Urban Trees and Forests of the Chicago Region

REGIONAL TREE CENSUS

The full Regional Tree Census document is currently in printing with the USDA Forest Service. We anticipate this document to be available in spring of 2013.

Abstract

An analysis of trees in the Chicago region of Illinois reveals that this area has about 157,142,000 trees with tree and shrub canopy that covers 21.0 percent of the region. The most common tree species are European buckthorn, green ash, boxelder, black cherry, and American elm. Trees in the Chicago region currently store about 16.9 million tons of carbon (61.9 million tons CO_2) valued at $349 million. In addition, these trees remove about 677,000 tons of carbon per year (2.5 million tons CO_2/year) ($14.0 million per year) and about 18,080 tons of air pollution per year ($137 million per year). Chicago's regional forest is estimated to reduce annual residential energy costs by $44.0 million per year. The compensatory value of the trees is estimated at $51.2 billion. Various invasive species, insects and diseases, and lack of adequate regeneration of certain species currently threaten to change the extent and composition of this forest. Information on the structure and functions of the regional forest can be used to inform forest management programs and to integrate forests into plans to improve environmental quality in the Chicago region. The findings provide a basis for building a platform for regional leadership in urban forest management that can inspire the region to plant and protect trees and improve the vigor of the urban forest.

Executive Summary

Trees in the regional forest can contribute significantly to human health and environmental quality. The regional forest resource is comprised of all trees, both within and outside forested stands. This can include boulevard trees, trees planted within parks, and trees that naturally occur within public rights-of-way, as well as trees planted on private or commercial properties. Unfortunately, relatively little is known about this forest resource and what it contributes to the local and regional society and economy, and the value of those contributions

The trees and forests of the Chicago region in Illinois are important natural resources that contribute substantially to the regional environment, human health, and quality of life. Prospects for the future point to increasing importance of these resources, but at the same time mounting threats from insects, disease, invasive species, climate change, development, and changing infrastructure. Addressing these future challenges is complicated by the diversity of the region's trees and forests, their dynamic character, the fragmented ownership pattern, and by a lack of comprehensive information about the resources. To begin to address these critical information needs, The Morton Arboretum undertook an assessment of the Chicago region's urban forests in collaboration with the USDA Forest Service. This assessment will inform approaches for regional urban forest management that can inspire the region to plant and protect trees and improve the vigor of the urban forest. This report conveys selected information about the region's urban forest in a manner that informs discussion of important trends and key policy issues. It also conveys the value of trees to constituencies who may not principally value trees, but value key services they provide. Targeting information about the value of the urban forest to many stakeholders fosters regional collaboration.

To better understand the forest resource and its numerous values, the USDA Forest Service, Northern Research Station, developed the Urban Forest Effects (UFORE) model, which is now known and distributed as i-Tree Eco at www.itreetools.org. Results from this model are used to advance the understanding of the forest resource, improve forest policies, planning and management, provide data to support the potential inclusion of trees within environmental regulations, and determine how trees affect the environment and consequently enhance human health and environmental quality in urban and rural areas.

The i-Tree Eco model is used to help quantify forest structure, function, and values. Forest structure is a measure of various physical attributes of the vegetation, including tree species composition, number of trees, tree density, tree health, leaf area, biomass, and species diversity. Forest functions, which are determined by forest structure, include a wide range of environmental and ecosystem services such as air pollution removal and cooler air temperatures. Forest values are an estimate of the economic worth of the various forest functions.

To help determine the vegetation structure, functions, and values of trees in the Chicago region, a vegetation assessment was conducted during the summer of 2010. For this assessment, 0.1-acre field plots (a total of 2,076) were sampled and analyzed using the i-Tree Eco model. This report summarizes results and values (Table 1) of:

- Forest structure
- Potential risk to forest from insects or diseases
- Air pollution removal
- Carbon storage
- Annual carbon removal (sequestration)
- Changes in building energy use

Summary of urban forest features, Chicago region, 2010

Feature	Measure
Number of trees	157,142,000
Tree and shrub cover	21.0%
Tree cover	15.5%
Most common species	European buckthorn, green ash, boxelder, black cherry, American elm
Trees < 6 inches diameter (%)	73.3%
Pollution removal	
Trees	18,080 tons/year ($137 million/year)
Trees and shrubs[a]	24,170 tons/year ($183 million / year)
VOC emissions	11,976 tons/year
Carbon storage	16.9 million tons ($349 million)
Carbon sequestration	677,000 tons/year ($14.0 million / year)
Building energy reduction	$44.0 million / year
Reduced carbon emissions	$1.3 million / year
Compensatory value	$51.2 billion

[a] Shrub removal estimate is approximate as shrub leaf area parameters were not measured
[b] Ton – short ton (U.S.) (2,000 lbs)

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