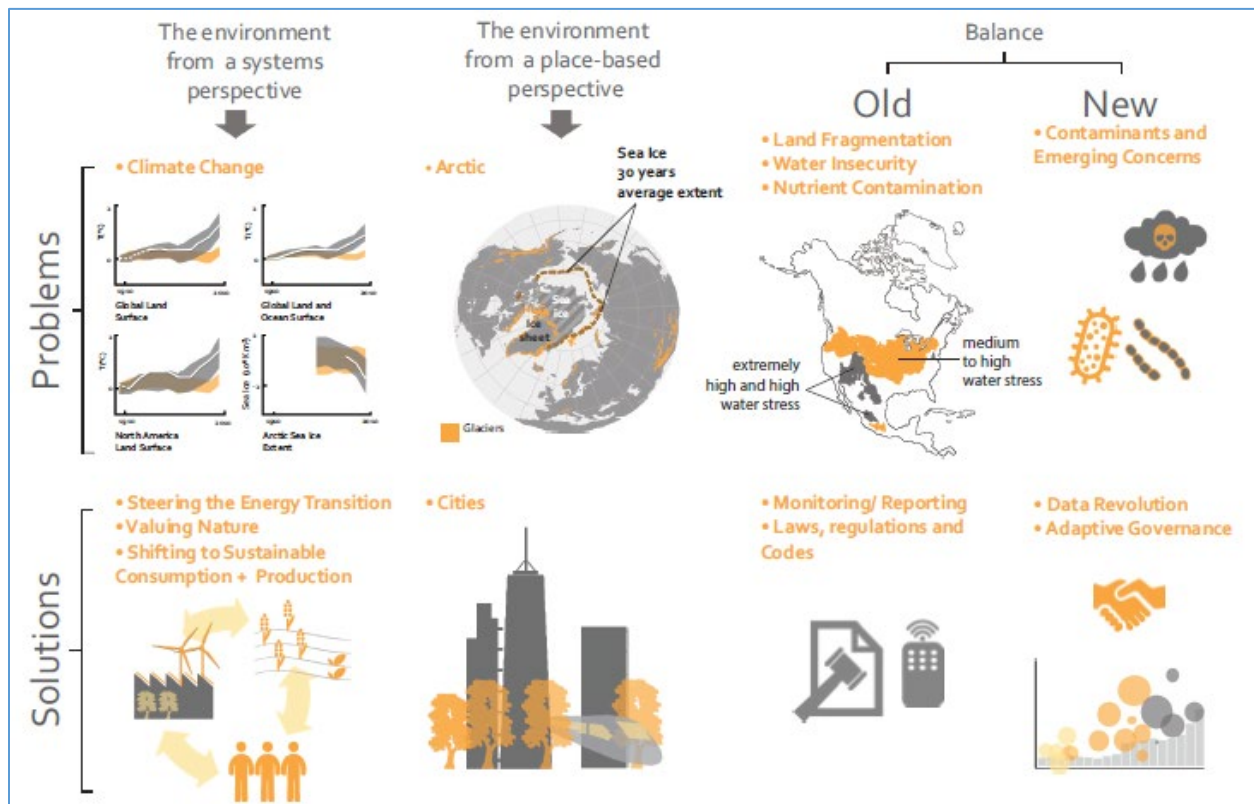


Figure 1. A conceptual illustration of the GEO 6 regional narrative for North America (UNEP 2016, used with permission).

In the North American context, the GEO 6 Regional Report¹ identified the major challenges as increasing greenhouse gas emissions and climate change, natural landscape fragmentation, water insecurity, nutrient contamination of rivers and lakes, and emerging chemical and physical contaminants such as endocrine disruptors and microplastics (Figure 1, UNEP 2016). Among the solutions, it highlighted the critical role of cities and the importance of valuing nature.

Within this global and North American context, Ottawa has a number of advantages that position it to respond well to challenges, to compete successfully with other mid-sized Cities, and to offer a continued high quality of life to its current and future residents. In particular, Ottawa can offer stability for investment and growth: not just political and economic stability, but the underlying environmental stability and sustainability that reduces risk and provides resilience to future disruptions, whether known or unknown.

