



## **DRAFT** Natural Heritage & Urban Forest Strategy (NH&UFS)

### **OVERVIEW**

June 2013

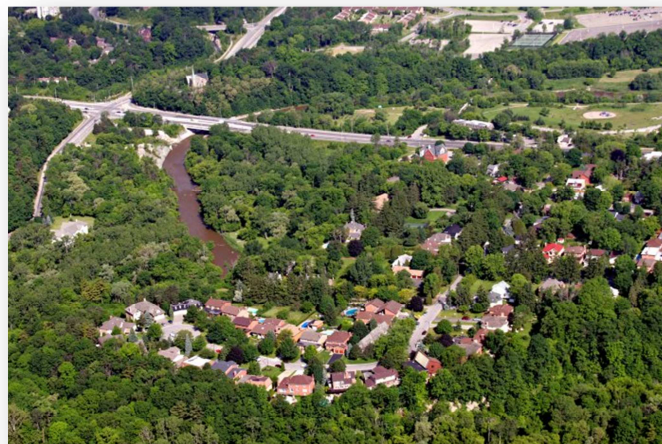
#### **Introduction**

Mississauga's natural areas and urban forest are found within the City's parks and open spaces, along its valley and stream corridors, across its lakeshore, and within its built-up areas on a wide range of public and private lands. These green spaces and green elements are the natural and cultural heritage shared by the community, and provide a vital connection to Mississauga's past, and its future.

While a number of municipalities have undertaken either Natural Heritage Strategies or Urban Forest Strategies, Mississauga is the first to fully recognize the close relationship and overlap between natural heritage and the urban forest, particularly in a city, by addressing them in a joint Strategy. This Strategy is also one of the first to look at natural heritage and the urban forest from a more holistic perspective in terms of their relationship to other "green" elements in the city.

In its Official Plan (2011), the City of Mississauga identifies a "Green System" that includes the Natural Areas System, Natural Hazard Lands and Parks and Open Space on both private and public lands. This Green System was immediately recognized through this Strategy as the perfect framework for: (a) conveying the interrelatedness of the various system components, (b) illustrating the connections between the people of Mississauga, and the natural heritage and urban forest around them, and (c) for identifying opportunities for protecting, enhancing, expanding and restoring the city's natural heritage and urban forest. Two key recommendations made through this Strategy to improve this framework are to:

1. change the label "Natural Areas System" to "Natural Heritage System" (to be more consistent with Provincial policy direction), and
2. recognize the urban forest as a cornerstone of the Green System.





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**Figure 1** conceptually illustrates the interrelatedness of the Natural Heritage System and the urban forest, as well as their overlap with other components of the City's Green System, and the central importance of the City's Green System within Mississauga as a whole. This figure has evolved over the course of this Strategy, and been developed based on input from City staff, stakeholders and the public.



**Figure 1.** Conceptual illustration of the interrelatedness of the Natural Heritage System and the urban forest with each other, and with the other components of the City's Green System, and the central importance of the City's Green System within Mississauga as a whole. *All of the components illustrated include private as well as public lands.*



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### Strategy Development

This Strategy has been developed based on:

- a critical review of all the relevant data, mapping, legislation, policies, plans and guidelines
- a review of the City's relevant operational and procedural practices
- consideration of relevant best practices and precedents, as well as the current technical and scientific literature, and
- input from: City staff, the City's Environmental Advisory Committee and representatives from other City committees, Peel Region's Urban Forest Working Group, a wide range of stakeholders<sup>1</sup>, and representatives for the community at large.

The direction in this Strategy (the NH&UFS) has also been informed by relevant Federal, Provincial and Regional policies and several key City plans. In addition, its implementation is directly supported by the City's Urban Forest Management Plan (the UFMP), which has been developed in tandem with this Strategy (as shown in **Figure 2**). The NH&UFS and UFMP share a vision, guiding principles and strategic objectives, but are two stand alone documents that can generally be distinguished as follows:

- The NH&UFS is the overarching document for both natural heritage and the urban forest that includes planning direction as well as strategies addressing opportunities with respect to external planning, management, engagement and partnerships, and tracking (including targets). It includes 30 strategies (summarized below).
- The UFMP is a more detailed and technical document focused on the operational, technical and tactical aspects of urban forest and natural heritage management required to implement many of the actions related to the broader strategies identified in the NH&UFS. It includes 24 Actions (summarized below).



