Urban Forest Management: An Opportunity for SFI
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Background

Urban and community forests include publicly- and privately-owned trees within an urban or community area, including individual trees along streets and in backyards, parks and natural areas (Nowak et al. 2001). Urban and community forestry is the integrated management of natural resources in developed areas and settled landscapes.

The urban areas of the United States have about 5.5 billion trees, including street trees, private yards, parks, and green space in large cities and small towns (Nowak and Greenfield 2018a). When looking at the more broadly defined metropolitan areas, the number of trees reaches 74 billion (Dwyer et al. 2000). Urban land in the United States increased from 2.6 percent of total land area in 2000 to 3.0 percent in 2010 and is forecast to expand to 8.6% by 2060 (Nowak and Greenfield 2018a). Increases in urban land are also occurring in Canada, with an increase from 0.23% in 1996 to 0.25% in 2006 (Stats Canada 2006). Approximately 84 percent of the U.S population lives in urban areas (USCB 2011), and 81.1% of Canadians live in urban areas (Stats Canada 2016).

Urban and community forests are a significant resource in North America and are likely to continue to increase in significance based upon demographic, economic, and environmental trends. The importance of responsible urban forest management will also increase in significance as it contributes to providing ecosystem services such as mitigating storm water runoff , reducing urban heat island effects, and sequestering carbon while contributing to the character, quality of life, and economic and social infrastructure of a community. Diverse threats, such as the introduction and spread of invasive species and wildfire in the wildland-urban interface, require increasing levels of management and expertise in urban and peri-urban areas.

In 2018, the Programme for the Endorsement of Forest Certification (PEFC) approved changes to their benchmarking standard to include Trees Outside Forests (TOFs).[1] The definition of TOF includes urban and community forest areas. The guidance provided by PEFC in the Appendix of the Benchmark can be utilized by PEFC members to develop standards or modules that address certification of responsible management of TOFs and would be eligible for PEFC endorsement.[2]

With this guidance, the Sustainable Forestry Initiative (SFI) has the opportunity to explore a leadership position in establishing standards for responsible urban forest management in North America and supporting the growth and evolution of this branch of professional forestry. The development of urban forest management certification standards will also contribute to providing pathways to ensure improved utilization and less waste of wood removed from urban areas due to development, hazard abatement, storm events, insect infestation, disease, or other causes.

Need and Importance

The management of urban tree cover is an important strategy for providing multiple social and environmental benefits in developed areas, as well as critical green infrastructure to shade buildings and hard surfaces and manage runoff entering stormwater drainage systems. Green infrastructure mimics natural landscape features and can capture, retain, and reuse water on-site. A tree canopy can effectively store 100 gallons of water or more before it reaches saturation (MacPherson, 2010). Tree foliage also

[1] Trees outside Forests (TOF) are defined by PEFC as "Trees growing outside areas of nationally designated forest land. Such areas will normally be classified as "agriculture" or "settlement"".

[2] Appendix 2: Guidelines for the interpretation of requirements for Trees outside Forests (TOF)

filters particulate matter and pollutants such as ozone, nitrogen oxides, ammonia and sulfur dioxides (Akbari, 2001). In the U.S. alone, urban trees remove 822,000 tons of pollutants annually and store about 919 million tons of carbon (Nowak and Greenfield 2018a).

Urban tree cover also provides many economic benefits. The annual benefits derived from U.S. urban forests due to air pollution removal, carbon sequestration, and lowered building energy use and consequent altered power plant emissions are estimated at $18.3 billion (Nowak and Greenfield 2018a). In one of Canada's largest cities, Toronto, it is estimated that the annual benefits provided by the urban forest is worth over $7 billion including benefits to water flow, air quality, energy savings, carbon sequestration and energy emissions (Alexander and DePratto, 2014). Urban and community forests also provide an important source of fuel wood and tree trimmings used in renewable energy production (MacFarlane 2009). Approximately 32 million tons of so-called urban wood waste are generated annually in the US, mainly through storm recovery activities, with nearly 21 million tons of this amount recovered (USDOE 2011).

Trees in urban and community forests can also provide diverse forest products and associated employment opportunities. Based upon current urban tree removal and replacement rates, it is estimated that in the U.S., the equivalent of 1.8 to 3.5 billion board feet of lumber could be produced annually from urban trees in the U.S. (Sherrill 2018). Urban trees are a source of many useful products including lumber and bio-energy feedstocks while also helping to conserve landfill space and generate economic opportunities (Bratkovich 2008). In this way, urban forest are significant direct and indirect drivers of employment. Also significant are the peripheral economic values provided by urban and community forests including increased property values (Irwin 2002, Sander 2010) and increased tourism and visitor spending (Wolf 2003).