Specific Challenges and Opportunities for Ottawa

The State of Ottawa's Natural Environment

Rural Natural Landscape

The outstanding character of Ottawa's natural environment provides its residents with an opportunity and resource for building North America's most liveable, globally oriented, mid-sized City. Overall, the City's natural environment appears healthier and more diverse than at any other time in the last 100 years. Environmental regulations have improved water quality and aquatic habitat in the region's major rivers and lakes. The recovery from historical logging and associated forest fires, along with the abandonment of marginal farmlands, has increased the area of forest cover. The return of beavers to the landscape after 200 years has restored many historical wetlands.

In 2011, upland forests and wetlands covered approximately 36% of Ottawa's 2850 km². Tree cover, including swamps, covered 30% of the City. Land cover mapping suggests that Ottawa retains all of its pre-European settlement habitat types, including globally significant alvar² habitats. Biodiversity across the region remains high, with the great majority of historical species still present on the landscape.

Fragmentation of the natural landscape creates a long-term threat to the City's biodiversity, particularly in the context of climate change. As shown in Figure 2, broad areas of settlement tend to separate the City's core natural areas, with intermittent smaller woodlands, hedgerows, and watercourses providing important linkages. Some of the core natural areas, like the Corkery Forest and the Marlborough Forest, are subject to on-going fragmentation caused by development. Over time, fragmentation leads to a loss of biodiversity and reduced resilience to stressors such as climate

¹ UNEP 2016. GEO-6 Regional Assessment for North America. United Nations Environment Programme, Nairobi, Kenya.

² Alvars are areas of flat, shallow limestone bedrock, with thin, patchy soils, supporting unusual or rare plant species and plant communities, as well as many animal species at risk.

change, invasive species, new pests, and human disturbance. The loss of smaller woodlands, hedgerows, and watercourse buffers also creates increased flooding risks and threats to water quality.

The good news is that Ottawa continues to manage and mitigate these impacts. The City has instituted a program of regular landcover mapping to monitor and to report on changes in forest cover, wetlands, and riparian cover across the City. Mapping is complete for 2011 and is underway for 2014 and 2017. The City and its conservation partners will use this information to guide and to refine future voluntary conservation and stewardship actions.