**Figure 2. Illustration showing the key City guiding documents for the Natural Heritage & Urban Forest Strategy, and the close relationship between the NH&UFS and the Urban Forest Management Plan.**

<sup>1</sup> Stakeholders representing a range of local groups and organizations invited to participate in this process include representatives from: aboriginal organizations, government and agencies (including adjacent municipalities and local conservation authorities), committees to City Council, local educational institutions, environmental groups, community groups and residents associations, recreational facilities, business and development organizations, local utilities and transit firms, and arboriculture firms.





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### Mississauga's Natural Heritage System



Mississauga's Natural Heritage System (NHS) was originally conceived in 1996. Since that time it has evolved and been refined in response to changes in Provincial and City policy direction, increased involvement of the conservation authorities in natural heritage planning, an increase in the availability and accuracy of information related to the natural environment, and changes in the approach taken to protect natural heritage. The NHS includes woodlands, wetlands, watercourses, and valleylands.

In 2012, Mississauga's NHS comprised 2737 ha (6760 ac) and covered 9.4% of the city (excluding the recently acquired Ninth Line Corridor lands). An additional 481 ha are being recommended for addition through this Strategy (including the Ninth Line Corridor lands). The recommended additions increase the NHS cover 11% of the city, as shown in **Table 1**.

**Table 1. Components of Mississauga's Natural Heritage System.**

	2012 NHS Area ha (acres)	2013 Recommended Additions ha (acres)	2013 Recommended NHS Area ha (acres)	2013 Updated NHS % of City*
<b>Natural Areas</b>	2147 (5305)	141 (348)	2288 (5651)	7.8%
<b>Residential Woodlands</b>	232 (573)	0 (0)	232 (573)	0.8%
<b>Contributing Linkages</b>	186 (459)	0 (0)	186 (459)	0.6%
<b>Special Mgmt. Areas</b>	172 (426)	340 (840)	512 (1265)	1.7%
<b>TOTALS</b>	<b>2737 (6760)</b>	<b>481 (1188)</b>	<b>3218 (7948)</b>	<b>11.0%</b>

\* Percentages based on an area of 29,213 ha, which excludes the recently acquired Ninth Line Corridor lands

Major trends identified through the annual update reports since 1996 include: (1) a decrease in the area of tableland and smaller wetland natural areas in the City, (2) a gradual decrease in the quality of the vegetation communities, (3) a City-wide decline in the diversity and abundance of amphibian species, and (4) an increase in naturalization projects undertaken by the City, usually as part of community based stewardship initiatives (which, in some cases, have contributed to small expansions of the Natural Heritage System).

These trends point to the need for: (1) stronger protection for natural areas – particularly woodlands and smaller wetlands, (2) more active management of protected areas (at least those that are City or conservation authority owned), (3) habitat enhancement and, where possible, expansion, as well as mitigation as it relates to amphibian breeding, overwintering and movement, and (4) continued and expanded stewardship efforts.

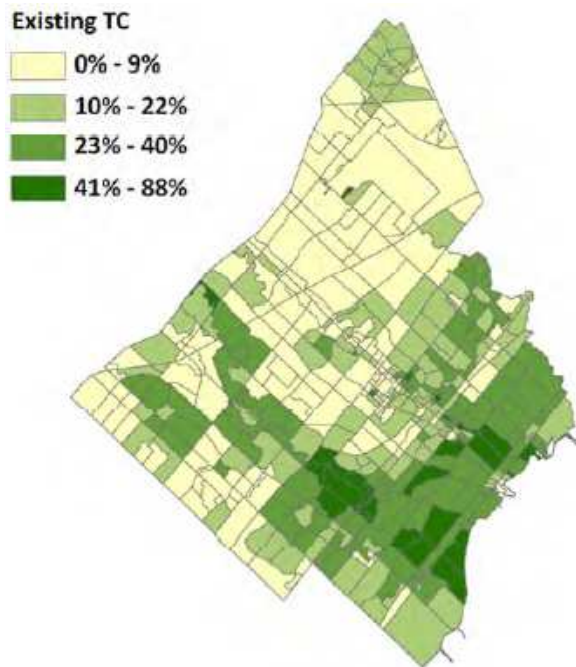


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#### Mississauga's Urban Forest



Mississauga's urban forest is fundamental to the City's environmental, social and economic well-being. The City's estimated 2.1 million trees provide valuable environmental services such as pollution filtration, flood control, carbon storage, benefits related to mental and physical health, and various economic spin-offs. The urban forest includes all the wooded areas within the Natural Heritage System, plus all the trees outside this system within the city's boundaries (e.g., street trees, trees in parks, residential yards, business parks, commercial lots, school grounds, hospital grounds, golf courses, cemeteries, etc.).

