



Guiding Urban Forestry Policy into the Next Decade: A Private Tree Protection & Management Practice Guide

Kaitlin Webber, Melissa Le Geyt, Theresa O'Neill, Vignesh Murugesan

July 2020

Contents

Introduction	2
Provincial & Territorial Approaches to Tree Protection & Management	3
Private Tree Protection & Management in Ontario	5
1. Environmental Scan	6
2. Provincial Policy & Legislation Overview	9
3. Municipal Policy Scan	11
4. Review of Best Practices	21
Recommendations	28
References	34
Appendices	
A. Background Research	
B. Review of Best Practices	

Kaitlin Webber, Melissa Le Geyt, Theresa O’Neill and Vignesh Murugesan are all Master’s students in the School of Planning at the University of Waterloo.

This Practice Guide was adapted from a project conducted in PLAN 721: Advanced Planning Project Studio at the University of Waterloo. The original project, “Tree Protection & Tree Management: A Best Practices and Legislative Review” was prepared for the Community, Recreation and Culture Services department at the City of St. Catharines, Ontario.



Kaitlin Webber
kaitlin.webber@uwaterloo.ca



Melissa Le Geyt
mjlegeyt@uwaterloo.ca



Theresa O’Neill
theresa.oneill@uwaterloo.ca



Vignesh Murugesan
vignesh.murugesan@uwaterloo.ca

Acknowledgements

The project team would like to express gratitude to the following individuals and organizations who contributed to the success of the project:

- Bob Lehman, Dana Anderson, and Nancy Adler - the PLAN 721 course instructors at the University of Waterloo - for their support, advice, and planning-related humour. An extended thanks to Bob for supporting us beyond the scope of the course project and helping to create this Practice Guide.

- Municipal staff members from the surveyed Ontario municipalities for their considerations, and helpful contributions through the interview process, including:
 - The Town of Ajax
 - The City of Barrie
 - The City of Cambridge
 - The City of Guelph
 - The City of Mississauga
 - The City of Niagara Falls
 - The Town of Oakville
 - The City of Oshawa
 - The City of St. Catharines
 - The City of Thunder Bay
 - The City of Toronto
 - The City of Waterloo
 - The City of Windsor

- Staff members from the following provinces, territories, and municipalities, who allowed us to expand the scope of our project:
 - Calgary, Alberta
 - Prince Edward Island
 - St. John's, Newfoundland & Labrador
 - View Royal, British Columbia
 - Winnipeg, Manitoba



Image: City of Vancouver

Using This Guide

This Guide aims to provide planners and policymakers with an improved understanding of the legislative framework and current approaches to private tree protection and management in Ontario. It also highlights effective tools for protecting, managing, and increasing tree canopy coverage on private land. It is informed by interviews with municipal practitioners, and a review of policy documents and academic articles that pertain to municipalities in Ontario. However, findings and recommendations are applicable to municipalities across the country due to their shared responsibilities and challenges of protecting urban trees.

The Guide begins by providing an overview of the current state of Canada's tree canopy, and current approaches to tree protection and management in major cities across the country. Next, the remainder of this Guide uses Ontario as a case study to examine the effectiveness of current tree protection and management strategies, accomplished through the following tasks:

- 1. Environmental Scan:** State of Urban Forestry Literature
- 2. Provincial Policy & Legislation Overview:** Relevant Policy Framework in Ontario
- 3. Municipal Policy Scan:** Key Themes and Unique Policies
- 4. Review of Best Practices:** Municipal Staff Survey

Key findings from these tasks have been summarized and used to develop recommendations for planners and policymakers who are working to meet and exceed canopy goals in municipalities across the country.

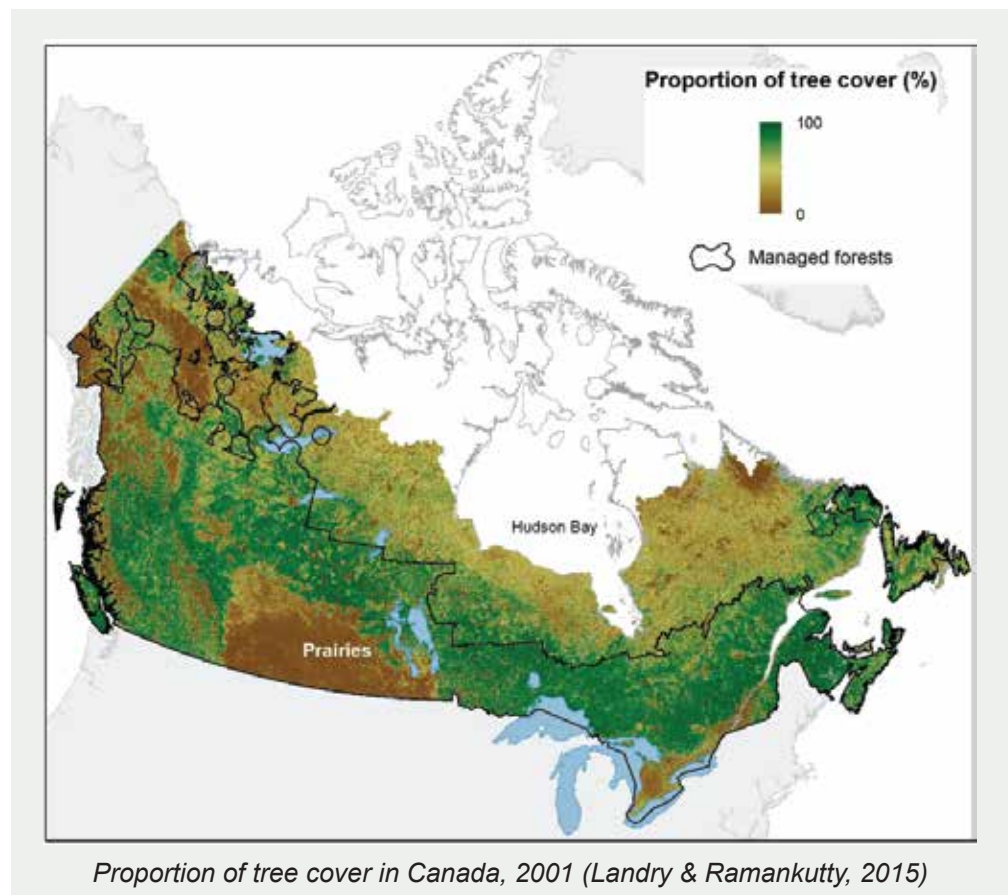


Introduction

Trees are well understood to have significant value, from the ecosystem services they provide, to their role in establishing healthy communities. In an urban context, individual trees and forested areas improve ground water quality, reduce soil erosion, contribute to stormwater management by reducing and storing run-off, help to mitigate urban heat islands, and provide flora and fauna habitat. Additionally, trees in urban areas can reduce risk factors to health, such as high blood pressure and chronic stress (Ulrich et al, 1990), and provide space for local communities. These health benefits have the capacity to extend across the country, as more than 80% of Canadians live in urban areas (Statistics Canada, 2011).

Between 1991 and 2011, urban areas in Canada grew outward by about 6% through the conversion of agricultural and forested lands. Over the same decade, Canada's urban tree canopy decreased by about 1.5%, from about 27.6% in 1990, to 26.1% in 2012 (McGovern & Pasher, 2016). While the national average has decreased, in the Prairies, there has been an increase in tree cover, as treeless landscapes that existed before are being converted into urban areas. Further, tree canopy in urban areas increases as tree cover matures over time (McGovern & Pasher, 2016).

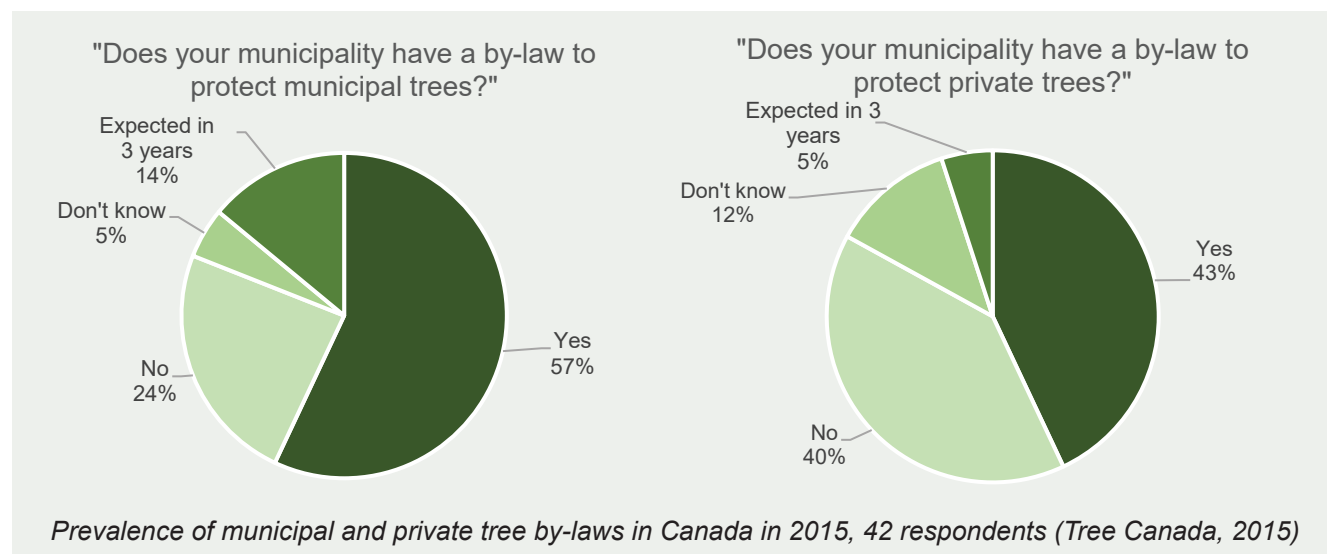
As the owners of trees on city land, municipalities can protect public trees using methods such as by-laws. However, there is an increasing need to also protect trees on private property in order to reach ideal canopy cover and maintain ecological integrity. This is especially important in regions such as Southern Ontario, where a large proportion of trees are located on private property. For example, in the City of Cambridge, 80% of the urban forest



canopy is on private land (City of Cambridge, 2015), and in Toronto, private trees make up 60% of the City's tree canopy (City of Toronto, 2013). To help protect private trees and improve urban tree cover, this Practice Guide provides an overview of different policy and planning approaches taken by municipalities throughout the province of Ontario.