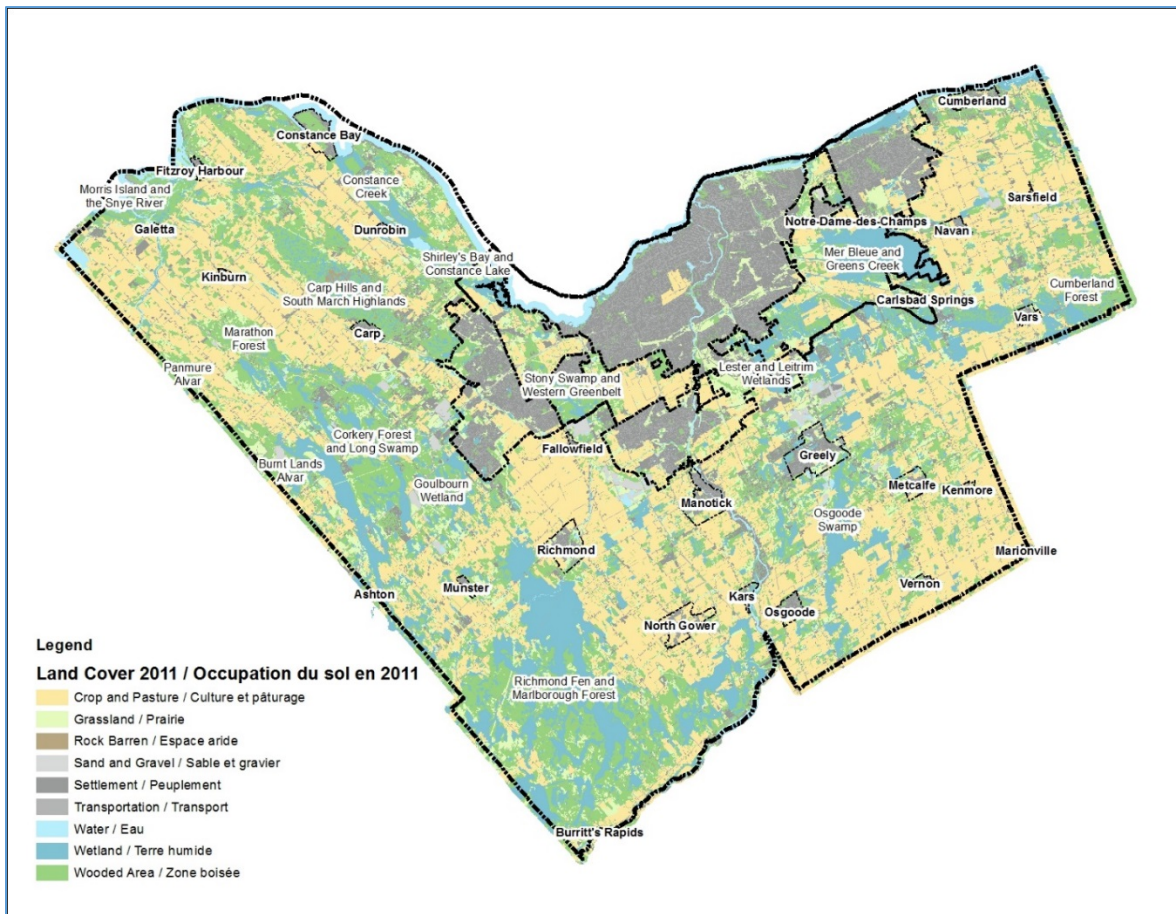


Figure 2. City of Ottawa Landcover (2011)

Urban Natural Areas and Greenspace

As with the rural area, landcover mapping for the urban area also tells a generally positive story (Figure 3). In 2011, woodlands and wetlands covered approximately 22.5% of the area within the urban boundary, with cropland and pastureland covering another 13.7%. However, those numbers include both the National Capital Commission Greenbelt and suburban growth areas designated for development. After excluding the Greenbelt, woodlands and wetlands covered 9.6% of the urban area, while cropland

and pastureland covered 7.5%. Most of the woodlands lay in larger blocks like the South March Highlands Conservation Forest or the Orleans ravine lands. Most of the wetlands lay along the Ottawa River, in Shirley's Bay and around Petrie Island. Most of the agricultural land lay in developing communities like Fernbank and Riverside South.

When considering Figure 3, one should remember that it does not show the network of smaller developed parks and greenspaces that lie enmeshed within the urban settlement area. In a 2011 analysis, the City found that more than 95% of residential households in Ottawa lay within 400 m (a five minute walking distance) of accessible urban greenspace. City staff are working to update that analysis to 2017 as part of a planned review of the City's Greenspace Master Plan.