**Figure 3. Existing tree canopy cover (TC) by small geographic units (from City of Mississauga Urban Forest Study, 2011).**

In addition to the data collected in Mississauga's wooded natural areas through the City's Natural Areas Surveys (ongoing since 1996), recent urban forest studies undertaken by the Peel Region Urban Forest Working Group<sup>2</sup> have provided additional useful data about Mississauga's urban forest as a whole. Key findings include: (1) Mississauga has an urban forest canopy cover of approximately 15% which is not evenly distributed across the city, (2) most of Mississauga's trees are in relatively good health, but small in stature (e.g., about 60% are 15 cm in diameter or less), (3) the dominant trees in the city are maple and ash, with ash accounting for about 18% of the trees in residential areas and 10% of the street trees, and (4) more than half of the city's canopy cover is located in residential areas.

These facts point to: (1) the need to target tree establishment to areas with relatively low canopy cover, (2) the importance of establishing and maintaining recently planted trees so that they are able to mature to canopy producing stature, (3) the need to increase the diversity of tree species being planted on public and private lands so that the urban forest is more resilient to the next invasive pest or pathogen that arrives, and (4) the important role of residential areas and the remaining natural areas in sustaining and expanding the current canopy cover.

<sup>2</sup> The Peel Region Urban Forest Working Group is comprised of the Region of Peel, City of Mississauga, City of Brampton, Town of Caledon, Toronto Region Conservation Authority and Credit Valley Conservation.



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### Ecosystem Services Provided by Mississauga's Green System

As illustrated in **Figure 1**, Mississauga's Green System includes the Natural Heritage System and the urban forest, as well as natural hazard lands, parks and open space, and other green infrastructure elements such as green roofs. Together, these provide what are called "ecosystem services". "Ecosystem services" is a term used to describe the processes of nature needed to support the health and survival of humans. While ecosystem services are required and used by all living organisms, the term has been coined to capture their direct value (quantified or not) to humans. Critical ecosystem services provided by the Green system include:

- flood and drought management
- air and water purification
- carbon storage and sequestration
- pollination of crops and other vegetation
- contributing to safer cities
- contributing to human physical health
- contributing to human mental health and spiritual well-being
- social networking opportunities
- habitat for native biodiversity, and
- ecological connectivity.



**One research paper reported a 46% decrease in crash rates across urban arterial roads and highways after landscape improvements were installed.**

*Naderi, J. R. (2003)*

**Research in Portland Oregon found that the presence of street trees, on average, added \$8870 to the sales price of the house and reduced the time on the market, on average, by 1.7 days.**

*Donovan, G. H. and D. T. Butry. 2010. "Trees in the city: Valuing street trees in Portland, Oregon". Landscape and Urban Planning 94: 77-83.*

**Researchers at Columbia University have found that for every additional 343 trees per square kilometer, asthma rates drop by 25% in young children.**

**... [P]hytoncides (essential oils derives from trees) have been suggested to exert a preventative effect on cancer generation and development.**

*A Healthy Dose of Green (Trees Ontario 2012)*



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### Natural Heritage System and Urban Forest Targets

Indicators and targets are recognized as useful tools in measuring performance in relation to established objectives. This Strategy builds on the direction provided in the City's Strategic Plan (2009) and Living Green Master Plan (2012), and has developed six targets which can serve as bars against which the City can measure its progress over the next 20 years (i.e., the timeframe of this Strategy, and the related Urban Forest Management Plan, 2014 to 2033).

Although the targets #1 and #3 are not optimal, in the context of Mississauga they are considered progressive and achievable.