Provincial & Territorial Approaches to Tree Protection and Management: Overview of Policies and Programs

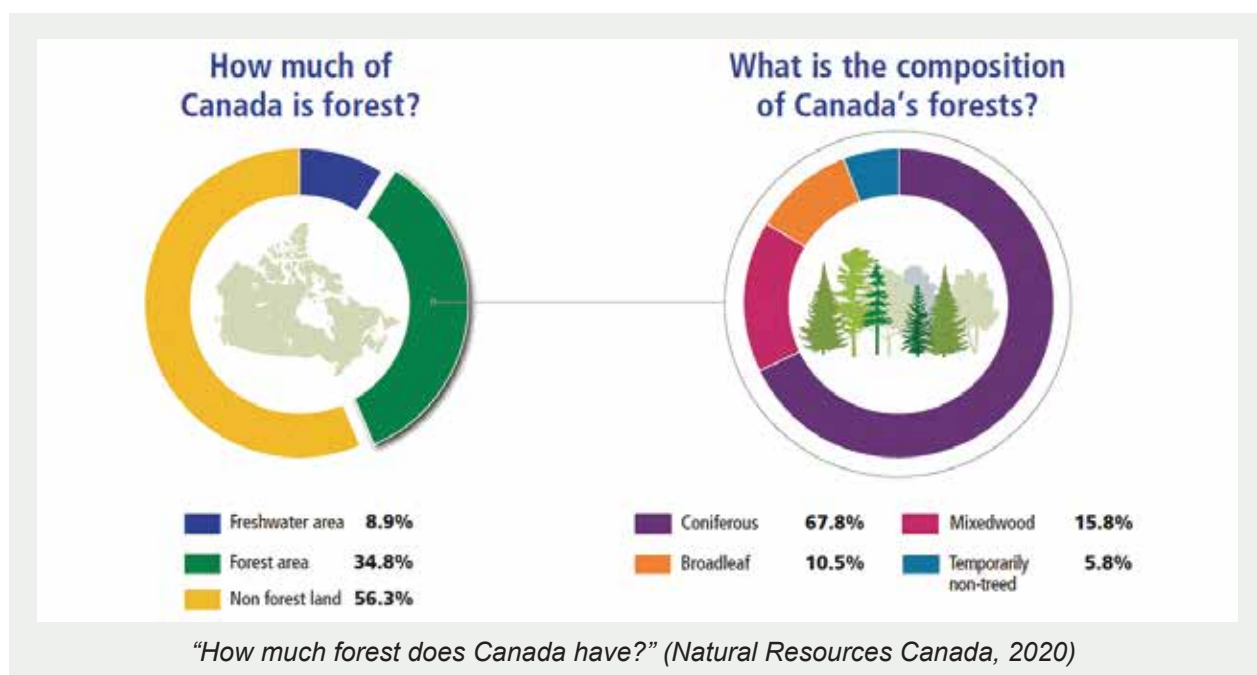
Municipalities across Canada have taken various measures to protect trees in their jurisdiction. These measures vary according to their priorities and circumstances. A survey conducted in 2015 revealed that 57% of the 42 surveyed municipalities accorded the protection of municipality-owned trees to the presence of by-laws. However, only 43% of the municipalities had by-laws that protect private trees (Tree Canada, 2015).



While by-laws are the highest form of protection accorded to urban trees, there are other ways that cities have tried to preserve trees. In this section, we provide an overview of urban tree protection strategies used by various municipalities across Canada, with an exception of cities in Ontario, as this is expanded upon in the case study section of this report. Various provincial legislations like Municipal Government Acts, Local Government Acts, Planning Acts, etc. give municipalities the power to regulate and protect trees within their boundaries. In all Canadian provinces and territories, municipalities have the authority to regulate and protect trees within their boundaries. Some components of each province and territory's tree-related legislation are outlined below.

- **British Columbia:** municipalities must adhere to Regional Growth Strategies when creating Official Community Plans. Vancouver and Victoria have both private and public tree by-laws. The City of Victoria has also "gamified" tree planting by creating a challenge to plant 5000 trees on public and private land. The municipality also has an Urban Forest Master Plan.
- **Alberta:** municipalities must adhere to regional plans when exercising their authority to regulate land use. The City of Calgary has protected public trees through a bylaw. It also protects several trees by designating them as heritage trees. Edmonton has similar provisions and also provides protection to perimeter trees via a Community Standards by-law. However, both Edmonton and Calgary see protection of trees on private property as a challenge.
- **Saskatchewan:** the municipalities of Regina and Saskatoon have provisions such as by-laws to protect public trees, but private trees don't have similar protections.

- **Manitoba:** the City of Winnipeg requires tree preservation reports during any development that impacts trees. The Manitoba Heritage Tree Program legislated under the Forest Health Promotion Act shows some promise of protecting significant trees.
- **Quebec:** Montreal and Quebec City have a permitting process for cutting trees on private and public property, where the permit is issued only when the tree in question is liable to cause damage, is dead, or is afflicted with an incurable disease. Trees are also protected during any new development projects.
- **New Brunswick:** in the City of Fredericton, only public trees are protected by by-laws.
- **Newfoundland & Labrador:** in St. John's, only public trees are accorded protection. However, the City does offer homeowners a voucher that can be used for purchasing trees.
- **Nova Scotia:** Halifax has protected trees on public land by means of a by-law.
- **Prince Edward Island:** Charlottetown has accorded protection to public and heritage trees through a by-law.
- **Northwest Territories:** the City of Yellowknife protects its trees on both public and private lands through different planning processes. The trees on public lands are protected by a by-law whereas trees on private lots are preserved and managed by means of landscaping requirements and the site development process.
- **Yukon:** in Whitehorse, trees on public lands are regulated and preserved by a by-law. Trees on private property are protected and managed by landscape guidelines which apply overlay controls to protect significant trees and landscape character. It also provides guidelines for tree protection during construction.
- **Nunavut:** almost all of the territory lies above the tree line and therefore, no regulations exist to preserve trees in urban areas. However, there are provincial building practices that suggest the preservation of onsite vegetation.





Case Study:
Private Tree Protection
& Management in Ontario

1. Environmental Scan: State of Urban Forestry Literature

This scan identifies and summarizes academic literature on tree protection and management in Ontario. Findings are categorized into three categories, which are summarized below. Detailed findings can be found in Appendix A1.

Tree Management Policies

There is a growing body of literature that compares urban forestry policies across Ontario. From these studies, general findings emerged, including:

- The most common urban forestry policies in Ontario are pest and disease control policies, landscape guidelines, and standards for development. Tree planting and greening strategies are less common.
- Upper-tier municipalities are more likely to have tree by-laws than lower-tier municipalities. This has been attributed to resource constraints and the population threshold required for enacting conservation by-laws.
- A universal standard for urban forestry best practices has not been adopted across Ontario. Some municipalities refer to the International Society of Arboriculture, while others refer to American National Standards Institute.

Urban Forestry Strategies and Management Plans

Urban Forestry Management Plans (UFMPs) are a common tool used to provide strategic direction for dealing with urban forest-related matters. This may include articulating specific programs to be implemented, or for certain actions to occur (e.g. hiring a municipal staff member to oversee conservation efforts). In a study conducted comparing effectiveness of UFMPs, they found that key factors contributing to effective UFMPs include adopting “active adaptive management” (adapting plan to changing conditions) and taking a collaborative approach both internally and externally to ensure a consistent approach to implementation (Douglas, 2016).



Within UFMPs, municipalities approach native and non-native species differently:

- While all municipalities include themes of ecosystem services and ecological integrity in their UFMPs, the importance of native species is only raised when discussing an area's ecological integrity.

- Many municipalities discuss the importance of native species and express a desire to increase the proportion of native species in the urban forest. However, they do not include native-to-non-native target ratios or scenarios when native or non-native species should be used.

When it comes to the choice of tree belonging to either sex, findings from the Canadian Urban Allergy Audit (2012) show a preference for male trees in Canada's urban forests:

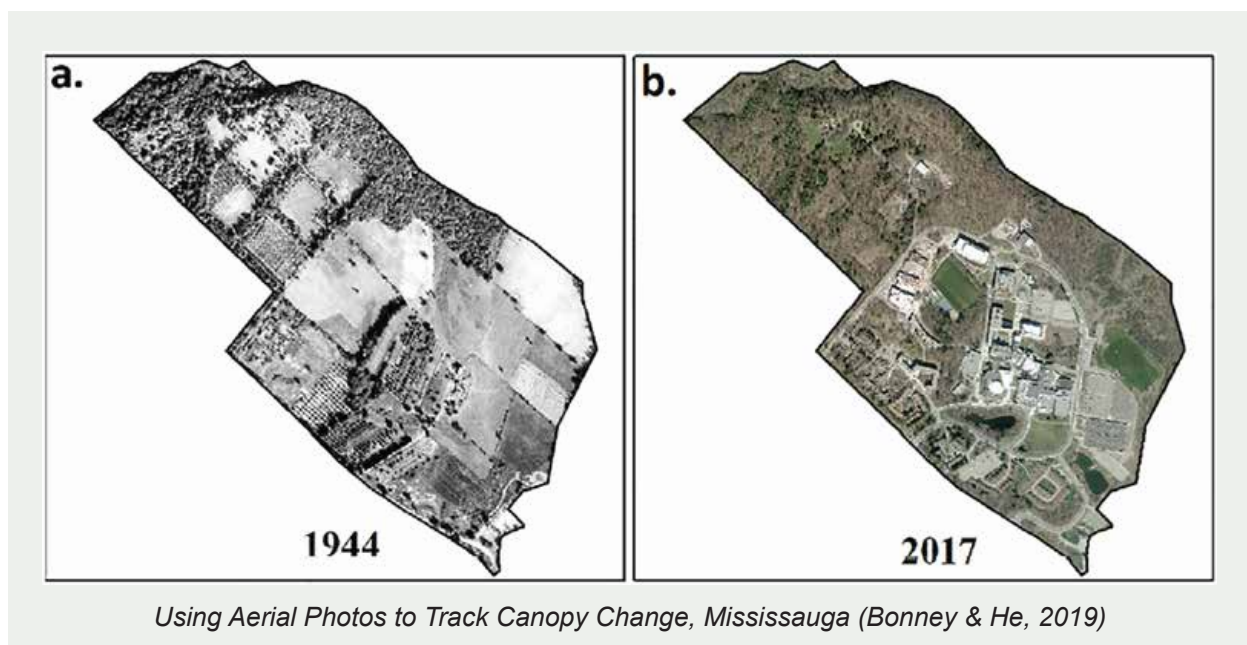
- In most major cities, over 90% of the trees in urban forests are male. Municipalities prefer male trees over female trees because they are considered litter-free in comparison to female trees.
- This bias in favour of male trees has resulted in increased pollen presence in the air, leading to aggravation of associated allergies and asthma in urban areas.

Assessment of Urban Forestry Methods

Literature on tree canopy measurement methods and techniques is limited, as are techniques for evaluating the success of approaches to increase the tree canopy. This gap in the research is likely a result of the relatively recent adoption of monitoring policies, as well as the limitations associated with measurement technologies.

One study conducted in Mississauga (Bonney & He, 2019) used leaf-off (i.e. autumn) aerial photographs from the 1940s to 2017 to track changes in the City's tree canopy. Notable findings include:

- Tree density is able to recover, be maintained, or increase post-development.
- Aerial photographs, while not originally intended for tree-related purposes, can be effectively used to track changes to the tree canopy over time.



Another study explored urban foresters' perspectives on assisted migration - a process where non-native species are used in anticipation of future climate change (Fontaine & Larson, 2016). Researchers found:

- Many urban foresters are aware of the concept of assisted migration, but it remains more of a theoretical concept than a management tool.
- Many municipalities unknowingly employ assisted migration strategies such as planting southern tree species at the northernmost end of their range, and using non-native trees in areas where native species cannot adapt and/or where their growth is compromised.

