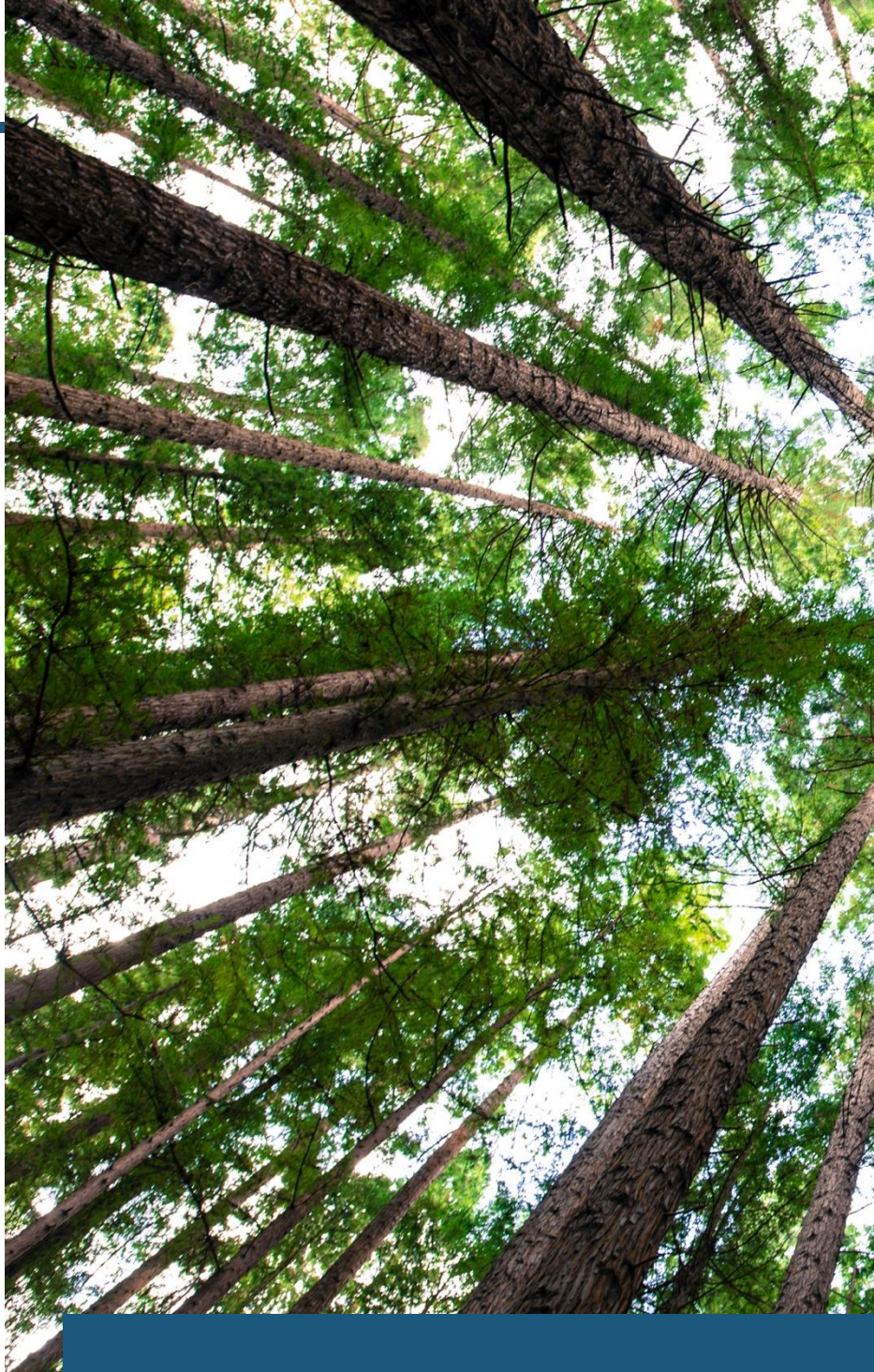

NATURE-BASED SOLUTIONS TO CLIMATE CHANGE IN THE CITY OF OTTAWA

A Report to Ecovision



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Introduction

As the City of Ottawa faces escalating climate change challenges, incorporating innovative and sustainable approaches to urban planning and development is crucial. Approaches based on natural processes and ecosystems (nature-based solutions or “NBS”) are often cost-effective in mitigating greenhouse gas emissions and enhancing resilience to climate change impacts, as well as conserving and restoring biodiversity and improving urban residents’ quality of life.