**Table 2. Recommended Natural Heritage System (NHS) and urban forest targets.**

Target Type	Current Status	Recommended Target
<b>1. NHS Size</b>	9.4% of the City	12% to 14% of the City
<b>2. NHS Linkage</b>	a. 62% of watercourses have vegetation for at least 30 m on either side b. XX% (TBD)** of Significant Natural Areas are linked through the NHS	a. 75% of watercourses have vegetation for at least 30 m on either side b. XX% (TBD)** of Significant Natural Areas to be linked through the NHS or other components of the Green System
<b>3. NHS Quality</b>	Conservation Plans have only been completed for a few Significant Natural Areas	Conservation Plans to be completed and implemented for all Significant Natural Areas
<b>4. Urban Forest Canopy Cover</b>	approximately 15%	15% to 20%
<b>5. Urban Forest Quality (of City Street and Park Trees)</b>	a. Current City tree inventory is not up to date, is missing some key metrics, and excludes naturalized portions of City parks b. About six species account for 42% of the urban forest c. Invasive Norway maple accounts for about 8% of the urban forest	a. The inventory includes all City street and park trees, including current data on their condition and health b. No tree species represents more than 5% of the tree population City-wide or more than 20% on a given street c. Gradual reduction of non-native, invasive trees on City lands
<b>6. Urban Forest Canopy Distribution</b>	Current canopy cover distribution in the city is very uneven.	Canopy cover is increased disproportionately in areas previously below 15%.

\* Data Source: City of Mississauga Urban Forest Study (2011) and subsequent analyses by the Peel Urban Forest Working Group. \*\* Data analyses are underway.





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Notably, target ranges (as opposed to single target values) have been selected for #1 and #4 to reflect the fact that there are variables outside the City's control that will influence gains (and losses) in NHS cover and tree canopy cover over the next 20 years, and which can influence the outcomes significantly. Targets #3, 5 and 6 only apply to City and conservation authority lands.

**TARGET 1:** The target range of 12% to 14% NHS cover is an ambitious, but achievable for Mississauga, assuming the applicable recommended strategies are implemented. Between 1996 and 2012 the NHS had net gains of 49.76 ha (3.1. ha/yr). Assuming the 481 ha identified through this Strategy is added to the NHS (see **Table 1** and **Map 1**), to achieve the lower end of the target range of 12%, net gains of 15.6 ha/yr over the next 20 years will be required. Gains of 46.5 ha/yr will be required to achieve the higher end of the NHS target range of 14%. Although another substantial increase is not unlikely, going forward, additional incremental expansions are anticipated through: annual Natural Areas updates, updates to the Residential Woodlands (to capture areas where canopy cover has matured since the original mapping was done), the expansion of Special Management Areas along watercourses as opportunities arise, and other opportunities to be determined (e.g., possible habitat creation projects).

**TARGET 2:** Although the connectivity of Mississauga's Natural Heritage System is constrained by the built environment, there remain opportunities to enhance and improve it: (a) along the watercourses, and (b) by recognizing the linkage functions of the other components of the NHS as well as of the Green System in supporting natural connectivity (see **Map 2**).

**TARGET 3:** Within urban areas, two primary factors that impair the quality of natural areas are invasive species invasions, and over-use. However, both of these factors can be addressed through management, therefore it is recommended that concise Natural Area Conservation Plans focused on operational needs (Strategy #13) be developed for all Significant Natural Areas.

**TARGET 4:** In reality, increasing canopy cover in an urban area is more challenging than might be expected. Even with ongoing tree planting efforts, a target of 15% to 20% is considered realistic for Mississauga because: (a) emerald ash borer, a pest that kills almost all ash trees, is established in Mississauga and will peak over the next few years, (b) many lands have existing zoning that permits some type of development, (c) infrastructure still needs to be improved or expanded, (d) hazard trees must be removed, (d) most of the City's trees are small and will not start contributing substantially to canopy cover for at least 10 to 20 years, (e) some trees, in the past, were planted in poor conditions, (f) it is a added challenge to maintain newly planted trees under conditions of climate change (e.g., more intense periods of drought, more frequent storms).





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**TARGET 5:** Improving the species diversity of street and park trees, and having a comprehensive and well-maintained inventory of all these trees, will be critical to ensuring the City's urban forest is more resilient to climate change and other stressors.

**TARGET 6:** Strategically targeting additional tree planting efforts in areas that have lower than average canopy cover in the City will contribute to overall canopy cover targets, and also help ensure that access to the range of ecosystem services provided by tree cover are provided more equitably across the city.