Resident Perspectives

A growing body of literature that is particularly useful when exploring private tree management strategies examines resident perspectives related to a variety of tree-related topics. Key findings are as follows:

- Resident participation in tree planting and removal activities is primarily motivated by aesthetic reasons.
- Residents were more supportive of private tree management policies if they were in newer neighbourhoods, if they recently moved to the area, if they have a university degree, and/or if their household does not include older adults.
- Resident knowledge of native tree species is generally low, whether or not their municipality has a UFMP.
- While most residents believe native species are more beneficial than non-native species, native status is not a primary consideration when choosing a tree to plant on their property.
- Residents in municipalities that have UFMPs are more actively engaged in planting native trees, planting and removing trees on their properties, and had more trees on their properties in general.

Overview of Findings

Urban forestry research is a small but growing field. Based on these findings, several conclusions about the state of urban forestry in Ontario can be made:

- The lack of best practice guidance from the Province has resulted in a wide range of municipal urban forestry plans and policies.
- The effectiveness of these plans and policies is difficult to assess, as these plans often lack concrete measurements and targets, partly due to the absence of historical tree canopy data.
- Residents are willing to be active participants in tree preservation and management programs, but must be engaged meaningfully.

As municipal tree protection efforts are increasing rapidly, it is expected that this field of research will continue to grow and inform best practices for tending to urban forests.

2. Provincial Policy & Legislation Overview: Relevant Policy Framework

In Ontario, municipalities are either single-tier or two-tier. In single-tier municipalities, local governments assume all responsibilities as outlined in the *Municipal Act* (2001). In two-tier municipalities, the upper-tier municipality (either a county or a regional municipality) is composed of several lower-tier municipalities, and responsibilities are divided amongst the two levels. This assessment outlines the hierarchy of provincial and regional policies and legislation that impact how tree protection and management measures can be undertaken at the municipal level.

At the highest level is the provincial legislation that outlines the authorities granted to municipalities, which includes:

- **Municipal Act (2001):** contains legislation which gives both upper- and lower-tier municipalities the responsibility to ensure laws and plans are in place to protect natural features, including the power to create tree by-laws (135(1)). Municipalities are allowed to prohibit or regulate the destruction or injuring of trees (135(1)), including on private land, and dictate that they shall have regard for Good Forestry Practices (135(5)). Both upper- and lower-tier municipalities can enact tree by-laws, though some restrictions exist (e.g. only lower-tier municipalities with a population greater than 10,000 can monitor and regulate tree cutting).
- **Planning Act (1990, revised 2019):** gives municipalities the power to set goals and priorities through Official Plans, as well as the ability to pass by-laws to protect and regulate significant natural features.
- **Provincial Policy Statement (1996, revised 2014):** outlines the long-term general protection of environmental features, and details the protection of natural feature areas, including significant natural areas (2.1). It also contains policy direction for defining forests, woodlands, and woodlots, referencing the Forestry Act (1990) for technical details.

The following are pieces of provincial legislation that pertain exclusively to trees. Among other things, these acts provide municipalities with the appropriate language to use in their subsequent policies.

- **Forestry Act (1990):** along with Ontario's ecological land classification system, define forests, woodlands, and woodlots for policy use. They reference values including significant eco-systems, important fish and wildlife habitat, soil and water quality and quantity, forest productivity and health and the aesthetics and recreational opportunities of the landscape (F26). The Act also defines "Good Forestry Practices", which include activities conducted in ways that lead to ecological sustainability of managed stands, more specially, by minimizing damage to the site and wildlife habitats, and by protecting natural features for the integrity and long-term health of the stand (S. 2).
- **Professional Foresters Act (2000):** defines the urban forest, which gives policy direction for managing and protecting trees specifically within urban boundaries. It includes a wide range of vegetation, including woodlots, plantations, shade trees, fields, wetland and riparian areas (18,3(3)).

The Province also has a number of policies that affect different geographies, such as:

- **Places to Grow Act (2005):** allows the Province to designate different areas as “growth areas” with a specific planning focus (e.g. Growth Plan for the Greater Golden Horseshoe [2006, revised 2019]).
- **The Greenbelt Act (2005):** provides the Province with the authority to create the Greenbelt Plan (2017). It also includes the Niagara Escarpment and Oak Ridges Moraine, and their associated plans.

There are few provincial and regional policy and legislative mechanisms that enable the protection and management of urban trees, and in particular, trees on smaller properties. However, there are a few options that can be considered as possible tools, including:

- **Site Plan Control:** Under the *Planning Act* (1990) municipalities are allowed to designate site plan control areas and withhold approval of site plans if consideration is not given to woodland buffers and renovation, and trees for landscaping and protecting adjoining lands, including highways.
- **Heritage Trees or ‘Significant Community Trees’:** Under the *Ontario Heritage Act* (1990), trees can be given heritage status by designation under Part IV, or through recognition under the Heritage Tree Program of Forests Ontario. If the tree(s) are on private land, the landowner is not required to agree to the designation; however it can be challenged. Once established, a heritage designation remains even if the property is sold.
- **Endangered Species Act (2007):** identifies tree species on the Species at Risk in Ontario List and protects their destruction. However, the *More Homes, More Choice Act* (2019) allows developers to pay into a fund rather than refraining from activities that may harm at-risk species, and trees could be cut down if approved by the provincial government.
- **Environmental Protection Act & Building Code Act:** Under these acts, trees in designated Shoreline Areas and Environmental Protection Zones can be protected.



Overall, the policies and legislation in place at the provincial level are broad and lack specificity regarding tools that municipalities can use to protect and manage trees. This makes it difficult for municipalities to defer to the provincial government for guidance. Additionally, due to the lack of enforcement mechanisms, the onus falls on the development planning process to enforce desired measures.

3. Municipal Policy Scan: Key Themes & Unique Policies

This scan explores the range of policies that address urban trees on private property across 17 municipalities in Ontario. Each municipality's Official Plan, Urban Design Guidelines, and Tree By-laws (if applicable) were scanned for tree-related policies (Table 1). Urban Forest Management Plans (UFMPs) were scanned separately to assess their recommendations and direction. Additionally, tree-related programs present in each municipality were recorded and compared for analysis. Due to project scope, the following scan includes a selection of municipalities and is therefore non-comprehensive; other municipalities in Ontario also have relevant policies. Additional details about the policies included in this scan can be found in Appendix A3.

Municipality	Official Plan	Private Tree By-law	Urban Design Guidelines	Urban Forest Management Plan
Ajax	✓	✓	✓	✓
Barrie	✓	✓	✓	
Cambridge	✓		✓	✓
Guelph	✓	✓	✓	✓
Kingston	✓	✓	✓	✓
Kitchener	✓	✓	✓	✓
Mississauga	✓	✓	✓	✓
Niagara Falls	✓		✓	✓
Oakville	✓	✓	✓	✓
Oshawa	✓		✓	
Peterborough	✓	✓		
St. Catharines	✓		✓	✓
Thunder Bay	✓		✓	✓
Toronto	✓	✓	✓	✓
Vaughan	✓	✓	✓	✓
Waterloo	✓		✓	
Windsor	✓			

Table 1: Municipal Documents Scanned

Key Themes

1. Protection & Preservation

This theme encompasses a variety of policies that pertain to the protection of existing trees on private land. Some policies include general and non-binding language, while others clearly establish the protection of trees as a key consideration (e.g. “where possible” versus “shall”).

Oshawa, Landscaping Design Policies (1988): “Existing features such as trees [...], and other site assets shall be preserved in the design of a site, wherever feasible. The proponent may be required to undertake protective measures and maintain such protective facilities to the satisfaction of the City to ensure that these features are protected during the course of site development. No tree cutting or regrading shall be permitted on a site while the City’s decision on a development application is pending.” (1.0 GENERAL REQUIREMENTS - 1.9)

Kitchener, Urban Design Manual - City-wide Design (2019): “Retain and incorporate existing trees and other natural features into new development planning where possible, using tree protection and conservation techniques to protect the integrity of the root soil zone as well as the existing growing and drainage characteristics of the site.” (Urban Forestry)

Toronto, Townhouse And Low-Rise Apartment Guidelines (2018): “Provide high-quality, sustainable streetscape and landscape between the building and adjacent streets, parks and open spaces. a. Retain and protect existing trees, vegetation, natural slopes and native soils and integrate these features into the overall landscape plan, wherever possible (5.1 Streetscape, landscape and stormwater management - 5.1.2a.)

Other distinct groups within this theme emerged, and are divided into the following sub-categories:

a. Replacement & Relocation of Trees

These policies direct proponents to replace trees removed through the construction process. While there are several replacement- and relocation-focused policies, the majority are only applicable to municipal government-led projects and public infrastructure projects. Fewer policies direct proponents to replace private trees removed or damaged during development.

Niagara Falls, Model Urban Design Guidelines (2005): “If any significant trees designated for preservation are removed or substantially damaged during clearing, grading, or construction, they should be replaced. Replacement trees should be the same diameter, and of similar species to the trees removed or damaged, or alternately a species native to the Region.” (3e. Natural Heritage - 3e. 6 Significant Tree Preservation: g))

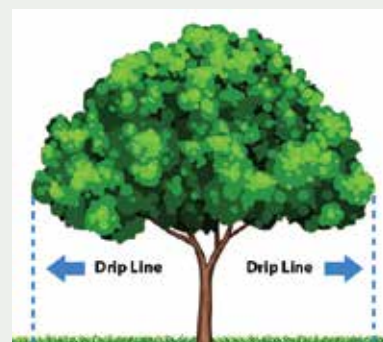
Oshawa, Landscaping Design Policies (1988): “Trees which are to be preserved as per the Landscape Plan, and which have died or have been damaged beyond repair during site construction activities, shall be replaced with a tree(s) of species and size which shall reflect the size and species of the damaged plant material as determined by the Director of the Department of Planning and Development. The location of such trees shall be approved by the Director. Failure to replace damaged trees shall result in the City exercising its right to draw upon the landscape portion of the letter of credit as per Section 7.4 of this document.” (6.0 PLANT MATERIAL - 6.10)

b. Preservation of Perimeter Trees

Policies that aim to preserve perimeter trees can encourage more intense development while preserving existing trees. Such policies permit development to occur with the understanding that some trees will be damaged (e.g. trees in the centre of a site), but focus on ensuring that trees located along the perimeter of the site will be protected. Overall, perimeter tree protection policies are limited and currently not widely enacted by municipalities.

Ajax, Employment Areas Urban Design Guidelines (2006): “Preserve all existing perimeter trees with minimal changes to the area beneath the drip line. Locate underground services and utilities so as not to encroach within the drip line of trees to be preserved, to minimize disruption to the root system” (4.3 Landscaping)

Ajax, Urban Design Guidelines for Motor Vehicle Gas Bars/Service Centres (2006): “Protect all existing perimeter trees worthy of preservation, with minimal grade changes to the area beneath the drip-line” (6.0 Landscaping and Tree Preservation)



Drip Line (Good Earth Plants)

c. Heritage Protection

Several policies frame tree protection as a matter of preserving cultural or historic heritage, or the natural heritage features of neighbourhoods. Some policies provide direction on designating trees in select neighbourhoods as a natural heritage feature protected under the *Ontario Heritage Act* (1990). This allows for increased protection measures, which in turn, makes it more difficult for trees to be removed.