This report by Laura Casciaro for Ecovision www.ecovision-law.ca reviews the City of Ottawa’s actions to integrate nature-based solutions into the City’s climate strategy. This report analyzes whether the City of Ottawa’s by-laws, policies, and programs support or impede the implementation of nature-based solutions to climate change. The review was conducted for by-laws found on the City of Ottawa website and policies and programs published in the Climate Change Master Plan, Urban Forest Management Plan, Rain Ready Ottawa, proposed High Performance Development Standards, and other City documents.

These by-laws, policies, and programs were examined in order to assess the City’s approach to implementing nature-based solutions as a part of its strategy to mitigate and adapt to climate change. Specifically, the report investigates six NBS topics identified by the Citizen Climate Counsel (C3). These topics include green roofs; lawns; pollinator gardens; surface permeability; tree cover; and water.

The objective is to identify how by-laws, policies, and programs related to these six topics contribute to or impede the adoption of nature-based solutions to climate change. In the following sections of this report, each of the six topics is examined in turn, considering the challenges and benefits of each in the context of the City of Ottawa, followed by a recommendation as to how the City of Ottawa can better integrate nature-based solutions in its strategy.

Green Roofs

Summary

The City of Ottawa does not have a by-law or policy about green roofs in place. Ottawa City Council has delayed implementing the High-Performance Development Standard (HPDS) because the City is waiting for the province to sign off on its new Official Plan, particularly to see how the *More Homes for Everyone Act* and *More Homes Built Faster Act* will affect policy.

Challenges

Without any by-law or policy on green roofs, developers and property owners lack guidance for green roofs in new developments or existing properties.

Benefits

The City of Ottawa should encourage green roof construction because of the benefits they provide to urban environments. Green roofs provide vegetation to absorb carbon dioxide, helping the City mitigate and adapt to climate change. Economic benefits of green roofs include reduced energy costs from reducing building summer temperatures and shielding roofs from the effects of extreme temperatures and damage. Public health benefits of green roofs include improving air quality by removing pollutants and offering a location for urban agriculture to increase local food production.

Recommendation

Ottawa City Council should approve the HPDS. Buildings are one of the largest GHG emission sources, accounting for 45% of the City's total community emissions in 2018. The HPDS has voluntary and required standards that would raise the performance of new building projects to achieve sustainable and resilient design such as the HPDS's metric 1.8 sustainable roofing strategy.

By-laws from Other Municipalities

In 2009, Toronto was the first North American municipality to adopt a by-law governing green roof construction. Toronto's Green Roof By-law requires and governs green roofs on new developments, ranging from 20-60% of a building's available roof space. The Eco-Roof Incentive Program offers \$100/m² for green roof projects, \$2-5/m² for cool roof projects and a Structural Assessment Grant providing up to \$1000 (to offset green roof construction suitability assessments that applicants may be eligible for). From 2010-2017, approximately 420 green roof permits were issued, totaling 450,000 square meters of green roof space. The Eco-Roof Incentive Program has supported 336 projects since 2009.

Lawns

Summary

The City of Ottawa by-laws *Property Maintenance* (No. 2005-208), *Property Standards* (No. 2013-416) and *Use and Care of Roads* (No. 2003-498) impair the implementation of nature-based solutions relating to lawns, such as naturalization.

Challenges

The current by-laws discourage private residents from taking individual action, such as growing a naturalized lawn, and prohibit planting anything but grass on the right of ways (ROWs). The following is a list of sections of by-laws that are challenges to implementing NBS.

1. Property Maintenance (By-law No. 2005-208):
 - a. S. 3(2) *clear the lands of such heavy undergrowth, long grass or weeds so as to be consistent with the surrounding environment*
 - b. S. 7(1) *the City may cause the work to be done and the cost of the work shall be at the expense of the owner*
2. Property Standards (By-law No. 2013-416)
 - a. S. 6(3) *heavy undergrowth shall be eliminated from the yard to be consistent with the surrounding environment*
 - b. S. 6(6) *lawns shall be kept trimmed and not be overgrown or in an unsightly condition out of character with the surrounding environment*
 - c. S. 6(13) *accumulations of material, wood, debris or other objects that create an unsafe or unsightly condition, deleterious to the neighbouring environment, shall be removed*
3. Use and Care of Roads (By-law No. 2003-498)
 - a. S. 3(2) *no owner or occupier of land shall allow any part of a tree, shrub, sapling, hedge or any other plant to extend over or upon any highway, so as to interfere with, impede or endanger persons using the highway*
 - b. S. 3(4) *no person shall break, dig up, destroy, or damage the sod or grass of a boulevard, or a fence, or railing erected and maintained for the protection of the boulevard*