### Vision, Guiding Principles and Objectives

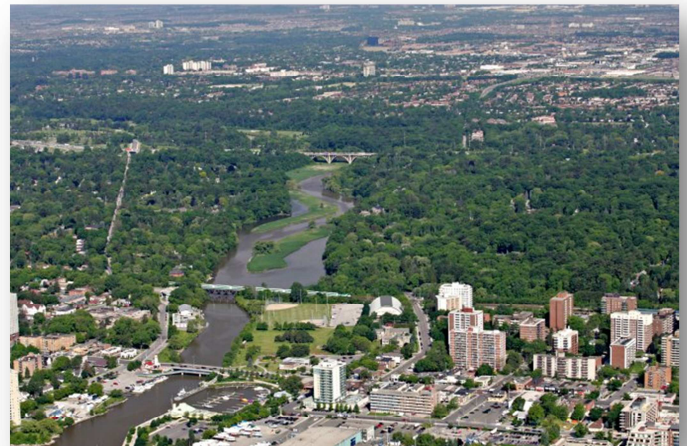
The following vision, guiding principles and objectives are intended to provide the “big picture” direction for this Strategy over the document's 20 year lifespan.

**VISION:** *The City, private and public stakeholders, and members of the community are working together to protect, enhance, restore, expand and connect Mississauga's Natural Heritage System and urban forest so that native biodiversity and the ecosystem services essential for a healthy community are sustained for present and future generations.*

Key themes in the **guiding principles** include: taking a “conservation first” approach, maximizing native biodiversity, building on past successes, learning from others, viewing the NHS and urban forest within the city's broader Green System, recognizing the value of the ecosystem services provided by this system, making stewardship part of daily living, integrating climate change and adaptive management, pursuing opportunities for protecting / enhancing / restoring / expanding the NHS and urban forest, and tracking performance.

The nine **strategic objectives** recognize different approaches are required for public versus private lands, and include the following direction:

1. Increase internal (within the City) and external (among the community and other stakeholders) awareness
2. Expand the Natural Heritage System (NHS) on public and private lands
3. Build on existing, and develop new, public and private sector partnerships
4. Undertake regular monitoring of the NHS and urban forest
5. Protect the NHS and urban forest on public lands through proactive management, enforcement of applicable regulations, and education





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6. Enhance and restore the NHS and urban forest on public lands by improving their condition and connectivity, establishing more trees, and creating habitats
7. Support the NHS and the urban forest by managing public open spaces to maximize their ecological functions (while maintaining their primary uses)
8. Protect the NHS and urban forest on private lands through education, implementation of applicable policies and regulations, the development review process, and enforcement
9. Enhance and restore the NHS and urban forest on private lands by promoting stewardship, naturalization, restoration, tree planting and proactive tree care with creative outreach and incentives

### **Recommended Strategies and Supporting Actions**

A total of 30 STRATEGIES have been identified to support the vision and objectives, as well as guide the City in achieving the established targets, under the following four themes: (1) planning, (2) management, (3) engagement and (4) tracking. These Strategies are shown with the more detailed supporting ACTIONS (24 in total), identified through the Urban Forest Management Plan.

#### **PLANNING FOR THE NATURAL HERITAGE SYSTEM AND URBAN FOREST**

**STRATEGY #1:** Improve interdepartmental coordination and information sharing on natural heritage and urban forest issues

- **Action #3:** Formalize involvement of City Forestry staff in the City planning and information sharing related to trees
- **Action #19:** Improve and maintain awareness among City departments about current natural heritage and urban forest policies, by-laws and technical guidelines

**STRATEGY #2:** Revise the City's Green System framework to clarify natural heritage feature categories and include the urban forest

**STRATEGY #3:** Revise Official Plan policies related to the Natural Heritage System to be more consistent with Provincial and Regional policies

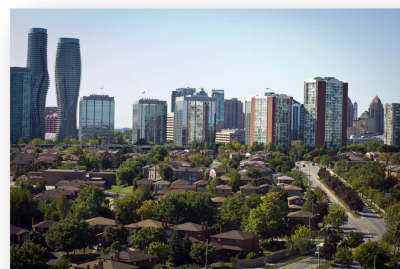
**STRATEGY #4:** Clarify and strengthen Official Plan policies related to the Natural Heritage System

**STRATEGY #5:** Refine Official Plan policies to better support connectivity of the Natural Heritage System

**STRATEGY #6:** Strengthen Official Plan policies related to the urban forest

**STRATEGY #7:** Update Residential Woodlands mapping and expand site plan control areas to include this mapping

**STRATEGY #8:** Strengthen existing by-laws to improve their ability to support natural heritage and urban forest objectives





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- Action #12: Update Public Tree Protection by-law to better support urban forestry objectives
- Action #13: Update Erosion Control by-law and the Nuisance Weeds by-law to support urban forestry and natural heritage objectives
- Action #14: Update the Private Tree Protection By-law to better support urban forestry objectives