*Designated Heritage Tree
(City of Windsor)*

Oakville, Official Plan (2009): “The Town shall develop a set of criteria for determining trees of cultural heritage value.” (5.3 Heritage Conservation - 5.3.12)

Waterloo, Official Plan (2012): “When considering development applications and site alteration permit applications, the City may require the protection and enhancement of hedgerows, especially where: (c) they are composed of mature, healthy trees; (d) they contain trees that are rare, unique, culturally important, or over 100 years in age.” (8.2 Natural Heritage - 8.2.9 Urban Forest - 3)

Windsor, Official Plan (2000): “The objective of the Sandwich Heritage Conservation District is to preserve the buildings and streetscape. Owners of property will require a heritage permit for the following changes to their property: (s) Removal of trees with a minimum trunk diameter of 10 centimetres.” (1.26 Sandwich Heritage Conservation District - Building Renovations and new construction - 1.26.8)

2. Design Element & Function

Many policies address tree protection and management by promoting their benefits and ecosystem services. These policies fall into two sub-categories:

a. Functional Benefits

The first sub-category encompasses policies that reference the ecosystem services trees provide. These often include: urban cooling (shade), air purification, stormwater management, slope stabilisation, erosion mitigation, wind breaks, noise reduction, carbon sequestration, and privacy screening. As mature trees provide more ecosystem services than young trees, mature trees and continuous canopies are often favoured by tree protection policies.

Niagara Falls, Model Urban Design Guidelines (2005): “Landscape plans should use deciduous street trees and on-site trees where these trees will grow to shade windows of residential structures. Such trees provide shade and help reduce temperatures inside adjacent units during the warmer months and shed their leaves to allow sunlight and better heat penetration during cooler months.” (4g. Environmental Sustainability - 4g.6 Solar Orientation)

Toronto, Urban Design Guidelines for Privately Owned Publicly-Accessible Spaces (2014): “Arrange trees and other plantings to provide maximum effect and efficiencies in maintenance and watering and consider methods to capture stormwater (e.g. sloping paved areas towards planters).” (5.3 SOFT LANDSCAPING - d)

Vaughan, Official Plan (2010): “The design of rooftops and parking areas should minimize the heat island effect, through rooftop gardens, green roofs and the planting of shade trees between parking aisles.” (11.3 Steeles West Secondary Plan - Environmental and Servicing Policies - 11.3.13.3).

Thunder Bay, Urban Design Guidelines (2012): “Playground equipment should be [...] located in areas shaded by trees.” (Parks and Open Space: 2C Uses and Amenities: b))

Windsor, Official Plan (2000): “Council will contribute to the reduction of air pollution by using the following land use planning approaches: (e) protecting and improving trees and natural areas.” (Atmospheric Air Quality Policies - 5.3.7.2)

b. Aesthetic Benefits

Many policies linked the presence of trees to a more visually appealing streetscape. These policies highlighted the aesthetics of trees, in terms of the visual impact they provide property owners, the neighbourhood, and the larger community.

Oakville, Site Design and Development Standards for Oakville (2017): “In order to minimize and alleviate the conflicts of the railway network with adjacent land uses aesthetic measures should be implemented [...]. Any required 7.5 m continuous landscape width should contain, at a minimum: a. one (1) deciduous or coniferous tree planting for every 4.5 m of abutting land, with a minimum of 80% of the trees within the buffer strip as coniferous species; [...] to form a continuous screening element with a minimum height of 1.8 m.” (2.0 Soft Landscape Standards - 2.6 Treatment for Required Landscaping: 4.)

Kitchener, Urban Design Manual - Mid-rise Buildings (2019): “All sites are to be comprehensively landscaped including substantial tree planting [...]. Use landscaping to accentuate, unify and complement different areas of the site.” (Shared Spaces - Landscaping)

Thunder Bay, Urban Design Guidelines (2012): “In order to improve the aesthetic quality of the urban environment, the Official Plan advocates increasing the stock of trees through planting programmes, adhering to high standards regarding maintenance and replacement, and encouraging developers to retain existing trees wherever practical. In addition, the City places a high priority on the protection and wise management of natural heritage features.” (Urban Forestry)

3. Ecosystem Management - Systems Approach

The policies within this theme address the role trees play in the overall ecosystem. These policies aim to protect trees by identifying their importance as a component of a healthy natural system and outlining suitable management practices to maintain them. These practices often refer to connecting ecological networks, native and climate-appropriate planting, and suitable tree-planting conditions.

a. Ecological Network

Many municipalities protect and encourage continuous ecological networks of trees and other vegetation by linking in Natural Heritage Systems (NHS) or referring to tree canopy goals. Such policies can focus on continuous canopies or articulate the importance of preserving individual trees in order to achieve the larger goal of maintaining an ecological network.

Mississauga, Official Plan (2019): “The Natural heritage System will be protected, enhanced, restored and expanded through the following measures: a. ensuring that development in or adjacent to the Natural Heritage System protects and maintains natural heritage features and their ecological functions through such means as tree preservation, appropriate location of building envelopes, grading, landscaping, and parking and amenity area locations.” (6.3.24)

Oakville, Site Design and Development Standards for Oakville (2017): “New development [...] shall demonstrate adherence with the canopy cover targets established [...]; development should implement the target canopy to help achieve Oakville’s town-wide 40% canopy coverage objective.” (2.0 Soft Landscape Standards - 2.1 Canopy Cover)



The Value of Urban Trees (Urban Forest Stewardship Network)

b. Native and Climate-Appropriate Planting

Native and non-native non-invasive tree species are well-adapted to local climatic conditions and encourage biodiversity. Many municipalities encourage the planting of native and climate-appropriate trees and vegetation through their Official Plans and Urban Design Guidelines. In some cases, these policies integrate *assisted migration*: the practice of planting trees according to the projected future climate, which ensures the longevity of a municipality’s tree canopy and ecological system.

Oshawa, Landscaping Design Policies (1988): “The use of indigenous plant material is encouraged. It is suggested that at least 50 percent of all proposed tree and shrub plantings on a site be of indigenous material.” (6.0 PLANT MATERIAL - 6.4)

Toronto, Official Plan (2015): “[...] secure the following sustainable design features in development that address exterior building and site matters [...]: trees to enhance the urban forest and use of native species to protect, restore and enhance the natural heritage system.” (5.1.3 SITE PLAN CONTROL - 3. e))

Niagara Falls, Model Urban Design Guidelines, (2005): “Street trees and street landscaping should be locally adapted native species. Plants that grow naturally in the Region of Niagara are adapted to the local climate and soil conditions and have a better than average chance of surviving with minimum upkeep, use of fertilizer, pesticide or irrigation.” (3h Environmental Sustainability - 3h.3 Right-of-Way & Street Infrastructure: e))

Ajax, Official Plan (2016): “To maintain, protect, and enhance the existing tree canopy, the Town shall: Encourage the planting of native or non-native non-invasive tree species and vegetation that are resilient to climate change and provide high levels of carbon sequestration, subject to the Town’s approval, particularly through new development and on municipally-owned land.” (2.1.4 Tree Canopy, b))

c. Soil & Conditions for Tree Growth

Many policies outline the conditions necessary to ensure trees can reach maturity and survive long-term. They include directions about the location of trees on a site, soil conditions, and structural supports. Good growing conditions are an important aspect of the longevity and preservation of trees planted on a site in accordance with other development policies.

Mississauga, Urban Design Guidelines - Green Development Standards (2012): “For groups of two or more trees planted primarily in hardscaped areas, provide a minimum volume of 15 m³ (530 ft³) of high quality soil per tree. A single tree planted in hardscape requires a minimum volume of 30 m³ (1060 ft³) of soil. - Provide trees planted in softscape with a minimum volume of 30 m³ (1,060 ft³) high quality soil. - Plant “shade trees” approximately 6-8 m (20-27 ft) apart along all street frontages, open space frontages and public walkways.” (4.1)

Cambridge, Design Guidelines - Preston Streetscape (2013): “The use of strata cells (structured soil cell) is proposed [...] Urban trees require a large volume of soil in order to survive and establish into healthy specimens, however, often urban environments do not allow for adequate space. Soil structure systems allow for adequate soil volumes and also allow the structural support required to engineer roadways.” (4.2 Street Trees and Planters)



Strata Cells (Greenleaf Ireland)

Vaughan, City-wide Urban Design Guidelines (2018): “Landscape design should prioritize provision of soil volumes to support mature tree growth to help achieve York Region’s urban tree canopy goal for the City of 25-35%.” (6.1.1 Tree Planting (a))

Waterloo, Urban Design Manual (n.d.): “Encourage designs that allow for increased soil volumes for root growth and canopy space for future growth of large shade trees to promote an urban forest.” (2. GENERAL CITY DESIGN GUIDELINES - 2.5 SUSTAINABLE DESIGN - (17))

4. Enforcement

Policies that explicitly connect tree protection mechanisms with the development application process and enforcement measures are classified in this theme. These policies allow municipalities to take a stronger stance in order to ensure that developers take appropriate steps to address tree protection. Most of these policies state that if any existing trees will be impacted by the proposed development, a tree inventory and preservation plan will be required of the proponent.

A serious concern for municipalities is the potential for landowners (i.e. residents and developers) to clear-cut properties before submitting a planning application. Clear-cutting beforehand not only negatively impacts the tree canopy, but could also result in the proponent not having to adhere with tree-related policies, as it is only through the formal planning process that Official Plans, Urban Design Guidelines, and other relevant policy documents can be applied to a development proposal. This scan found that municipalities are beginning to confront this concern by including policies to ensure proponents are held accountable for any site alterations made before a planning application is submitted to the municipality.

