

CHICAGO'S URBAN FOREST AGENDA



City of Chicago
Richard M. Daley
Mayor



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Letter from the Mayor

As Mayor and on behalf of the City of Chicago, I am proud to present *Chicago's Urban Forest Agenda*.

Our urban forest represents all of the trees and vegetation found within our commercial and residential areas, along our streets, and in our parks. This great forest is one of the city's most important assets, with benefits ranging from reducing air pollution, managing stormwater, providing natural habitat for birds and other wildlife to enhancing our quality of life. Our urban forest will prove increasingly valuable in the face of climate change. Expanding and maintaining the forest can help us both mitigate climate change, by absorbing carbon dioxide, and adapt to it, by helping to cool the city.

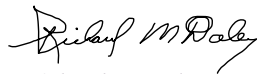
The city's great early planners recognized the value of the urban forest when they planned the tree-lined boulevard system, renowned lakefront parks and expansive forest preserves in the late 1800s and early 20th century. As we celebrate the centennial of Daniel Burnham and Edward H. Bennett's *Plan of Chicago* in 2009, we also recognize that 100 years ago the Chicago City Council saw the importance of appointing the Chicago Tree Committee to properly care for and protect our trees.

Chicago's Urban Forest Agenda continues and strengthens our city's long commitment to its natural environment. It outlines four central goals for our work:

- Maintaining and Conserving Trees
- Expanding Our Forest
- Integrating Green Infrastructure
- Fostering Stewardship

I hope you will join me in our efforts to protect and expand our urban forest for future generations of Chicagoans.

Sincerely,



Richard M. Daley
Mayor





Photo credit: Katie Falbo

Chicago's Urban Forest

In 1837, the City of Chicago incorporated with *Urbs in Horto* (City in a Garden) as its motto. Chicago's early planners believed that the preservation of nature would have important value for life in a growing metropolis. In 1899, the City Council created the Special Park Commission to develop a consistent plan for establishing parks and recreational areas across the city.

Since its inception, Chicago has made unprecedented strides to preserve natural areas and green space in the metropolitan area. The designs and visions of the nation's greatest planners – Olmsted, Burnham, Jensen and Caldwell – have left Chicago with a world class park system. Daniel Burnham and Edward Bennett, in the 1909 *Plan of Chicago*, believed “human nature demands such

simple and wholesome pleasures as comes from roaming the woods, for rowing and canoeing, and for sports and games that require large areas.”

In the same year of the “Burnham Plan,” the City Council appointed the Chicago Tree Committee to properly care for and protect the trees on the public streets. It was the first official group convened to address forestry related responsibilities in the city.

A few years later, in 1913, as one of the first official land protection efforts in the world, Chicago's forest preserves were established to protect forested lands. Today, the Forest Preserve District of Cook County protects more than 67,000 acres of land across the county, 3,688 acres of which fall within the city limits.



Beyond the large natural areas, the demand for smaller neighborhood parks culminated in 1934 with the establishment of the Chicago Park District, which united the efforts of 22 individual park commissions from Lincoln to Washington Park. It has grown to manage 570 parks occupying over 7,500 acres in the city.

Since Chicago's early conservation efforts, we have gained new insight into the environmental, social and economic value of our urban forest. Significant research efforts have been made to understand the role of the urban forest in improving quality of life, reducing crime rates, increasing property values and providing habitat for wildlife, among other things. Most recently, the City has begun using a variety of tools to inventory and quantify the urban forest including random sampling, geographic information systems (GIS), aerial and satellite imaging and computer

modeling (see Chicago's Urban Forest Effects Model Study and Urban Tree Canopy boxes on pages 6 and 7).