Benefits

Naturalized lawns should be encouraged by the City of Ottawa because they provide diverse ecosystems that benefit biodiversity. Lawns are monoculture ecosystems that do not often support native biodiversity, and they require chemical fertilizers and pesticides for maintenance. Replacing grass with diverse native plant species reduces water and fertilizer usage, requires less maintenance in comparison to grass lawns and supports native pollinator species. Further, residents can

incorporate edible plants, which reduces food miles. As residents are beginning to transition away from full grass lawns, the City of Ottawa should encourage outdoor spaces that support biodiversity.

The City of Ottawa has recently revisited the *Use and Care of Roads* (By-law No. 2003-498) and approved most planting in ROWs. Previously, the legislation prohibited residents from planting anything but grass in ROWs. This by-law revision is a positive step toward supporting individual and community action to implement NBS. We recommend that the City review this by-law annually, especially in relation to the current prohibition on food planting and planter boxes.

Recommendation

The City of Ottawa should review language used in the Property Maintenance and *Use and Care of Roads* by-laws to ensure the by-laws are better aligned with the priorities of the Climate Change Master Plan. Encouraging private action is one of the eight priority areas for 2020-25 identified in the Climate Change Master Plan. Yet, some phrases in these by-laws discourage residents from taking private action by impairing their ability to have naturalized front lawns. For instance, the wording “consistent with the surrounding environment” used in *Property Maintenance* By-law No. 2013-416 S. 6(3) may pose a problem to residents with naturalized lawns. Additionally, news reports have identified some residents who received by-law violation notices from Ottawa by-law officers for their naturalized front lawns. The City should review these by-laws to ensure the language assures private individuals that naturalizing their lawns aligns with Climate Change Master Plan priorities and supports nature-based solutions.

Policies from Other Municipalities

Various municipalities across Ontario allow residents to naturalize their front lawns and gardens on their front ROWs, including adding native and edible plant species. Toronto and Guelph allow soft landscaping on boulevard gardens. Mississauga’s Blooming Boulevards program provides residents with permits to plant gardens on their front ROWs.

Pollinator Gardens

Summary

Policies in the Official Plan discuss preserving Ottawa’s natural heritage system and greenspaces that provide habitats for pollinators, and they promote using native plant species in landscaping to support pollinators and biodiversity. The Park Development Manual targets naturalization in new parks, and maintenance quality standards for roads, sidewalks, parks, and fields recognize maintaining some areas as naturalized. In June 2019, Ottawa City Hall established a small pollinator garden and declared June 7 as the first annual Pollinator Appreciation Day. The City offers information about pollinator gardens, points to related resources from other organizations and provides guidance on making your own pollinator gardens and bee hotels. Several pollinator gardens have been established on City-owned land by community groups, with support from ward Councilors or municipal grants (Community Environmental Projects Grant Program).

Challenges

The City of Ottawa does not actively support or encourage individual residents and community groups to have pollinator gardens on their properties.

Benefits

Pollinator gardens support and protect important pollinator species by providing food and habitat. Pollinators have a positive impact on both nature and the economy. In terms of nature, pollinators maintain biodiversity, support plant reproduction, and provide ecological services. Pollinators play an essential role in our economy by pollinating crops that humans consume and trade. For instance, scientists estimate the production of around 35% of global food crops depend on animal pollinators.

Recommendation

The City should better support pollinator gardens by providing residents with resources in addition to general information. For instance, Minnesota pays residents to grow bee-friendly lawns. The state budgeted \$900,000 over one year to help homeowners cover the cost of converting traditional lawns by planting wildflowers, clover, and native grasses to help replenish food sources for pollinators.