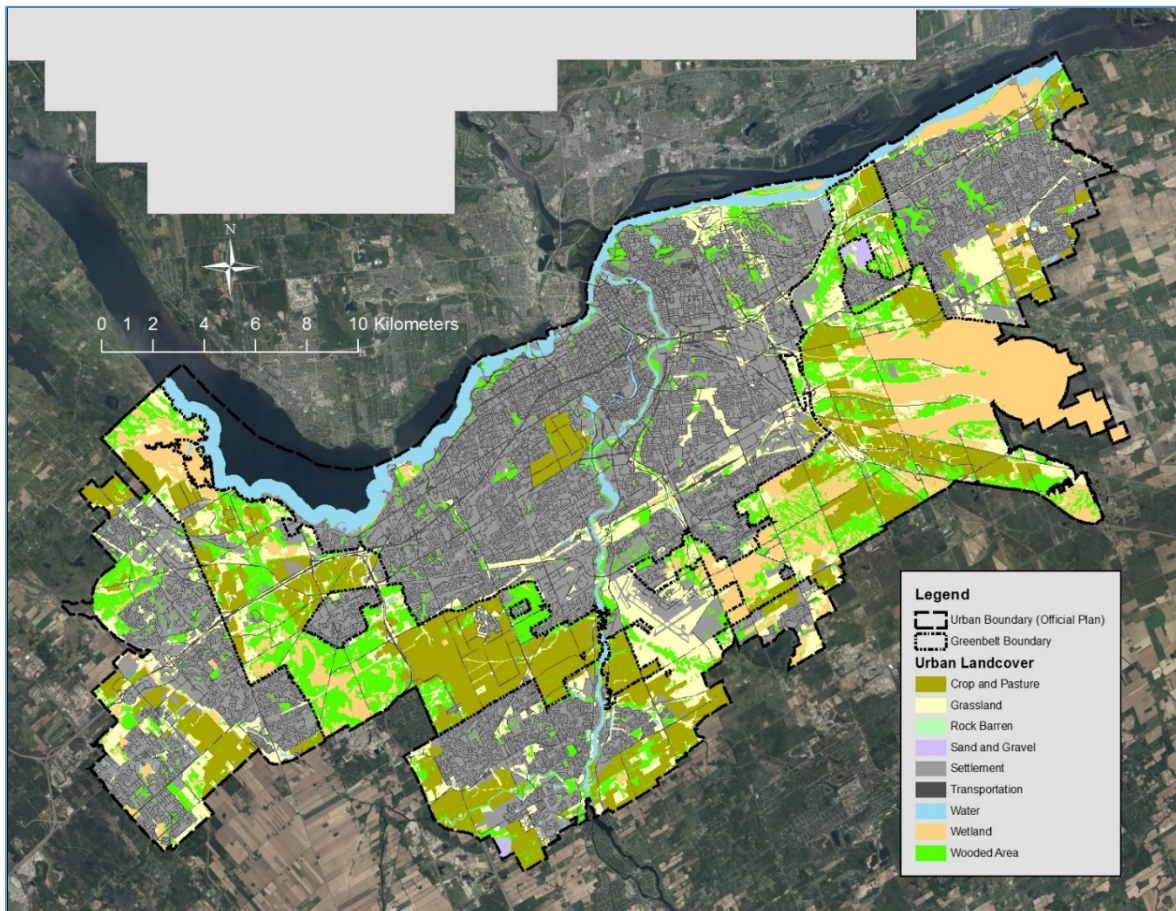


Figure 3. Ottawa Urban Landcover 2011

When reviewing the Greenspace Master Plan, we will need to consider how the relationship between the natural and the built environment changes across gradients of land uses, both between the rural and urban contexts and between modified and unmodified landscapes. The forms of the natural environment change along these gradients, as do the ecosystem services that they provide. Generally, as we move from wilderness to the downtown core, the natural environment inevitably and necessarily becomes more fragmented and less self-sustaining. Edges and interfaces become

dominant as we move from large, intact natural areas to smaller greenspaces, linear features, and interstitial spaces. The ecosystem services provided also change from the provision of fundamental, ecological necessities to more human-centred benefits. Consequently, the natural environment becomes more porous and enmeshed in the built environment. This spectrum provides risks and opportunities. As the [Healthy Ottawa](#) discussion paper summarizes so well, the loss of natural elements in the urban landscape has negative impacts on the physical and emotional well-being of people. However, recognition of this fact can lead to new, innovative approaches to the weaving of nature into the seams of the urban fabric.

The Urban Forest

Notwithstanding the large area of urban greenspace, Ottawa's urban tree canopy faces substantial threats. In 2014, the City estimated the total urban tree canopy, including the Greenbelt, individual street trees, and private trees, as covering 25% of the urban area. The urban canopy ranged from a low of 21% in the urban core and Barrhaven, to a high 31% in Orleans and Leitrim. In many places, emerald ash borer, the natural loss of older trees, and infill development has led to precipitous declines. A recent City survey of trees in five older neighbourhoods showed that up to 40% of the trees sampled in 2008 were subsequently lost, with losses in total canopy cover of up to 20%. In 2017, in response to this on-going trend, Ottawa City Council approved the Urban Forest Management Plan, with the goal of halting and reversing the decline.

Ecosystem Services

Ottawa's natural lands and features provide far more benefit to residents than simply aesthetic beauty and habitat for wildlife. For example, Figure 4 illustrates some of the ecosystem and "green infrastructure" services provided by the urban forest.³ In acknowledgement of these vital services, the City of Ottawa, the National Capital Commission, and the City of Gatineau are collaborating on an inventory and study of the urban tree canopy to understand and maximize the benefits that it provides to the National Capital Region's residents.

A similar list of services could be compiled for rural forests, or for any of the City's natural features. The Rideau Valley Conservation Authority, for example, has calculated that wetlands within the Rideau watershed reduce peak flood levels by approximately 10%, helping to protect areas such as Richmond, Manotick, Barrhaven, Ottawa South, and Vanier. Similarly, an abundance of research shows that retention of habitat for native pollinators is important for the production and yields of many economically important crops, such as berries, tomatoes, and canola. Much of Ottawa's resiliency and adaptive capacity depends upon these ecosystem services.

³ Livesay *et al.* 2016. The Urban Forest and Ecosystem Services: Impacts on Urban Water, Heat, and Pollution Cycles at the Tree, Street, and City Scale. *Journal of Environmental Quality* 45(1): 119 – 124.