Guelph, Official Plan (2018): “Development and site alteration within or adjacent to a Cultural Woodland shall also require a Tree Inventory and Tree Preservation Plan in accordance with Section 4.2.4” (4.1.4.3 Cultural Woodlands - Policies - 3)

Guelph, Official Plan (2018): “Plans prepared in conjunction with development and site alteration applications will require indigenous plants, trees and shrubs except where harsh environmental conditions would limit their survival” (4.1.7 Natural Heritage Stewardship and Monitoring - Policies - 4.1.7.1 Invasive Species)



Developer Clear-Cut Lot (CBC Hamilton, 2017)

Barrie, Official Plan (2018): “Where existing trees have been substantially removed and land stripping and/or the removal of topsoil has occurred prior to an application for development or during the process of obtaining approval for any development of a site, Council may impose conditions of such approval in accordance with the intent of the City’s tree cutting by-law”

Oshawa, Official Plan (1987): “No significant removal of trees or topsoil or significant grading shall be undertaken within the Pinecrest Planning Area without prior approval from the City. In this regard, the City may require the submission of an environmental analysis report including a Tree Inventory and Preservation Plan in accordance with Policy 5.12.4 by a qualified arborist prior to granting such approval” (8.4.12 Environmental Management - 8.4.12.10)

Oshawa, Landscaping Design Policies (1988): “Trees which are to be preserved as per the Landscape Plan, and which have died or have been damaged beyond repair during site construction activities, shall be replaced with a tree(s) of species and size which shall reflect the size and species of the damaged plant material as determined by the Director of the Department of Planning and Development. The location of such trees shall be approved by the Director. Failure to replace damaged trees shall result in the City exercising its right to draw upon the landscape portion of the letter of credit as per Section 7.4 of this document.” (6.0 PLANT MATERIAL - 6.10)

Tree By-laws

Of the 17 municipalities studied, 11 have private tree by-laws. When reviewing the by-laws, two key differences emerged:

1. Application of the By-law

Each by-law examined contains a detailed section that delineates the specific trees and circumstances upon which the by-law is enforceable. The by-laws vary significantly with regard to the restrictiveness of their application. Criteria outlining which trees are subject to the tree by-law included items such as the diameter of the tree (e.g. Vaughan), land use designation (e.g. Ajax), or the size of the land that the subject tree is located on.

2. Permit Requirements

Each municipality with a private tree by-law had different levels of requirements for obtaining a tree removal permit. For example, some required an extensive application with reports from arborists and written consent from the adjacent property owner (e.g. Mississauga's Tree By-law), while others asked for a notification with the property owner's contact information, the tree's species and diameter, and the reason (if any) for removing the tree and plans (if any) for replacing it (e.g. Peterborough Tree Notice By-law). The varying levels required to obtain a permit to remove a private tree impact how rigorously a municipality can monitor the tree canopy.

Tree Planting Programs

While a comprehensive study of urban forestry programs was not conducted, programs mentioned were noted and some additional research was conducted. Many municipalities have public programs and events aimed at tree planting and maintenance, which are used to inform residents about the importance of trees and provide education on tree stewardship. These programs exist outside of municipal policy frameworks, although many UFMPs and some Official Plans indicate the need to create such programs. The three general models adopted by municipalities are highlighted below.

1. Donation Programs

Greening Guelph is a donation program aimed at helping to increase the tree canopy in Guelph. Donations are solicited from interested individuals and corporate sponsors, then are used to fund existing tree planting, protection, and education programs in the municipality.



Thunder Bay Hydro Recognized for Tree Stewardship (NetNewsLedger)

2. Events & Planting Partnerships

Events and public-private partnerships exist in many forms. These partnerships allow the municipality some control over tree protection and management while working strategically with a private entity to facilitate the desired outcome. Examples include:

- The City of Windsor's public-private partnerships to expand the urban forest, relying heavily on city expertise and planting support from local environmental groups.
- The City of Cambridge's subsidized tree program, delivered in partnership with Local Enhancement & Appreciation of Forests (LEAF) and Reep Green Solutions. For between \$150 and \$220 per tree, residents receive a personalized consultation, delivery, planting, and a long-term care guide.
- The City of Thunder Bay hosts many events throughout the year that promote tree planting and education, which are advertised on the City's website.

3. Planting Programs

Some municipalities have larger-reaching public programs aimed at increasing the tree canopy. For example, Mississauga is well known for their *One Million Trees* program. Through this program, groups or individuals can input information about the tree(s) they've planted, which are then displayed on the program's website. This 'gamification' has allowed the municipality to better track their goal of planting one million trees and encourage resident participation in achieving this goal.

CONNECT WITH US   

380,657
trees
planted

Help the City of Mississauga
plant one million trees by 2032

 **MISSISSAUGA**

One Million Trees Program (City of Mississauga)

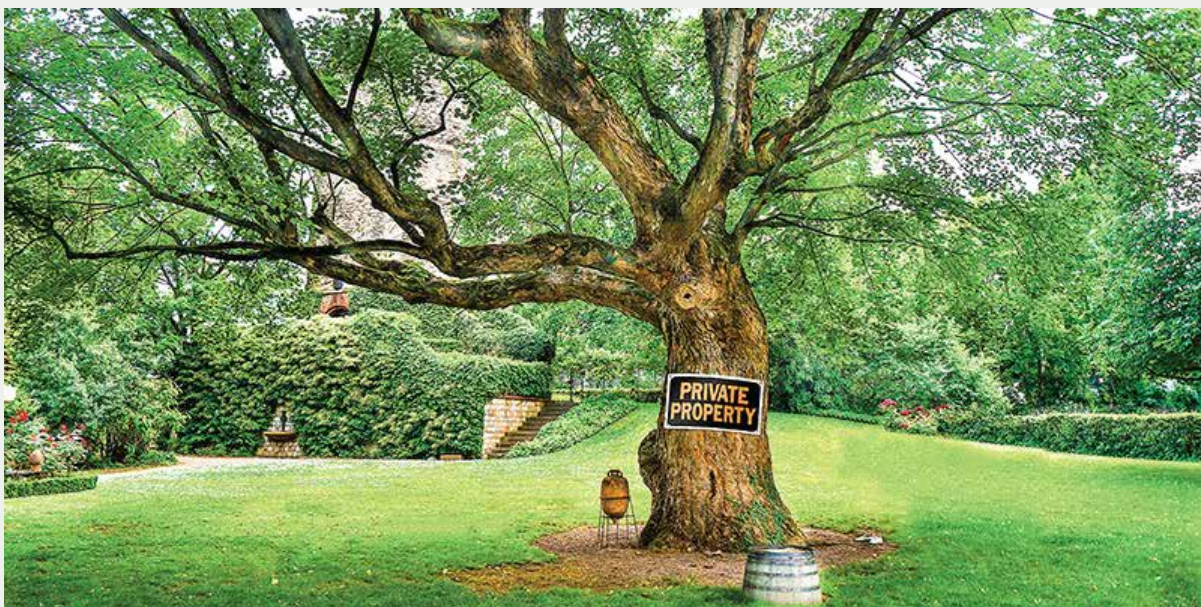
Urban Forest Management Plans

Of the 17 municipalities selected for this review, 12 have UFMPs. As previously mentioned, a UFMP is a document adopted by a municipality that outlines their plans and goals regarding the tree canopy. UFMPs range in style and approach, from high-level plans-of-action that focus on visionary statements and urban forestry goals, to specific recommendations and courses of action to enhance the municipality's urban forest. The actions or recommendations typically are based on existing municipal documents, best practices employed by other municipalities, and public engagement on the matter.

UFMPs are important documents for municipalities, as they can provide direction on a variety of initiatives the municipality is willing to undertake to enhance their urban tree canopy and meet coverage targets. They can include direction on establishing public education programs, tree-planting programs, and can influence Official Plan and Urban Design Guideline policies regarding private trees. A selection of UFMPs have been included in Appendix A3, and demonstrate the types of tree-related issues addressed by the municipality, and other ways they plan on growing their urban tree canopy.

Overview of Findings

Through the scan of municipal policy documents, it is evident that there are a wide range of policies that pertain to private tree protection and management. Municipalities have enacted policies that address the tree canopy from various angles, which are unique to and reflect their local context. In terms of private tree by-laws, there is little consistency across municipalities and there are major differences among their approaches, which results in a significant variation in the number of trees protected in a municipality, and likely has an impact on resident perspectives of tree protection. By sharing best practices, municipalities can take a targeted approach to protect more trees on private residential property.



Tree on Private Property (The Sarnia Journal, 2017)

4. Review of Best Practices: Municipal Staff Survey

Context & Methodology

As demonstrated through the *Municipal Policy Scan*, municipalities in Ontario employ a variety of strategies to protect and manage their urban forests. As many of these strategies are relatively new, it is difficult as yet to determine what methods are effective. Additionally, municipalities seldom share assessment strategies or reflections until the policy or program is updated. To gain insight into the effectiveness of policies and programs implemented to protect and manage urban forests, a municipal staff survey was conducted.

Key informants were recruited from all 17 municipalities included in the *Municipal Policy Scan*. Of the municipalities contacted, 13 responses were received. Since tree protection overlaps with a number of municipal activities, and municipalities vary in their internal organization, informants came from a variety of departments, further highlighting the complexity of this topic.

Key Informant Survey: Respondents			
Ajax	Mississauga	St. Catharines	Windsor
Barrie	Niagara Falls	Thunder Bay	
Cambridge	Oakville	Toronto	
Guelph	Oshawa	Waterloo	

Table 2: Municipal Survey Respondents

Summary of Findings

Through conducting key informant interviews with municipal staff, several themes emerged, which are outlined below:

1. Policy Effectiveness

Of the 13 municipalities surveyed, all have Official Plans that reference the importance of trees, 9 have UFMPs, 12 have Urban Design Guidelines, and 6 have private tree by-laws. However, these policies vary greatly among the municipalities, highlighting the reality that tree protection and management is not one-size-fits-all.

Private Tree By-laws

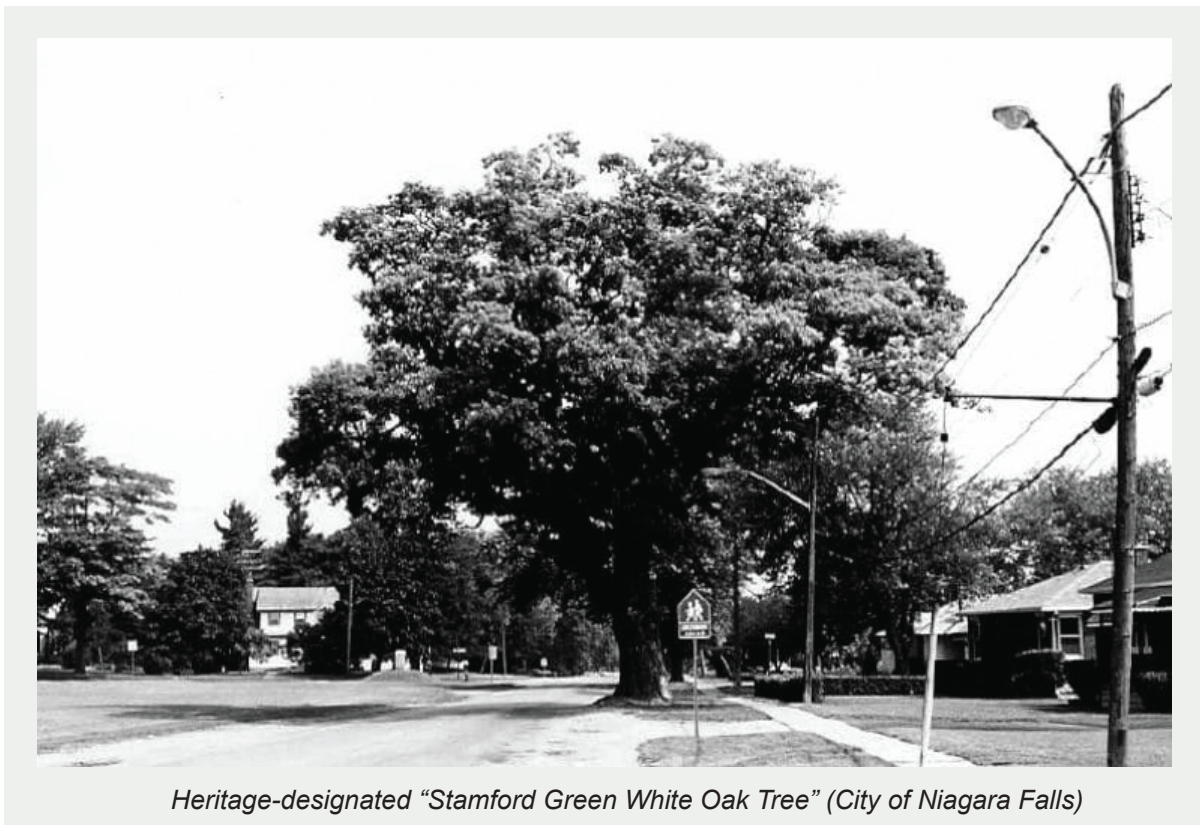
All municipalities with private tree by-laws stated that they were the most effective tool for protecting and managing trees on private property, simply because they are “an actual enforcement tool” (Guelph). As discussed in the *Municipal Policy Scan*, the restrictiveness and coverage of private tree by-laws ranges significantly across municipalities. Some of these municipalities, such as Ajax, have expressed an interest in expanding their by-law to cover a greater

area. Further, most municipalities without private tree by-laws cited a desire to adopt one, but have faced challenges in doing so.