Pledges from Other Municipalities

Bee City is a movement supporting pollinators. Participants commit to creating, maintaining and/or improving pollinator habitats and educating their community about the importance of pollinators. Over 40 Ontario municipalities are currently Bee Cities, including Toronto, Mississauga, Brampton, Guelph, Waterloo, and Hamilton.

Surface Permeability

Summary

Rain Ready Ottawa is a City of Ottawa pilot program supporting and encouraging residents to take action on their property to reduce the harmful impacts of rainwater runoff. This program offers information on home projects, home assessments with custom advice and solutions, and rebates to install practices for managing rainwater. Home projects eligible for rebates include downspout redirection, rain garden installation, soakaway pit installation, permeable pavements and certified landscape design. Additionally, the Ottawa River Action Plan includes 17 projects that enhance the Ottawa River's health and protect Ottawa's water environment. This plan identified stormwater runoff as a key issue affecting the Ottawa River's health.

Challenges

The Rain Ready Ottawa program is not equipped to support enough city residents. Home assessments are fully booked for 2023, so capacity to make this program widely available to residents could be limited.

Benefits

Permeable surfaces are an effective solution to decrease and manage stormwater. Nature-based permeable surfaces include blue and green infrastructure, such as rain gardens, bioswales and natural retention ponds. These nature-based options can deliver benefits such as mitigating risk from heat and drought, better water quality and biodiversity for less cost than machine-made options.

Recommendation

The City should expand the Rain Ready Program to reach more residents. More resources and funding should be delegated to the Rain Ready Program to increase capacity for home assessments. The City could also expand the rebate by making it available to residents outside of the priority stormwater retrofit area.

Programs from Other Municipalities

The Town of Ajax has implemented and monitored rain gardens to achieve water quality protection by mimicking the natural process of infiltration and groundwater recharge. A two-year monitoring program from 2015-17 resulted in significant runoff volume reduction, with one of the gardens removing 100% of total runoff volume from water events up to 20 mm.

Tree Coverage

Summary

The City of Ottawa *Tree Protection* By-law protects trees from being injured or removed without a permit. The by-law ensures protection of trees and provides guidelines for working around trees to avoid root injury. Exceptions include farm practices, power line maintenance, extraction according to provincial regulations and professional surveying. Additionally, the Trees in Trust program provides street trees by request on a first come, first served basis for homes with City-owned street frontages.

Ottawa's Urban Forest Management Plan (UFMP) is a 20-year strategic plan with 26 recommendations to grow Ottawa's urban forest. At the June 20, 2023 Environment and Climate Change Committee meeting, City staff presented an update for the plan's first management period. Projects from this period include:

- Tree by-law review
- Development of a new tree protection by-law
- Baseline canopy cover assessment for Ottawa, which used data collection that will be completed every five years
- Starting the integration of urban forest resources into the City's asset management reporting
- Updated policies and guidance on significant woodland identification and protection
- Development of a forested areas maintenance strategy
- New tree compensation requirements
- Pilot early pruning program for new trees
- Added stewardship and outreach coordinator role within the Forest Management branch

Staff reported that several projects for this period were not started. The challenges they experienced working on implementing the UFMP included insufficient staffing capacity to fulfill the work plan and extreme weather events that delayed regular work.

Challenges

The tree by-law and UFMP are insufficient in protecting and increasing the City's tree cover. The *Tree Protection* By-law includes exemptions that permit tree cutting, such as the clear cutting of dozens of hectares of trees in the Tewin suburb by a developer. Insufficient resources and challenges have resulted in setbacks to the UFMP's implementation.

Benefits

Urban forests can help cities adapt to climate change. They bring many benefits, including reducing GHG emissions, cooling and cleaning the air, reducing flooding, and supporting biodiversity. Trees are

also a valuable resource for improving public health; benefits have been seen in terms of both physical and mental health. Trees can reduce harmful pollutants and particulate matter levels, increase immune system functioning, decrease stress levels, and promote physical activity.

Recommendation

Exceptions to the *Tree Protection* By-law were first put to the test and failed in a recent issue involving Taggart Group. The developers clear cut around 70 hectares of trees in the future Ottawa suburb of Tewin. Taggart Group was exempted from clear cutting these trees without a permit, claiming the trees were removed in preparation for farming in this rural area. Exemptions should be revised or clarified to improve how the tree protection by-law can support nature-based solutions.