Chicago's strong commitment to protecting and enhancing our green space has been an example to the rest of the world. It has been a hundred years since Burnham's vision was unveiled and the protection of trees became a City priority with the Chicago Tree Committee. Today, in the centennial spirit, the City of Chicago is strengthening its commitment to the urban forest – to every tree that stands in our parkways, medians, schoolyards, parks, forest preserves, backyards and community gardens – with Chicago's Urban Forest Agenda. The City aims to align and increase the collaborative efforts made to protect, enhance, understand and expand our urban forest.

History of Chicago's Urban Forestry Efforts



1837 City of Chicago incorporated with *Urbs in Horto* (City in a Garden) as its motto.

1866 John S. Wright's plan for a tree-lined boulevard system encircling the city was published in the *Chicago Times*.

1909 Daniel Burnham and Edward H. Bennett published the *Plan of Chicago*, which proposed a system of parks and boulevards to form a permanent green belt around the city.

1909 The Chicago Tree Committee was appointed by City Council to properly care for and protect the trees on the streets and public spaces of Chicago. It was the first official group convened to address forestry related responsibilities in the city.



1934 The 22 independent park commissions were consolidated with the establishment of the Chicago Park District.

1989 Mayor Daley's Clean & Green initiative commenced and continues every year with spring and fall cleaning events around the city. The day, designed to get community members involved in their neighborhood and parks, includes flower and tree planting, painting, sweeping and trash collection.

Definitions

Urban Heat Islands are developed areas that experience elevated surface and atmospheric temperatures, which can be 6-10°F higher than rural areas. They are created principally by expansive urban surfaces, such as concrete, dark roof tops, asphalt lots and roads, which absorb sunlight and reradiate that energy as heat. Trees can help mitigate urban heat islands by shading buildings, blocking solar radiation and cooling the air by evapotranspiration.

Green Infrastructure encompasses the naturally occurring and human-built features that manage stormwater, remove pollutants, conserve energy, reduce erosion and provide other ecological services through vegetation, soil percolation and other natural functions in an ecological, cost-effective and environmentally sustainable way.

Ecological Services can be defined as the benefits arising from healthy ecosystems, including those that provide for human health, cultural, environmental and economic needs. Such services include greenhouse gas mitigation, groundwater recharge, storm-water management, pollination, seed dispersal and other functions.

Chicago Leading by Example

The City of Chicago has understood the importance of trees in contributing to improved quality of life for its citizens for over a century. From the shade-covered streets of residential neighborhoods, to the tree-lined emerald necklace of the boulevards, to the world-renowned lakefront parks, trees are an integral part of Chicago. Some recent initiatives that reflect the City's commitment to the urban forest include:

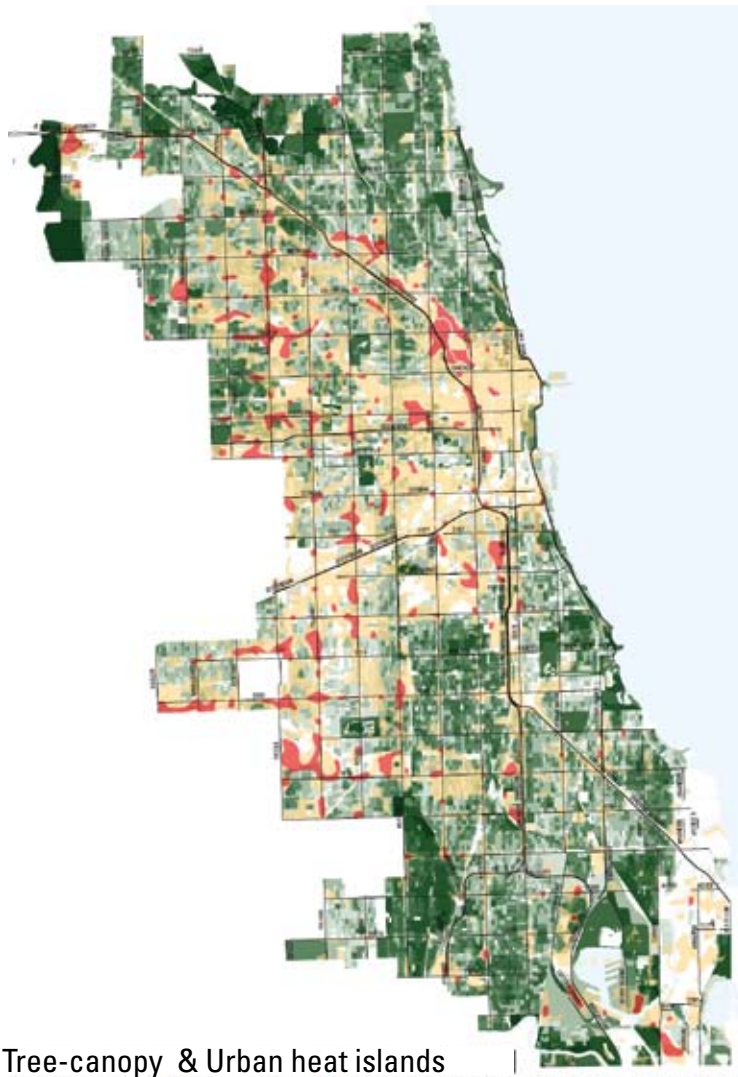
Response to Invasive Species

The City of Chicago, in coordination with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service-Plant Protection and Quarantine, Illinois Department of Agriculture and the U.S. Forest Service, led an aggressive survey, removal, quarantine and education campaign that limited the impact of the Asian Long-horned Beetle, a destructive invasive species. Without this decisive action this insect could have killed 50.2% of the city's trees with a structural value of over \$1.8 billion. Similar efforts have been made to control the Gypsy Moth and Emerald Ash Borer.

Chicago Landscape Ordinance

One of the first of its kind in the country, the 1991 Ordinance and 1999 revision led to the planting of over 112,000 trees as of 2007. Targeting building construction projects and parking lots, this ordinance requires the planting of trees, landscape islands and hedges. It also requires the planting of shade trees along parkways.





Tree-canopy & Urban heat islands

0.00 - 3.00
3.01 - 8.00
8.01 - 14.80
14.81 - 18.00
16.01 - 25.00
25.01 - 40.00
40.01 - 70.00
70.01 - 100.00
Tier 1 (10% warmest both daytime & nighttime)
Tier 2 (10% warmest either daytime or nighttime)

Based on 2003 Ikonos Satellite Images

Based on 2005 Landsat Satellite Images

Source: City of Chicago

Reducing Urban Heat Islands

Working with the U.S. Environmental Protection Agency, the City installed cooling and reflective landscapes to address urban heat islands, which cause a rise in energy costs and heat-related fatalities each year. The City has used urban heat island mapping to prioritize tree planting (4,431 trees in 2006 and 2007) and green-roof installation, in addition to partnering with LaSalle Bank to plant trees along the route of the Chicago Marathon.

Adding Green to Urban Design Plan

The Adding Green to Urban Design Plan represents the collaborative effort of City departments, public agencies, professionals and public task forces. It is a detailed implementation strategy for environmentally sustainable urban design. The Plan is intended to provide direction to the City of Chicago in developing and improving the city's built environment. The Adding Green to Urban Design Plan identifies 21 actions to (1) capture and use precipitation and encourage water conservation, (2) improve air quality, (3) preserve and expand the quality and function of vegetated surfaces and (4) improve safety and public health and engage people in the outdoor environment.

History of Chicago's Urban Forestry Efforts *(continued)*

STREETS & SANITATION **1990** Following Mayor Daley's promise to plant 500,000 trees, the City increased the Forestry Division within the Department of Streets and Sanitation to a full Bureau of Forestry. Today, the Bureau of Forestry includes four Foresters and a staff of over 204 full-time employees to plant and maintain the city's street trees.