Heritage Designation

Several municipalities discussed the effectiveness of using heritage designations to protect trees on private land. Heritage designation through the Ontario Heritage Act (1990) can be applied at the scale of an individual tree to entire neighbourhoods. Some examples include:

- **Barrie:** “Natural Heritage Resources ‘protected areas’ mapping is the greatest improvement in high level planning to identify areas of significant forested/natural lands for protection from development”.
- **Mississauga:** “while staff, through development applications, encourage the retention of trees, there really isn’t enough authority for staff to refuse or withhold an approval to save trees, unless a tree is designated under the *Ontario Heritage Act*”.
- **Niagara Falls:** two individual trees have been designated as culturally significant under the *Ontario Heritage Act*.



Development Process

Municipalities frequently face challenges during the land development process, and often struggle to balance tree preservation with other aspects of development. Some of these challenges include:

- Developers and landowners cutting down trees prior to submitting a Site Plan application or Building Permit. The informant from Mississauga explained that “where the City is able to prove that this has occurred, fines and penalties are pursued”, but it is likely that many instances go unreported.
- Unequal “power” of tree protection policies versus development applications, where development trumps tree protection. In many municipalities, “applications for permission to cut down trees made under the Private Tree By-law cannot be refused in the instance where it negates the approval of a development application” (Mississauga).

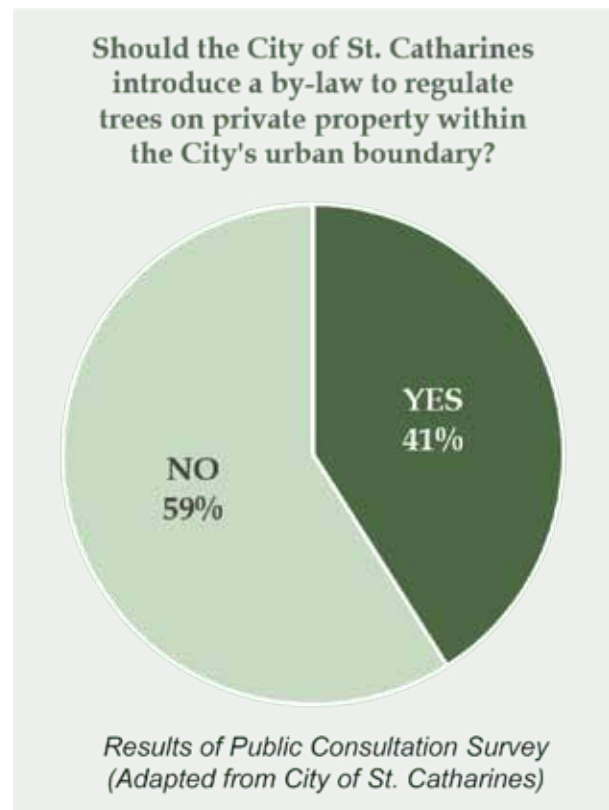
The representative from City of Thunder Bay spoke about the recent adoption of unique tree planting initiatives related to land development. For example, in 2018 the City began a program that involves collecting the money that would be allocated to tree planting requirements under Site Plan Control and planting the trees using the City’s own contractor. They explained that in removing the onus of tree planting from the developer, there is “no more warranty period for the contractor and no more battles with them”. Similarly, they began working with their Engineering Department for large capital rebuilds, where they “follow directly behind completion and replant boulevards regardless if there was a tree there or not”, which has been effective in increasing the number of trees in the City.

2. Policy Adoption Process

Opposition

While some policies and plans are more effective than others, many informants discussed challenges associated with both the initial adoption and long-term governance, including opposition from developers, residents, and City Council. Examples from informants include:

- **Barrie:** “the development community, often through planning consultants, challenged any new policy that would affect total development area on private lands”.
- **Mississauga:** when reviewing their private tree by-law in 2012, Councillors and residents largely disapproved of a more restrictive by-law. The informant explained, “while there are groups that advocate for more retention, there are also groups that want to be able to take down trees when they can”.
- **St. Catharines:** City staff were directed to consult the public after proposing a private tree by-law to Council. The negative responses from residents led Council to reject the by-law and instead seek alternatives.



- **Ajax:** when exploring expanding their current by-law to include properties within the Urban Area, the informant explained that “politically this has not been prioritized, and the cost of enforcement needs to be examined more closely”.
- **Windsor:** a private tree by-law was proposed several times, and while there was reported interest from residents, the informant explained that the political climate of Council caused the by-law to be rejected.

Implementation

While the first step to managing the urban forest lies in creating a tree protection or management strategy, municipalities often struggle with its implementation. For example, informants discussed the frequency in which developers and landowners ignore by-laws, and referenced private sector planners, engineers, and the Local Planning Appeal Tribunal (LPAT), who “do not give much attention to policy statements” (Barrie). The informant from Thunder Bay eloquently articulated this concern when referencing the effectiveness of their UFMP, explaining that “it remained, as so many plans do, on a dusty shelf with little appeal for higher ups to initiate”.

Enforcement

Some municipalities interviewed simply lack the financial and human resources to implement and oversee policies and programs. Examples of these challenges include:

- **St. Catharines:** “a tree protection by-law is only effective as it’s enforced”. City staff are concerned about the staffing required to review, implement, and enforce by-laws.
- **Windsor:** discussed their lack of City resources for monitoring a private tree by-law.
- **Thunder Bay:** when exploring a City-supplied and -sponsored tree planting program, they said one of the main reasons it has not been initiated is because of the lack of time and capacity of municipal staff.



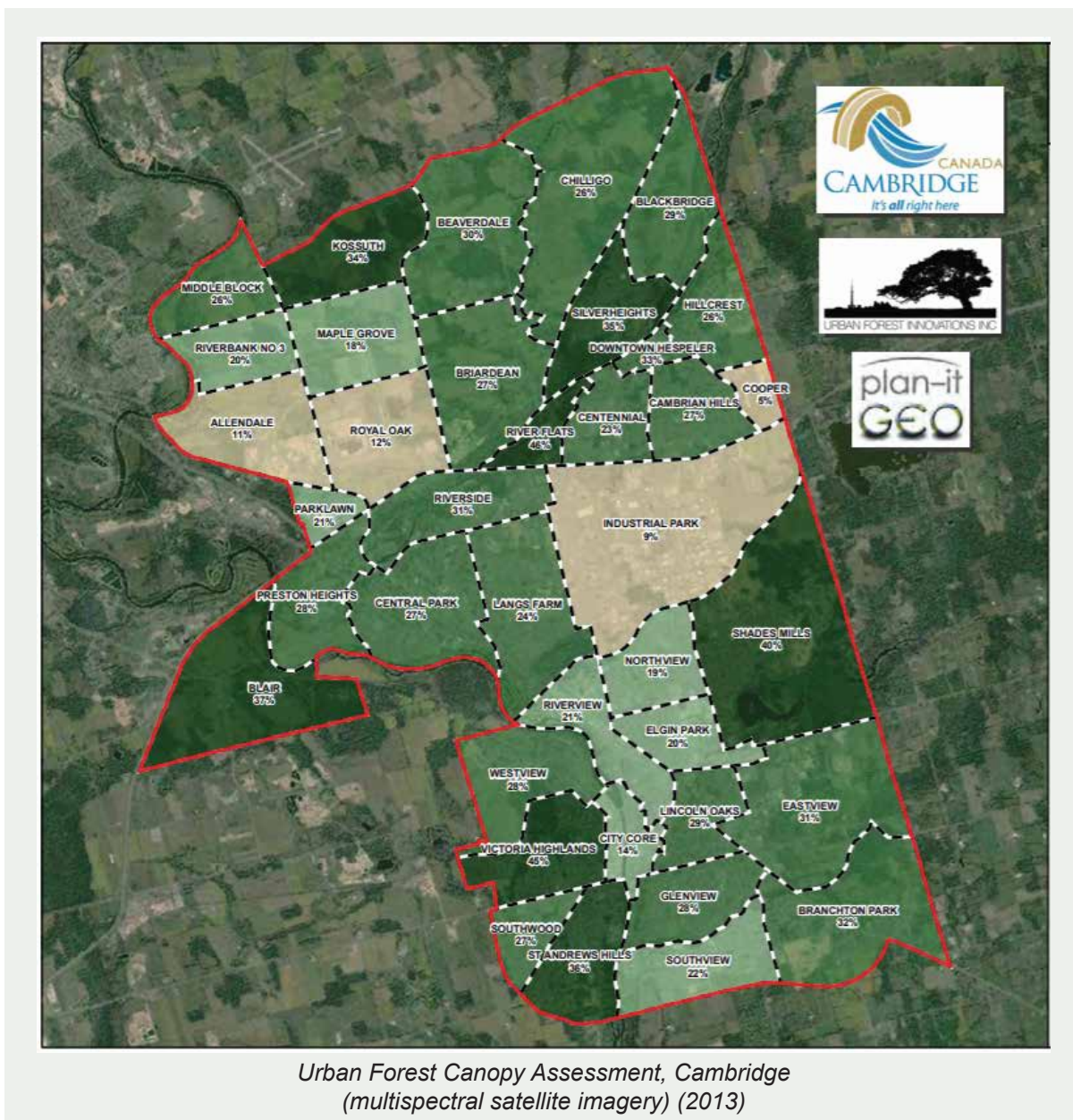
Tree Protection during Construction
(CBC Edmonton, 2017)

3. Measurement Methods

The municipalities interviewed employ a variety of methods to measure contributions to the urban forest and overall canopy growth. In most cases, a canopy measurement is completed as part of the UFMP, and will be conducted each time the plan is updated. Some examples of tracking strategies include:

- **Barrie:** through their Urban Forest Strategy, have begun mapping the tree canopy and conducting “urban forest health card assessments”.
- **Cambridge:** private consultants were hired to conduct in-depth canopy measurements in 2013 and 2018, which show tree cover at the city-wide, neighbourhood, and individual parcel scales.
- **Guelph:** is currently conducting an Urban Forest Study, which will set the baseline for monitoring the tree canopy, and be conducted every ten years.
- **Toronto:** conducts a canopy study every decade using LiDAR and satellite imagery.