**STRATEGY #9**: Develop selected policies and guidelines that apply outside of, but will support, the Natural Heritage System and the urban forest

### **PROTECTION AND MANAGEMENT OF THE NATURAL HERITAGE SYSTEM AND URBAN FOREST**

**STRATEGY #10**: Pursue opportunities to enhance and expand the Natural Heritage System

**STRATEGY #11**: Use a range of approaches to improve Natural Heritage System connectivity

**STRATEGY #12**: Track and recognize naturalization/stewardship initiatives on public and private lands

**STRATEGY #13**: Develop and Implement Natural Area Conservation Plans

- Action #17: Develop and implement City-owned woodland management through Natural Area Conservation Plans

**STRATEGY #14**: Develop and implement a targeted urban forest expansion plan

- Action #10: Work with City staff and external partners to implement urban forest expansion

**STRATEGY #15**: Improve tree establishment practices on public and private lands

- Action #4: Develop consistent and improved City-wide tree preservation and planting specifications and guidelines
- Action #5: Improve the inventory of City street and park trees
- Action #11: Implement improved tree establishment practices

**STRATEGY #16**: Improve tree health and risk management practices on City lands

- Action #5: Improve the inventory of City street and park trees
- Action #6: Improve street and park tree maintenance operations
- Action #7: Implement a young tree maintenance program
- Action #8: Develop and implement a tree risk management protocol
- Action #9: Implement an urban forest pest management plan

**STRATEGY #17**: Seek opportunities to integrate aquatic management needs with ongoing natural area management

**STRATEGY #18**: Continue strategic acquisition of high priority natural areas

**STRATEGY #19**: Ensure effective implementation and enforcement of natural heritage and urban forest policies and by-laws on public and private projects

- Action #15: Increase effectiveness of tree preservation as part of private projects
- Action #16: Increase effectiveness of tree preservation as part of municipal operations and capital projects



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#### **ENGAGING THE COMMUNITY IN CARING FOR NATURAL HERITAGE AND THE URBAN FOREST**

**STRATEGY #20:** Leverage the City's website and social media resources as a promotional tool

- **Action #18:** Develop a short video series and make the City's tree inventory public to support outreach, education and stewardship

**STRATEGY #21:** Use daily planning, operational and enforcement activities as opportunities to demonstrate and educate

- **Action #20:** Improve and maintain awareness among external stakeholders about current natural heritage and urban forest policies, by-laws and technical guidelines

**STRATEGY #22:** Build on current outreach programs with a variety of initiatives specifically targeted to local arborists, local developers, private open space uses, and youth

- **Action #20:** Improve and maintain awareness among external stakeholders about current natural heritage and urban forest policies, by-laws and technical guidelines
- **Action #21:** Support various partners and organizations in their efforts to undertake targeted engagement of local businesses and schools

**STRATEGY #23:** Develop and undertake a campaign to promote the value of public natural areas

- **Action #18:** Develop a short video series and make the City's tree inventory public to support outreach, education and stewardship

**STRATEGY #24:** Use the One Million Trees Program as a platform for expanding stewardship on lands not owned by the City

- **Action #22:** Continue to work with various partners to undertake stewardship on public and private lands

**STRATEGY #25:** Develop and expand partnerships with the Region, agencies, institutions and nearby municipalities to support information gathering, analysis and coordinated responses

- **Action #23:** Partner with local agencies and institutions to pursue shared research and monitoring objectives
- **Action #24:** Build on existing partnerships with the Region of Peel and nearby municipalities to facilitate information sharing and coordinate responses to environmental issues

**STRATEGY #26:** Pursue funding from a range of sources to support natural heritage and urban forest objectives, and support non-profit organizations and institutions in doing the same

**STRATEGY #27:** Identify cost-effective incentives to support the implementation of natural heritage and urban forest objectives

#### **TRACKING THE STATE OF THE NATURAL HERITAGE SYSTEM AND URBAN FOREST**

**STRATEGY #28:** Track the status of the Natural Heritage System

**STRATEGY #29:** Track the status of Mississauga's urban forest

- **Action #1:** Adopt the three-tiered UFMP framework to implement action items and monitor their status





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- **Action #2:** Monitor the status of the urban forest

**STRATEGY #30:** Report on the Status of the Natural heritage System and urban forest every four years

*Detailed implementation guidance (e.g., estimated resource requirements, responsible parties, priority, etc.) related to each of these strategies will be developed as part of project completion.*