PEEL REGION

Tree priority planting tool

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Source: Adobe Stock Photo

THE SCIENCE

The Regional Municipality of Peel (population 1.4 million) is located on the shore of Lake Ontario just west of the City of Toronto. Peel Region, which consists of three local municipalities – the City of Mississauga, the City of Brampton, and the Town of Caledon – is one of the fastest-growing municipalities in Canada.

The urban tree canopy provides a plethora of social, environmental, and ecological benefits to communities in Peel Region. Trees help reduce the urban heat island effect, reduce peak storm water run-off volumes, increase property values, mitigate air pollution, and improve mental health. Despite these benefits, municipalities in Peel Region have limited budgets with which to maintain existing tree cover and plant new trees. In addition, various pests and diseases such as the Emerald Ash Borer and an increase in extreme weather events because of climate change have dramatically accelerated the natural rate of tree loss and increased pressure on the urban tree canopy locally. The increased threats to the urban forest as well as rapid population growth raises some important questions for municipal planners and foresters. How can tree planting be encouraged beyond traditional areas like valley lands? Are there tools available to help practitioners direct limited resources to most effectively manage the urban tree canopy?

THE TRIGGER

Tree planting and maintenance services in Peel Region are primarily provided by the cities of Mississauga and Brampton, and the Town of Caledon. Between 2007 and 2011, the Region of Peel collaborated with these local area municipalities and two local conservation authorities (Toronto and Region Conservation and Credit Valley Conservation) to develop a comprehensive Peel Region Urban Forest Strategy. Following the publication of the Strategy in 2011, city and regional officials began discussing how to implement it. Questions arose about how best to direct limited resources to maximize the multiple environmental, social, and economic benefits of trees to the community. Discussion centred on the need for a rigorous science-based mapping tool that could help environmental stewards, planners and urban foresters prioritize geographic areas for tree planting based on scientific evidence of their multiple benefits.

THE APPROACH

The purpose of the Peel Tree Planting Prioritization Tool is to have an effective and strategic decision-making tool for prioritizing possible tree planting in areas of Peel Region to meet multiple environmental, social and economic objectives. The tool was developed over a two year period (from 2013 to 2015) with extensive stakeholder consultation at all stages of the project. A core project team managed the project and consultants were retained to develop the tool. A multi-disciplinary technical steering committee – with expertise in parks, forestry, environmental education and stewardship, public health, planning, transportation, and human services – was formed to provide input and advice at key stages throughout the tool's development. The development of the tool proceeded in three steps:

Sustainability Themes	Overall Benefit
A. Environmental	1. Mitigating air pollution
	2. Mitigating urban heat island effects
	3. Contributing to management of surface water quantity and quality
	4. Maintaining and enhancing natural heritage
B. Economic	5. Enhancing economic value
	6. Providing direct cost savings
C. Social	7. Supporting improved physical health and emotional well-being
	8. Strengthening communities and enhancing social equity

Target Benefit	Opportunity Zone	Opportunity Zone Categories
2. Cooling where heat island effects are greatest	Areas with surface temperatures of 31°C or more	Primary Zone: areas with surface temperatures between 35°C and 44.2°C Secondary Zone: areas with surface temperatures between 33°C and 34 °C Tertiary Zone: areas with surface temperatures between 31°C and 32°C

Figure 20: *The tool identifies criteria to apply to the sustainability themes (Source: Region of Peel)*

Step I: Identification of sustainability themes

The consultants conducted a comprehensive review of the scientific literature on the multiple benefits of the urban forest. The project team in consultation with stakeholders then grouped the various benefits into eight overall categories under three sustainability themes.

Step II: Identification of criteria to apply to the sustainability themes

The project team began this step by identifying potential target benefits and reviewing data sets at various scales to spatially define each of the eight categories of benefits. In consultation with stakeholders, the categories were screened with the data sets and cross-checked with scientific literature to arrive at 12 target benefits, along with data sources, spatial extent, and effective weighting. See the example above for "mitigating urban heat island effects."

Step III: Development of the GIS-based planting priority tool

The consultant used the datasets identified in steps 1 and 2 to develop an integrated computer-based mapping tool. Targeted benefit areas were combined with land cover mapping of possible planting areas (i.e. areas where there is existing open space such as bare earth and grass in which to plant trees) to derive a normalized score to prioritize geographic units for planting.

THE OUTCOME

The final tool is a flexible GIS model that can generate maps that illustrate areas to prioritize tree planting at different geographic scales; the smallest being census dissemination areas. The model and outputs are available to project partners to view and combine as necessary to meet specific program needs.

Local municipalities and conservation authorities plan to use the tool to guide their efforts in managing and growing the urban forest. Credit Valley Conservation, for example, intends to use the tool to guide outreach and restoration efforts on public and private lands in parts of the watershed that are being developed. The Town of Caledon plans to use the tool to identify gaps in the tree canopy on municipal lands where planting space is already available and planting activities could be launched in the short term. The tool could also be used in future review of development applications. The maps could be helpful for identifying existing woodlots and justifying management plans and proposed extensions to them.

A WORD FROM PEEL REGION

When asked what kind of advice she would give to other communities that would like to develop a similar tool, Janet Wong, a Planner at the Region of Peel mentioned that "developing a priority planting tool and establishing the overall benefits that trees could provide to the community is an intensive process that requires extensive consultation with people from across various organizations that have a diverse set of experiences and interests. In addition, suitable spatial data sources to reasonably and scientifically reflect target benefits to establish priorities for a large region need to be available to develop and help refine the tool."