While municipalities use a range of methods to measure the tree canopy and track changes, most municipalities indicated that it is too early to determine how tree protection and management actions have impacted the overall tree canopy.



4. Compensation Programs

Compensation programs may allow for the removal of healthy trees if more trees are planted to make up for the corresponding loss of ecosystem services. Cities have different formulas for calculating appropriate compensation ratios and often include a cash-in-lieu option:

- **Ajax:** a compensation program is employed through development applications, where a tree replacement formula is used and “trees are either replaced on-site, or cash-in-lieu is provided and the Town plants trees elsewhere”.
- **Cambridge & Guelph:** private tree by-laws work in a similar way, where, if homeowners are unable to plant enough compensation trees, they pay into a private tree planting reserve fund.
- **Niagara Falls:** the Official Plan “contain[s] a policy supporting a compensation program for the removal of private trees however a formal program has not yet been created”.

While compensation can be effective when trees cannot be protected, “the replacement trees are never at the same caliper as the tree removed typically” - meaning there is an initial decrease to the canopy (Mississauga).

3.5.4 Tree Replacement Program

At the discretion of the Town, deciduous trees with a min. caliper of 150 mm or coniferous trees with a min. height of 4.5 metres, which are to be removed or intended to be protected and expire within five years of completion of construction of the development, the following aggregate caliper formula shall be used:

If one 250 mm caliper tree is to be removed, the replacement shall be 5-50 mm caliper trees, 2-125 mm caliper trees or 1-250 mm caliper tree.

Based on the above formula, the applicant is to provide:

1. **How many healthy existing trees (that are more than 150mm DBH) are to be removed?** For example, there are 5 existing healthy deciduous trees with more than 150mm DBH that are to be removed due to the development.
2. **The total DBH (diameter at breast height in mm) removed** (i.e. the sum of all the removed trees' DBH). For example: 750 mm DBH (i.e. 5 x 150mm) are being removed.
3. **How many new trees (in what caliper) are to be replanted back to the subject site.** For example: 8 new deciduous trees in 60mm caliper, in a total of 480 mm DBH back to the site.
4. **The balance of DBH that is owing.** For example: 750 mm DBH – 480 mm DBH = 270 mm DBH.
5. **The balance of new trees.** 270 mm DBH divided by 60 mm (i.e. the size of a new tree) = 4.5, or round up to be 5 new trees
6. **Calculate the cash-in-lieu value for the balance of trees. We currently use \$500.00 per new tree.** \$500.00 x 5 = \$2,500.00 as the tree compensation cash-in-lieu.

Tree Replacement Formula (Town of Ajax)

5. Community Programs

Lastly, municipalities were questioned about the existence of tree-related programs facilitated by the municipality, and their effectiveness compared with tree protection and management policies. Programs mentioned include:

- Local Enhancement & Appreciation of Forests (LEAF) Backyard Planting Program (Ajax & Oakville)
- Reep Green Solutions Backyard Tree Planting Program (Cambridge)
- One Million Trees (Mississauga)
- Free Tree Giveaway Day (St. Catharines)



Free Tree Giveaway Day (St. Catharines Standard, 2019)

As indicated in the list of tree-related programs, programs are often implemented through partnerships with larger organizations. The informant from Barrie explained that “these programs as a result are far more successful as they start with the same goal in mind and are easy for municipal staff to support/assist with implementation”.

When comparing the effectiveness of policies versus programs, informants overwhelmingly cited the need for both. For example, the informant from Cambridge stated, “policies form the foundation of programs, so they are each important in their own way”. Additionally, the informant from Oakville discussed the success of both policies and programs in contributing to the tree canopy, stating that from 2017 to 2018, there were 2,072 planted on private properties through the revised private tree by-law and an additional 101 trees and 89 shrubs were planted on private properties through their backyard planting program.

The informant from Waterloo compared the effectiveness of private tree by-laws versus programs in reaching the goal of saving and protecting trees. For example, they explained that the punitive nature of by-laws is “burdensome to enforce and a great annoyance to the average resident”, whereas with less punitive measures and education programs, “trees become an asset to the property, not a liability”. Their perspective highlights the need for municipal staff, developers, and local residents to come together to “share an understanding and appreciation of the many benefits of trees”, which will, in turn, provide a better outcome overall tree canopy.

Conclusion

It is clear that municipalities share common successes and challenges with regard to urban forestry protection and management strategies. These findings are integrated into the *Recommendations* section in this report. More information about the survey can be found in Appendix B.

Recommendations

The need for protecting and enhancing urban tree canopies has become critical for municipalities. With tree canopies in many municipalities significantly below the recommended targets, alternatives to tree protection by-laws and new approaches through the legislative frameworks of planning are needed to ensure the expansion of urban tree canopies. In many municipalities, over half of the urban forest is located on private property. This has resulted in the need for urban forest strategies that extend beyond tree planting efforts and towards stronger development policies that ensure the protection and enhancement of existing trees on private land.

In addition to encouraging planners to incorporate the full array of applicable private tree planning policies in their work, the following recommendations are potential policy directions and tools for municipalities to consider. The list of recommendations demonstrates that private tree protection and management is best achieved when a variety of approaches and municipal actors are involved.

1. Develop & Implement a Private Tree By-law

Private tree by-laws are successful in protecting and preserving existing trees on private property. As a municipal by-law, this will be enforceable and can be applied throughout the development process, and in some instances, outside the planning development process.

- Develop a private tree by-law in consultation with residents and experts.
- Within the by-law, include specific language around fines for removing trees unlawfully (i.e. without submitting appropriate documentation), tree replacement ratios, and criteria for requiring a tree removal permit.



Developer Cut Down 30 Mature Trees Without Permit (Canuck Post)

2. Increase By-law Coverage

Municipalities may consider expanding the coverage within existing by-laws to include more regulations addressing trees on private property. This can be useful in cases where private tree by-laws are not viable. As mentioned in the report, this can be due to a variety of reasons, including a lack of interest or support from residents and Council, to the municipality's internal capacity for by-law governance and enforcement.

- Expand property standards-related by-laws to include the removal of hazardous trees, and add a standardized replacement formula and a cash-in-lieu calculation. Also consider providing a list of approved tree species for replacements.
- Explore means of including increased landscaped open space requirements in zoning by-laws, thus allowing municipal staff to request more tree planting on sites.

3. Strengthen Development Application Process

Several municipalities in Ontario are using creative tactics to bring tree protection and preservation into the development process, with some approaches proving to be highly effective in both protecting existing trees and encouraging new planting. In order to add a level of accountability to development applications, municipalities should formally incorporate tree protection and preservation into the development process.

- Add policies to the municipal Official Plan or Urban Design Guidelines that clearly outline requirements for a complete development application (e.g. requirements for tree protection/preservation plans when trees will be damaged by construction; or standards for site plans and the level of landscaping detail required).
- If a by-law is present, consider adopting an Official Plan policy that enables fines for removing vegetation prior to submitting a development application, similar to that present in the City of Barrie's Official Plan.
- Consider implementing a planting program modelled after the City of Thunder Bay (see 3.3.1 Policy Effectiveness - Development Process).
- Adopt a tree replacement ratio, under which a certain number of trees must be replanted for each tree an applicant removes. This formula could be a caliper-for-caliper replacement (e.g. Town of Ajax), a standardized formula, or a scaled formula (e.g. City of Vaughan). If new trees cannot be planted, a cash-in-lieu program should be implemented, where a monetary value for each tree removed is paid to the municipality (and can support off-site tree planting).



4. Designate Trees as Heritage Features

The *Ontario Heritage Act* (1990) allows trees to be given a heritage designation. Many municipalities cited the effectiveness of framing tree protection as a matter of preserving cultural or historic heritage, or the natural heritage features of neighbourhoods. Municipalities should explore neighbourhoods and trees that are potential candidates for tree protection.

- Compile a list of potential candidate trees to designate under the *Ontario Heritage Act* (1990) by engaging residents and experts.
- Apply to designate identified trees as natural heritage features or neighbourhoods as heritage landscapes through appropriate channels outlined by the *Ontario Heritage Act* (1990).

5. Create Resident-Focused Education Programs

Literature shows that while residents believe trees are beneficial, their knowledge of trees - including tree health and maintenance, native tree species, and ecosystem services they provide - is generally low. However, through staff surveys, some municipalities identified resident education as an important contributor to the success of tree programs and on-going tree protection and preservation efforts.

- Create educational programs and materials for residents about the benefits of trees, tree planting, and tree species identification.
- Identify and foster strategic partnerships with local organizations such as schools and other non-government organizations.
- Develop a culture of tree-conservation among city staff and the public. This can be facilitated by a strong UFMP.



Tree Education Program (LEAF - flickr)

6. Increase Tree-Related Programs

Staff from the municipalities interviewed overwhelmingly cited the need for both policies and programs to meet canopy targets. Municipalities used a combination of self-run initiatives and programs implemented through public-private partnerships with larger organizations. The latter approach may prove additionally beneficial as it decreases the onus on municipal staff to provide full-programming support.

- Partner with private organizations to develop resident tree stewardship and planting programs.
- Introduce and support year-round tree-related programs.
- Create a program that accepts monetary donations from residents and businesses to help fund community tree-planting initiatives and events.
- Explore the implementation of innovative programs that “gamify” tree planting and allow for robust data collection (e.g. Mississauga’s One Million Trees).

7. Leverage Perimeter Trees

The preservation of perimeter trees encourages more compact development while preserving existing trees on properties. Details can be included in municipal policies and guidelines to strengthen preservation and protection efforts. Municipalities should consider including the preservation of perimeter trees in policy and plans.

- Include preservation of perimeter trees in urban design guidelines and/or development regulations.
- Focus specifically on ensuring minimal disturbance to the root system of trees, so as to not encroach on tree drip lines.

8. Include Planting Target Ratios

Native tree species are well-adapted and contribute positively to the local ecosystem, however, many non-native tree species are better suited for harsh growing conditions (e.g. urban areas). Of the municipalities studied, no plans indicated target ratios for native-to-non-native or female-to-male planting, what the overall split of native-to-non-native species or female-to-male should be, or situations when respective species and sex should be used.

- Indicate target ratios for native-to-non-native and female-to-male tree planting in an UFMP and create a clear implementation strategy and timeline.
- Ensure that native trees are included on, and promoted via the municipal recommended planting list. These lists should also consider urban versus non-urban factors that influence the success of certain species.