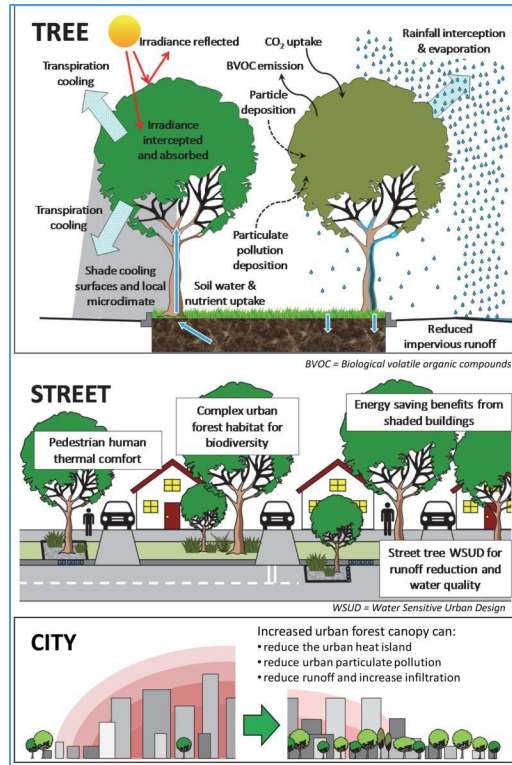


Figure 4. Ecosystem Services of the Urban Forest
(Livesley *et al.* 2016, used with permission)

Challenges

Drivers of Change

In the future, three related trends appear likely to affect our natural environment and the services that it provides:

- Population growth;
- Intensification;
- Increased demand for land.

Ottawa is already dealing with these trends. In 2019, Ottawa will reach a population of more than 1 million. Beyond 2036 contemplates a population between 2 million and 3 million by end of the century. The City has ambitious goals for urban intensification, which it is exceeding. Beyond 2036 makes it clear that the economic and environmental sustainability of the city depends further intensification. Even so, given Provincial requirements for land supply, it seems possible that future expansion of the urban boundary will be necessary to accommodate projected growth.

On top of these trends, climate change will bring its own changes and challenges:

- Milder winters and drier summers;
- More extreme weather patterns and events;

- Increased introduction and establishment of invasive species and pests;
- Increased introduction and establishment of vector-borne diseases (e.g. Lyme disease, Zika).

Ottawa already feels the effects of these changes, from increased cost of road maintenance due to more frequent winter freeze and thaw cycles, to the establishment of black-legged ticks and Lyme disease as an endemic health risk.

The challenges to the natural environment include:

- Increases in the extent and intensity of use of natural areas;
- Increasing tensions between conflicting uses and users (e.g. dog walkers and mountain bikers);
- The recent, substantial decline in urban canopy cover due to emerald ash borer, natural losses of older trees, extreme weather events, and development;
- A general failure to plan for and to provide adequate space for the planting and survival of new urban trees;
- Pressures on urban greenspace (i.e. proposed conversion of golf courses, requests for reduced watercourse setbacks, applications for rezoning of open space and leisure lands);
- Pressure for urban expansion and pre-emptive clearing of peri-urban natural features;
- Pressure for expansion of some rural villages;
- Clearing of watercourse buffers, woodlots, and marginal lands for agricultural use;
- Pressure for expansion of aggregate operations (quarries and pits) into natural features;
- Pressure for residential, commercial, and industrial development on rural lands.

Ottawa's response to all of these challenges will depend greatly on differing perceptions and beliefs regarding physical space – its availability and its priorities for use.