For the UFMP, City Council should increase resources delegated to implement the plan. City Council should support staff requests to hire additional staff to assist with implementation of the UFMP. Staff mentioned that increased public interest was a good thing, but this was a challenge because of the additional pressure to implement the UFMP. Additional staff would increase the City's capacity to implement projects in the second management period, and it would reduce the need to scale back on projects initiated and completed as a result of insufficient resources. Further, the Trees in Trust program for 2023 was full by the beginning of June. This is another program that requires more staff and funding resources. Overall, both the tree by-law and UFMP should encourage the protection of existing trees and planting of new trees to achieve the 40% canopy cover goal. City Council should expand incentives and support initiatives to increase tree canopy coverage across Ottawa.

By-laws from Other Municipalities

The City of Coquitlam has a *Tree Management* By-law that preserves trees, regulates cutting and removal of protected trees, and ensures the replacement of trees that are cut down. This by-law applies to all private properties, and it requires property owners to apply for a tree cutting permit before cutting down or damaging a tree. The District of Saanich has a *Tree Preservation* By-law that prohibits removing protected trees, significant trees, any tree with an Environmental Development Permit Area (EDPA) or Streamside Development Permit Area (DPA), nesting trees or any tree with a diameter of over 60 centimeters. It also prohibits any damage to trees without a permit.

Water

Summary

The Ottawa River Action Plan includes 17 projects to enhance the health of the Ottawa River and protect Ottawa's water environment. Currently, 10 out of 17 projects are complete, and 7 out of 17 projects are ongoing. Projects include upgrading sewer flow, monitoring programs and management plans to reduce flooding impacts. The cost of the Ottawa River Action Plan is estimated at \$231.1 million, of which \$62.09 million is covered by the federal government and \$62.09 million by the Province of Ontario. The City of Ottawa is responsible for all remaining costs.

Conservation authorities and municipalities are mandated by the province to regulate development in and around waterways. Ontario provides extensive flood mapping through its conservation authorities and their flood management mandates. The Rideau Valley Conservation Authority (RCVA) has floodplain mapping of over 1000 km of waterways in its watershed. Parks Canada is responsible for managing water levels on the Rideau Canal. Ontario conservation authorities have been prioritizing flood management.

Challenges

The Ottawa River Action Plan is mainly focused on using engineered solutions to protect the City's water environment. Nature-based solutions for water health protection and flood mitigation are not incorporated into the Ottawa River Action Plan.

Benefits

Nature-based solutions for water protection and flood mitigation can enhance water availability, improve water quality, and reduce risks associated with water-related disasters and climate change. NBS for water management can replace or work with grey infrastructure to provide value, benefits and efficiency. The solutions are one of the most cost-effective ways to protect against flooding.

Recommendation

The City of Ottawa should implement NBS for flood management. Nature-based solutions are often more economical than engineered solutions and are a more sustainable way forward. By adopting NBS, Ottawa can reduce its climate risks and reduce the need for engineered assets that have higher acquisition, maintenance, and replacement costs.

Policies from Other Municipalities

The City of Oakville in Ontario saved between \$1.24-1.44 million by preserving a 240-meter grass boulevard and stormwater ditch, instead of replacing it with pavement and stormwater pipes. Preserving this natural boulevard and stormwater ditch costs the city little to maintain, and it never needs replacement. Similarly, Ottawa's ditches, boulevards, bicycle paths and sidewalks could be designed to function as permeable stormwater catchments, which could result in significant savings in stormwater management.

The district of Sparwood in British Columbia saves significant flood management costs by using a natural pond at the outlet of a main culvert to capture 94% of the sediment. The same service from an engineered alternative would cost \$248,000 in capital and maintenance over 25 years.

The Grindstone Creek in the Greater Toronto and Hamilton area provides significant flood protection. The creek drains a watershed area of 91 km², providing a cost-effective method to address local flood-risk and water contamination. The estimated value is equivalent to over \$2 billion in engineered infrastructure replacements, not including operational costs.

The City should consider the flood benefits to Ottawa from the management of natural shorelines and wetlands of our two big rivers (the Ottawa and Rideau), plus the numerous creeks and rivers within our boundaries.