9. Formalize Climate Resilience Considerations

Climate change is altering the environment, including temperature extremes and frost dates. While urban trees can help in mitigating and adapting to climate change, they themselves are vulnerable to these changes. Successful tree planting and tree survival rates must consider these factors. Research and surveys revealed that some municipalities are considering alternative tree species, planting schedules and locations, often informally. In order to proactively plan for climate resilience and to ensure high rates of survival from tree planting efforts, municipalities should consider formalizing climate resilience considerations:

- Adopt “active adaptive management” such as planting techniques to encourage assisted migration.
- Develop information for linking ecosystem services to specific land use in to guide tree species selection.

10. Canopy Cover Monitoring Metrics

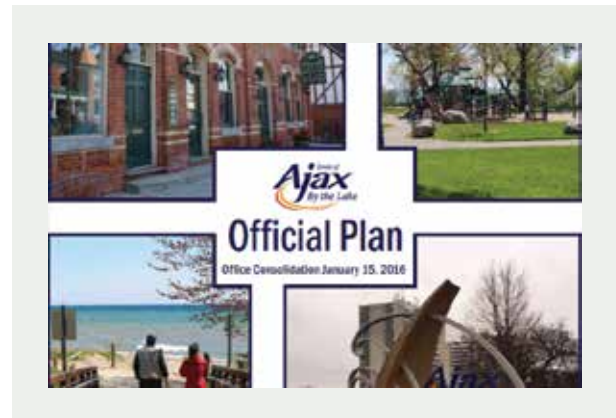
Currently, there are no national or provincial standards that identify canopy coverage targets or methods of measuring and monitoring the tree canopy. Municipalities studied either adopted targets from the International Society of Arboriculture or the American National Standards Institute. This can result in varying targets and approaches to both developing and pursuing tree canopy targets. Therefore, we recommend that municipalities:

- Support efforts to develop a scientifically-informed standard of practice for setting and achieving canopy cover targets (at the provincial- or national-scale).
- Continue identifying and following current best practices for canopy monitoring.
- Establish a canopy monitoring program (e.g. within an UFMP) that includes a recurring canopy assessment to track canopy change (e.g. every 10 years).
- Adopt a remote-sensing and land cover classification approach to long-range canopy monitoring. For example, The City of Toronto uses “high resolution leaf-on aerial and satellite imagery” to perform a land cover classification every decade. Although costly, remote sensing is an effective and practical method of monitoring canopy change over time.

11. Amend Official Plans and Design Guidelines to Include Overarching Tree Policies

Many municipalities have broad tree-related policies within their Official Plans and Design Guidelines. Such policies are an efficient way to address multiple aspects of private tree preservation and protection. Therefore, we recommend that municipalities amend these documents to include these policies that will address multiple aspects of all private tree matters using one policy. This can be effective as all policy aims can be included in one policy, instead of throughout an entire planning document. In addition to the specific policies included in this Guide, the documents below include comprehensive policy that can be used as models:

- **Ajax:** Official Plan (2016)
- **Cambridge:** Official Plan (2018)
- **Guelph:** Official Plan (2018)
- **Toronto:** Official Plan (2015)
- **Oakville:** Livable by Design Manual (Part C) – Site Design and Development Standards (2017)



12. Ensure a Consistent Municipal “Tree Vision”

To ensure the greatest success in maintaining and increasing tree canopy coverage, the municipality’s tree-related goals should be apparent and consistent across all documents, policies, programs, and activities carried out by the municipality. The goals of the municipality should be clear to all stakeholders. When all municipal departments, stakeholders, and residents are aware and committed to this vision, substantial progress in managing and protecting the urban forests can be made. To achieve this, it is recommended that municipalities create a vision statement, or a set of goals with regard to canopy coverage and urban forest health, that governs all activities that intersect with tree protection and management.

Concluding Remarks

Trees are valuable assets for Canadian communities due to the environmental, ecological, public health, and social benefits they provide. As this Practice Guide demonstrates, trees located on private property play an important role in the overall health and well-being of a municipality’s urban forest, and will continue to do so as urbanization increases across the country. Therefore, private trees should be specifically included in tree-related policies and programs by municipalities. Although this study was limited to the geography of Ontario, recommendations provided can and should be adapted to suit the unique socio-political framework present in other provinces and territories.

Substantial change can occur by adopting only a few of the suggested interventions; however, it is encouraged that municipalities adopt both policies and programs targeted at enhancing the tree canopy. The most important takeaway is that Canadian municipalities should implement tree protection and management measures to ensure the well being of their community and urban forests well into the future.

Definitions

Assisted Migration: A conservation tool and adaptation strategy that consists of moving and establishing species or populations outside of their historical range to a new location where the climate will be more suitable under expected conditions of climatic change (also referred to as Assisted Colonization) (Fontaine & Larson, 2016).

Drip Line: The area directly underneath the outer circumference of the tree branches. When the tree canopy gets wet, excess water is shed and falls along the drip line. This is also known as a tree's Critical Root Zone (CRZ).

Ecological Integrity: A contested definition, but generally refers to the natural composition of species and/or habitat, or the wholeness and proper functioning of an ecosystem (Conway, 2019).

Ecosystem Services: Goods or services produced by urban forests that contribute to human well-being (MEA, 2005).

Good Forestry Practices: As defined by the Forestry Act (1990), Good Forestry Practices refers to the proper implementation of harvest, renewal, and maintenance activities in a given forest and environmental context. This includes minimizing adverse effects on significant ecosystems, important fish and wildlife habitat, soil and water quality and quantity, forest productivity and health, and the aesthetics and recreational opportunities of the landscape (1(1)).

Invasive Species: Any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem; and whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Native Species: Trees and plants that have adapted to the local climate and soil conditions. This means that they do not need as many resources such as watering or fertilizers to grow properly. These species have evolved with native animals and insects, and provide habitat and a food source.

Significant Woodlands: Treed lands which are of special interest due to ecological, functional or economic considerations. Some municipalities differentiate between smaller “locally significant woodlands” and larger “provincially significant woodlands”.

Tree Canopy: A measurement of the aerial extent of tree foliage coverage, typically measured in percentage of total land area. Also known as forest canopy cover, or canopy coverage.

Tree protection: To prevent or minimize harm to any tree.

Tree preservation: To ensure trees are maintained in their existing states.

Urban Forest: The sum of all woody and associated vegetation in and around dense human settlements.

Urban Forest Management Plan: A tailored plan that guides tree care professionals to proactively and effectively manage and provide for maximum, long-term benefits to the community (United States Global Change Research Program, 2019).

References

- Bonney, M. T., & He, Y. (2019). Attributing drivers to spatio-temporal changes in tree density across a suburbanizing landscape since 1944. *Landscape and Urban Planning*, 192, 103652. <https://doi.org/10.1016/j.landurbplan.2019.103652>
- Canadian Urban Allergy Audit. (2012). PolleNation™. Retrieved May 27, 2020 from http://file.marketwire.com/release/PolleNation_Report.pdf
- Conway, T. M., Almas, A. D., & Coore, D. (2019). Ecosystem services, ecological integrity, and native species planting: How to balance these ideas in urban forest management? *Urban Forestry and Urban Greening*, 41, 1–5. <https://doi.org/10.1016/j.ufug.2019.03.006>
- City of Cambridge. (2015). Urban Forest Plan 2015-2034. Retrieved from <https://www.cambridge.ca/en/learn-about/resources/Accessible-PDFs/Cambridge-Urban-Forest-Plan-2015-2034.pdf>
- City of Toronto. (2013). Sustaining and Expanding Urban Forest: Toronto's Strategic Forest Management Plan 2012-2022. Retrieved from <https://www.toronto.ca/data/parks/pdf/trees/-sustaining-expanding-urban-forest-management-plan.pdf>
- Douglas, T. (2016). Best Practices for the Creation of Urban Forest Management Plans: Lessons from London and Mississauga for Ontario's Large Municipalities (Master's project), Queen's University, Kingston, ON.
- Fontaine, L. C., & Larson, B. M. H. (2016). The right tree at the right place? Exploring urban foresters' perceptions of assisted migration. *Urban Forestry and Urban Greening*, 18, 221–227. <https://doi.org/10.1016/j.ufug.2016.06.010>
- Landry, J-S., & Ramanjuttu, N. (2015). Carbon Cycling, Climate Regulation, and Disturbances in Canadian Forests: Scientific Principles for Management. *Land*, 4, 83-118.
- McGovern, M., & Pasher, J. (2016). Canadian urban tree canopy cover and carbon sequestration status and change 1990–2012. *Urban forestry & urban greening*, 20, 227-232.
- Millennium Ecosystem Assessment (MEA). (2005). *Ecosystems and Human Well-Being, Synthesis*. Island Press, Washington, DC.
- Natural Resources Canada. (2020). How much forest does Canada have? Government of Canada. Retrieved from <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/how-much-forest-does-canada-have/17601>
- Province of Ontario. (2014). Provincial Policy Statement. Retrieved from <http://www.mah.gov.on.ca/Page10679.aspx>
- Province of Ontario (2001). Municipal Act, Statute of Ontario, 2001, c.25. Retrieved from <https://www.ontario.ca/laws/statute/01m25>
- Province of Ontario. (1990). Conservation Land Act, 1990, c. C.27. Retrieved from <https://www.ontario.ca/laws/statute/90c27>
- Province of Ontario. (1990). Environmental Protection Act, 1990, c. E.19. Retrieved from <https://www.ontario.ca/laws/statute/90e19>

Province of Ontario. (1990). Forestry Act, 2000, c. 18. Retrieved from <https://www.ontario.ca/laws/statute/00p18>

Province of Ontario. (2005). Greenbelt Act, 2005, c. 1. Retrieved from <https://www.ontario.ca/laws/statute/05g01>

Province of Ontario. (1990). Ontario Heritage Act, 1990, c. O.18. Retrieved from <https://www.ontario.ca/laws/statute/90o18>

Province of Ontario. (1990). Planning Act, Revised Statute of Ontario, 1990, c.P.13. Retrieved from <https://www.ontario.ca/laws/statute/90p13>

Province of Ontario. (2005). Places to Grow Act, 2005, c. 1. Retrieved from <https://www.ontario.ca/laws/statute/05g01>

Province of Ontario. (2000). Professional Foresters Act, 2000, c. 18. Retrieved from <https://www.ontario.ca/laws/statute/00p18>

Province of Ontario. (2014). A Place to Grow – Growth Plan for the Greater Golden Horseshoe. Retrieved from <https://www.ontario.ca/document/place-grow-growth-plan-greater-golden-horseshoe>

Society of Arboriculture. (2011). Criteria and Indicators for Strategic Urban Forest Planning and Management. Retrieved from https://www.isa-arbor.com/events/conference/proceedings/2013/VAN_WASSENAER_article_AUF_%20May_2011.pdf

Statistics Canada. (2011). Census 2011 Census. Ottawa. Released October 24, 2012. http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/vc-rv/index.cfm?Lang=ENG&TOPIC_ID=1&GEOCODE=01

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments [https://doi.org/10.1016/S0272-4944\(05\)80184-7](https://doi.org/10.1016/S0272-4944(05)80184-7)

U.S. Climate Resilience Toolkit. (2019). Retrieved November 20, 2019, from <https://toolkit.climate.gov/tool/urban-forest-management-plan-toolkit>