Growth, Intensification, and the Urban Boundary

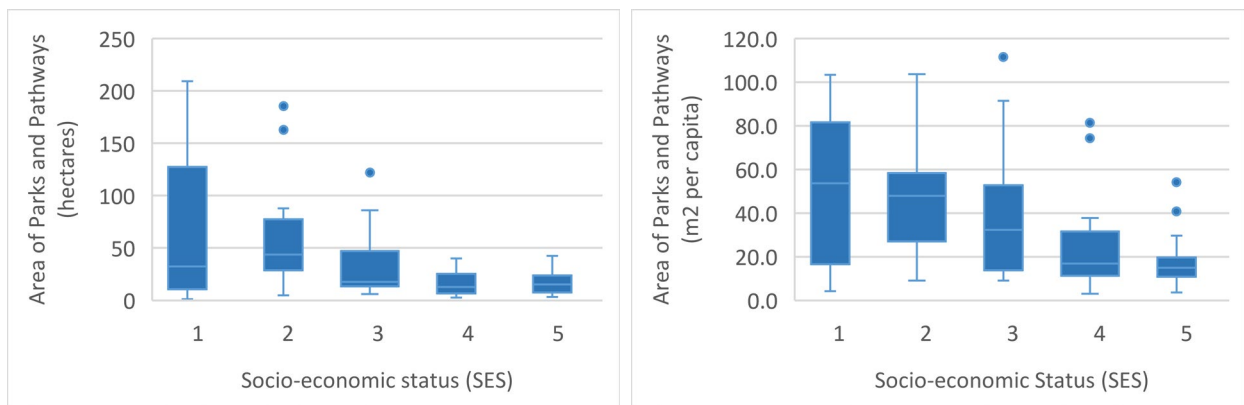
The relationship between intensification and urban expansion creates challenges for Ottawa's natural environment. The Province of Ontario requires that municipalities maintain a 20-year supply of developable land. The amount of land required depends upon population growth and the density of urban development. For the natural environment, the result is a trade-off: as currently practiced, intensification reduces the pressure for urban expansion, but puts greater pressure on urban greenspace and may reduce space for urban trees. The City continues to balance these competing interests through its tree by-laws, municipal tree planting program and development review process.

There are added controls on urban expansion to help safeguard the natural environment. For example, the Province prohibits development in provincially significant wetlands and floodplains. The Official Plan prohibits development in designated Natural Environment Areas. In many areas, organic or Leda clay soils make development impractical or even dangerous. Finally, the Province states that Agricultural Resource Areas (*i.e.* the City’s best farmlands) may only be considered for urban development once all alternatives have been exhausted.

A survey of Ottawa’s peri-urban landscape shows that much of the area falls into one or more of these development restrictions. Much of the remaining land consists of forests on shallow bedrock or abandoned and regenerating old fields. Even though these lands may provide core natural areas or natural landscape linkages, Provincial land use priorities and policies are flexible in instances where urban expansion is contemplated.

Building Communities for Everyone

As pressures increase on Ottawa’s urban greenspace and tree canopy, the City should take care to ensure that existing inequities in access and benefits do not increase. The Healthy Ottawa discussion paper documents the importance of “exposure to nature” for physical and mental well-being, especially among children and youth. However, as that discussion paper points out, “access to urban trees and forests is not always equal among different income groups.” In Ottawa, for example, data from the Ottawa Neighbourhood Study shows that people living in socio-economically disadvantaged, urban neighbourhoods (SES quintiles 4 and 5) tend to have substantially lower access to parks and pathways, especially in *per capita* terms (Figures 4 and 5).



Box and whisker plots. The lines shows the medians. The upper and lower ends of the boxes show the upper and lower quartiles. The whiskers show the highest and lowest values. Points show outliers.

Figures 4 and 5. The Relationship between Neighbourhood Socio-economic Status and Access to Parks and Pathways in the Urban Area

The reasons for the disparity are complex and difficult to disentangle. Density certainly plays a role, with more dense neighbourhoods tending to have higher levels of poverty, less greenspace, and greater intensity of use. However, exceptions exist at both the high and low ends of the socio-economic scale, often due to the influence of large urban natural areas. The challenge, moving forward, is to ensure that disparities in access to urban greenspace do not grow. This may require a reassessment of how we look at greenspace.

Moving Forward

As Ottawa develops its 2022 Official Plan, a more sophisticated approach would be to consider the natural environment within the gradients of land uses and forms: from rural to urban core; from untouched to built. How should our policies reflect the changes in ecosystem services provided by the natural environment along those gradients? How should they allow for the evolution of land uses, as the City intensifies and grows? Throughout, they must promote resiliency and adaptability in the face of future economic, social, environmental, and political uncertainty.

Work on much of this policy framework has already begun. Examples include:

- The Urban Forest Management Plan
- The National Capital Region Urban Canopy Project (a partnership between the City of Ottawa, the National Capital Commission, and the City of Gatineau);
- New Official Plan policies for significant woodlands;
- An updated Park Development Manual.