Nearly forty years of scientific study provide ample evidence that urban forests can improve human mental and physical health, improve academic performance, and increase social cohesion (University of Washington 2016). Urban forests play a critical role in the formation of an ecological identity a foundational component of a sense of place and critical for the development of a land ethic. Urban and community forestry programs provide an opportunity to engage citizens, elected officials, business interests, developers, and other stakeholders in dialogue about the value and function of healthy natural and naturalized urban environments

However, urban and community forests, much like other forests, face a myriad of management challenges. The availability of professional staff, expertise, and science-based guidance are essential for the sustainable management of urban and community forests. All too often municipalities get mired in responding to crises that affect forest cover at the expense of pro-active management planning and activities. Long-term strategic planning, appropriate tree species selection, acceptable care and management practices, and sustained local budgets allow municipalities and communities to avoid the current mode of crisis management (Hauer and Johnson 2008, Hauer and Peterson 2016).

Opportunities and Challenges

Section 12 of the SFI standard provides guidance on developing modules. As stated in this section:

> *"SFI Inc. has developed a process for the SFI program to address emerging issues and new opportunities, such as start-up templates for new Program Participants, carbon markets, short rotation woody crops, conservation easements, small lands, etc. through optional modules developed by SFI Inc. and approved by the SFI Inc. Board of Directors. These modules will provide implementation assistance using case studies or optional certification requirements to address specific issues of benefit to the SFI program. Any modules developed prior to the next standard review process in 2019 will be added in this section."*

This process has been used to develop the SFI Small Lands Group Certification Module, Small-Scale Forest Management Module for Indigenous Peoples, Families, and Communities, and the SFI Threatened, Endangered and Species at Risk module. This process could be applied to Urban and Community Forests.

Appendix 2 of the PEFC Sustainable Forest Management Requirements standard includes several considerations that need to be addressed as part of the standards development process for Trees outside Forests (TOF). The Appendix provides interpretation for developing regional, national and sub-national requirements and standards applicable for TOFs. As stated in PEFC ST 1003:2018, "*all requirements referring to 'forest' are also applicable to 'TOF' unless otherwise indicated in this Appendix*". Specific PEFC ST 1003:2018 requirements which may not be applicable to certain TOF systems are outlined in Section D of the Appendix.

To identify where PEFC requirements do, or do not, apply to Trees outside Forests, the PEFC defines four high-level categories to distinguish among different TOF management systems. The PEFC categories are based on the combined consideration of "*Land Classification"* and "*Management Intensity"* (Table 1).

Table 1. Programme for the Endorsement of Forest Certification (PEFC) Categories of "Trees outside Forests" (TOF).

PEFC TOF Category	**Land Classification**	**Management Intensity**
TOF-Ag -Intensive	Agriculture	Intensive
TOF-Ag - Extensive	Agriculture	Extensive
TOF- Sett - Intensive	Settlement	Intensive
TOF – Sett - Extensive	Settlement	Extensive

It is within the "TOF-agriculture extensive" and "TOF-settlement extensive" categories that select PEFC ST 1003:2018 requirements may not be applicable. The TOF Appendix of the PEFC benchmarking standard dictates that the typical TOF systems of national relevance be identified and that the appropriate thresholds between intensive and extensive management intensities be discussed and agreed upon during the national standard setting process. With these thresholds articulated, it should become clear to which category any particular TOF system belongs, and if any flexibility exists when applying the PEFC ST 1003:2018 requirements to the development of regional, national and/or sub-national standards.

Criteria to support establishing intensive vs. extensive management intensity thresholds at the National level are proposed in Section E of the PEFC's TOF Appendix. As further described in this Section, if during the national standard-setting process proponents agree to develop specific requirements and/or standard(s) for TOF, all PEFC ST 1003:2018 requirements are applicable with the potential exception of TOF-agriculture extensive and/or TOF-settlement extensive systems, for which certain requirements may not apply. In either case, the standard-setting process must build agreement around the appropriate thresholds to distinguish "intensive" from "extensive" TOF systems, based on clear rationale. Hence, the eligibility of any particular TOF system will be clearly communicated within standard(s).

The SFI standard setting process would therefore need to address these criteria and establish a threshold between intensive and extensive categorization of urban forest (i.e., settlement) TOF systems. Furthermore, when establishing the thresholds for management intensity-based categorization of TOF systems, the national standard-setting process should, at a minimum, consider:

a) size of management unit
b) tree cover/hectare
c) economic value of production
d) intensity of management
e) scale of cultural, ecological and conservation value

Questions/Next Steps

1. Should SFI develop an Urban & Community Forest Management Module as part of the current standards revision process?
2. Should SFI explore the application of the new Trees outside Forests (TOF) Appendix of the PEFC benchmarking standard and associated TOF policy to the North American context?
3. Should SFI attempt to address all PEFC TOF categories and scenarios in the revised SFI Forest Management Standard?
4. Should SFI limit the scope of an initial TOF-based module for Urban and Community Forests to lands classified as "settlement" as opposed to "agriculture" under the PEFC TOF categorization system (i.e., TOF-Sett-Intensive and TOF-Sett-Extensive categories); leaving open the possibility for inclusion of lands classified as "agriculture" in the future?
5. Does SFI need to conduct a cost/benefit and impact analysis to assess the opportunity and articulate the value proposition for developing a module to provide implementation assistance and certification requirements for urban and community forests in the revised standards? If so, then how does SFI articulate the values of urban forest that are not easily monetized?

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