Conclusions and Summary of Recommendations

Conclusions

This report highlights the significance of using nature-based solutions (NBS) to combat climate change. It outlines how the City of Ottawa can integrate NBS to increase resiliency and mitigate climate change impacts. Each of the six areas (green roofs, lawns, pollinator gardens, surface permeability, tree coverage, and water) provide unique opportunities and benefits that the City should consider. For green roofs, we strongly recommend the approval of the HPDS and encourage green roof construction on new and existing buildings. We outlined various by-laws relating to lawns that the City should review to increase biodiversity and support pollinator species. Pollinator gardens also need greater support from the City for residents and community groups taking on these initiatives. Surface permeability is well-addressed through the Rain Ready program, but it should be expanded to accommodate more residents. To improve tree coverage, increased resources are needed to implement the UFMP and to review the Tree Protection By-law. Lastly, Ottawa should increase integration of NBS for flood mitigation and to improve water quality, which will also result in cost savings.

By adopting NBS, the City of Ottawa has a significant opportunity to enhance its strategy and Climate Change Master Plan and become more resilient for the benefit of its residents. The recommendations in this report are drawn from an analysis of existing by-laws, policies, and programs from other municipalities in these areas, which provide the City with directions to integrate NBS. The City of Ottawa can become a leader in climate action by integrating NBS within the Official Plan.

Summary of Recommendations

Green Roofs - Ottawa City Council should approve the High Performance Development Standard (HPDS). Buildings are one of the largest GHG emission sources, accounting for 45% of the City's total community emissions in 2018. The HPDS has voluntary and required standards that would raise the performance of new building projects to achieve sustainable and resilient design such as the policy's metric 1.8 sustainable roofing strategy.

Lawns - The City of Ottawa should review language used in the *Property Maintenance and Use and Care of Roads* by-laws to ensure the by-laws are better aligned with the priorities of the Climate Change Master Plan. The City should review these by-laws to ensure the language assures private individuals that naturalizing their lawns aligns with Climate Change Master Plan priorities and supports nature-based climate solutions.

Pollinator Gardens - The City should better support pollinator gardens by providing residents with resources in addition to general information. For instance, Minnesota pays residents to grow bee-friendly lawns. The state budgeted \$900,000 over one year to help homeowners cover the cost of converting traditional lawns by planting wildflowers, clover, and native grasses to help replenish food sources for pollinators.

Surface Permeability - The City should expand the Rain Ready Program to reach more residents. More resources and funding should be delegated to the Rain Ready Program to increase capacity for home assessments. The City could also expand the rebate by making it available to residents outside of the priority stormwater retrofit area.

Tree Coverage - Exemptions to the *Tree Protection* By-law should be revised or clarified to improve how the by-law can support nature-based solutions. City Council should increase resources delegated to implement the Urban Forest Management Plan (UFMP). City Council also should support staff requests to hire additional staff to assist with implementation of the UFMP. The Trees in Trust program also requires more staff and funding resources. Overall, both the *Tree Protection* By-law and UFMP should encourage the protection of existing trees and planting of new trees to achieve the 40% canopy cover goal. City Council should expand incentives and support initiatives to increase tree canopy coverage across Ottawa.

Water - The City of Ottawa should implement NBS for flood management. Nature-based solutions are often more economical than engineered solutions and are a more sustainable way forward. By adopting NBS, Ottawa can reduce its climate risks and reduce the need for engineered assets that have higher acquisition, maintenance, and replacement costs.

About this Report

This report represents one starting point for a broader review of nature-based solutions at the municipal level and does not claim to be comprehensive in its analysis. Indeed, it is likely that other barriers and opportunities to adoption of nature-based solutions by the City were not researched given the time available. Research was commenced in April 2023 and concluded in August 2023. Note as well that the report focuses on measures that the City should take to support nature-based solutions that home and property owners can carry out. The report does not address how the City should apply nature-based solutions in the six topics to City assets, lands, and operations; clearly the benefits in terms of reduced emissions and greater resilience would be significant here as well.

This report was prepared in partial fulfillment of Laura's course obligations towards her J.D. degree at the University of Ottawa Faculty of Law. Laura was supervised in her work by Stephen Hazell, a retired Ontario lawyer and former adjunct professor at the Faculty of Law.

The insights provided by Citizen Climate Counsel (C3) are gratefully acknowledged. C3 is a group of concerned Ottawa residents that published 2022 Climate Progress Account: City of Ottawa Actions to the End of 2021 in December 2022 <https://cafesottawa.ca/citizen-climate-council-climate-progress-account-report>.

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