These initiatives build upon past work to identify and protect the City's natural heritage, both in the rural and urban areas of the City. As required by the Provincial Policy Statement, Ottawa's Official Plan and its schedules identify a network of urban natural features, greenbelt lands, rural natural environment areas, significant wetlands, significant woodlands, significant valleylands, habitats, and other natural features. Depending upon the type of feature, jurisdiction, and landscape context, these have a range of protections varying from outright prohibition on development and alteration to simple consideration for the feature's ecological functions.

The Province requires municipalities to take a "systems" approach to natural heritage planning and protection, encompassing the water environment system. Ottawa has already undertaken analyses in support of this change through a Natural Landscape Linkage Study (in support of OPA 150) and through a collaboration with its conservation partners on the Ottawa Conservation and Stewardship Vision. The latter initiative mapped areas of common conservation and stewardship interest, reflecting the overlapping priorities of partners such as the National Capital Commission, the Conservation Authorities, the Nature Conservancy of Canada, and Ducks Unlimited Canada (Figure 6). Many of these organizations have already used the mapping to target and to collaborate on the purchase of environmental lands from willing sellers, conservation of public land, and voluntary land stewardship.

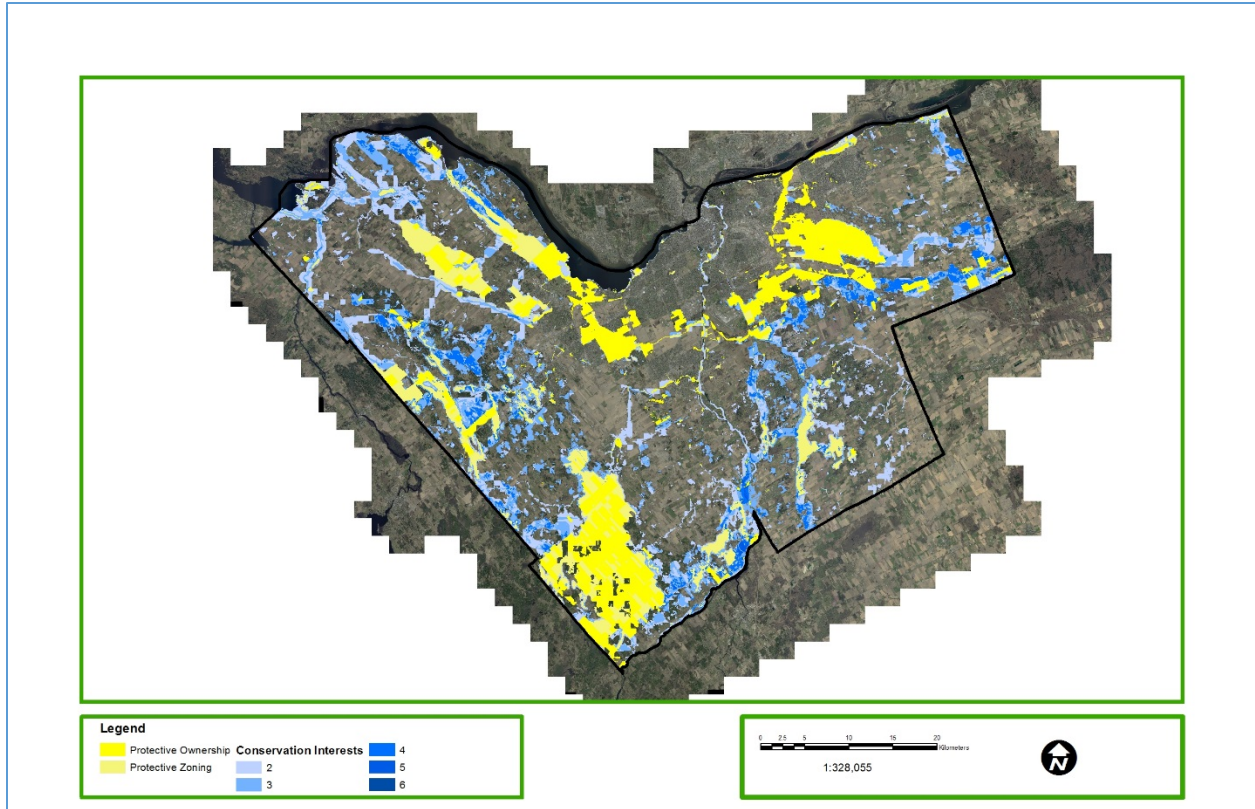


Figure 6. Ottawa Conservation and Stewardship Vision Showing Existing Land Protections

Some new work will be required to support of the new Official Plan. The Province now requires municipalities to prepare a Park Plan. Ottawa already has such a plan in the form of the highly successful Urban Greenspace Master Plan. This 2006 document needs an update to reflect the growth of the City over the past decade and the progress made in the Urban Natural Features Strategy. Just as important, it should consider how the City’s urban greenspaces, including its urban natural features, can accommodate the increases and changes in use that will come with a larger and more dense urban population.

As pressures on urban greenspaces increase, we will need to reconsider their accessibility and management. For example, the City has taken a hands-off approach to the management of many urban natural features, preferring to leave them as “natural” as possible. Many urban woodlots, like the Chapman Mills East forest, have no formal pathways or amenities, despite regular public use. In most cases, the surrounding communities create their own *ad hoc* trail networks. These trails tend to widen and multiply with time, creating a greater environmental footprint and impact than would a managed trail system. They may create environmental and physical hazards to users. Careful design and management, on the other hand, can increase the accessibility of these areas to all users, expand the range of uses, increase public safety, and make the experience more enjoyable – while better protecting the natural values of the area.

We should also reconsider what “nature” means in a dense urban environment. An urban, community park, such as the Ottawa East Children’s Garden bears little or no resemblance to an intact forest, grassland, or wetland. But it can provide adults and children with an opportunity to experience the growing, natural world, to touch the earth, and to plant and harvest food. A single green roof or treed courtyard will not contribute greatly to biodiversity, but can provide a cool, restful spot on a hot day to listen to a bright chorus of house sparrows, or a sunny, sheltered refuge on a windy, winter day. It can capture and hold rainfall that might otherwise run straight into stormwater sewers. A ribbon of green roofs and courtyards, linked by tree-shaded sidewalks and connected to a larger network of pathways and public transit, won’t bring necessarily bring wildlife into the city, but will encourage people to leave their cars, to walk, and to linger at shops and cafes.

The relationship between mobility and urban greenspace has several dimensions. The City’s green corridors already provide much of the backbone of Ottawa’s pedestrian and cycling network. Many of the new and planned LRT stations, such as the Bayview and Hurdman stations, will benefit from these linkages. Consideration should also be given to the greening of local, street connections in developing or redeveloping areas such as Tunney’s Pasture, to improve their quality and appearance and to encourage LRT ridership. The LRT could also be crucial for providing greater access to the City’s larger urban natural features, especially for people in disadvantaged neighbourhoods. Phase 1 of Light Rail will make the NCC’s future Ottawa River Park, Dow’s Lake, and the Rideau River much more accessible to people reliant upon public transit. Phase 2 of Light Rail will open up the eastern, western, and southern Greenbelt lands. The potential synergy between Light Rail and access to nature should be further explored as both the transit system and the urban greenspace network develop.

Annex 1: Representation of Beyond 2036 Themes

Economic Development	Social – Cultural and Quality of Life	Environment	Urban Form and Mobility
<ul style="list-style-type: none"> • City image and identity. • Access to greenspace for the attraction of talent and capital in a mobile, knowledge-based economy • Tourism, including eco-tourism and agri-tourism. • Recreational activities – revenue generating (e.g. skiing, snowmobiling, fishing). • Rural and village character. • Support for agriculture (habitat for pollinators, pest control). • Source water protection. • Flood control and natural hazard mitigation (e.g. landslide prevention). • Reduced energy use and costs. • Protection of infrastructure. 	<ul style="list-style-type: none"> • Community and neighbourhood identity (e.g. aesthetics, sense of place and history). • Connection to Indigenous history, culture, values. • Physical, mental, and psychological development in children and youth (e.g. play, physical activity, contact with nature). • Physical, mental, and psychological maintenance in seniors. • Reduction in environmental stressors. • Recreational activities – personal or organized. • Space for community gatherings, events, celebrations. • Space for cultural events, art, festivals. • Space for urban agriculture. • Winter activities. 	<ul style="list-style-type: none"> • Maintenance of biodiversity and essential ecological processes. • Mitigation of the urban heat island effect. • Provision of shade. • Provision of shelter from winter weather. • Maintenance of air quality (removal of contaminants). • Reduction in stormwater volumes and contamination (interception and infiltration). 	<ul style="list-style-type: none"> • Aesthetics. • Street trees: street character and the street – building interface. • Public space and place-making. • Animation of public space in winter. • Accommodation of active transportation – commuting (walking cycling).