1990 Bureau of Forestry conducted a 100% street tree census and counted a total of 441,572 street trees.

1990 Mayor Daley's GreenStreets Program was initiated to improve quality of urban life through the following programs: tree planting, landscaping community greening and floral container displays. Overseen by Chicago Department of Transportation, GreenStreets has planted over 60,000 trees and hundreds of thousands of shrubs, vines, perennials and annuals throughout the city's streets and neighborhoods.

1991 The City passed the Landscape Ordinance which requires new or expanded developments to plant trees, hedges and landscape islands on site.

1992 The U.S. Forest Service's Chicago Urban Forest Climate Project was established to increase the understanding of how vegetation within urban areas influences local climate, energy use and air quality.

1995 The City closed its final tree nursery on the grounds of O'Hare International Airport and began planting larger size nursery stock through private contractors.



Green Infrastructure

The Chicago Department of Transportation has taken the lead in integrating green infrastructure into transportation infrastructure to enhance ecological services through a number of programs including the Green Alley Program, Mayor Daley's GreenStreets, Sustainable Streetscapes and Landscaped Median Projects. From collecting and treating stormwater, to smog-neutralizing concrete, to neighborhood markers that define communities, these efforts have brought the greenery of parks and parkways into the Loop and all corners of the city.

Chicago Climate Action Plan

The goal of the Chicago Climate Action Plan (CCAP) is to mitigate greenhouse gas emissions to 25% below 1990 levels by 2020. CCAP is widely hailed as an aggressive blueprint for combating climate change. The Plan outlines 26 strategies to reduce greenhouse gas emissions by 15.1 Million Metric Tons Carbon Dioxide Equivalent (MMTCO₂e) and nine strategies to prepare for climate change. One mitigation strategy identified is to expand the tree canopy which will cut greenhouse emissions. One adaptation strategy identified is to preserve native species by preventing and controlling the spread of invasive species in our ecosystems. For more information about the Chicago Climate Action Plan, visit www.chicagoclimateaction.org.

Chicago's Urban Forest Effects Model Study

Chicago's Urban Forest Effects (UFORE) Model Study

Building upon the seminal work of the United States Department of Agriculture Forest Service's Chicago Urban Forest Climate Project, a study of the benefits of the urban forest was completed in 2007. Survey crews visited more than 740 plots citywide and more than 140 plots in Chicago Park District property to identify land use, vegetation and the health, size and species of any trees in the 1/10th acre plot. From this survey we learned:

<i>Number of trees</i>	<i>Pollution removal</i>
3,585,000	754 tons/year (\$6.4 million/year)
<i>Tree cover</i>	<i>Carbon storage</i>
17.2%	716,000 tons (\$14.8 million)
<i>Diversity</i>	<i>Carbon sequestration</i>
Top ten trees account for 45.7% of total trees	25,200 tons/year (\$521,000/year)
<i>Density</i>	<i>Structural value</i>
24.3 trees/acre	\$2.3 billion
<i>Native species</i>	
51.9% of the tree species in Chicago are native to Illinois	

Source: U.S. Forest Service



Urban Tree Canopy (UTC)

In order to encourage residents to plant trees and set new policies, we need to know where trees are and where we can plant more. Many areas already have young trees that will grow with time, while other areas are inappropriate (e.g., sporting fields, grasslands and wetlands and areas directly adjacent to railways, airports and some roads). The UTC analysis, currently underway, will allow us to set canopy goals for the city so that resources are effectively invested.



Aerial and satellite image



Existing canopy



Impervious surfaces



Potential planting spaces*

*Areas in yellow are potential, not necessarily suggested, planting spaces.

Source: RFP Mapping

Urban Tree Canopy

History of Chicago's Urban Forestry Efforts *(continued)*

1995 The Bureau of Forestry published *The State of Chicago's Street Trees: A Random Sample Inventory*. The study found that the city has 450,000 street trees valued at \$500 million dollars with 64% of all potential planting locations filled.

1999 The Landscape Ordinance was amended to require larger size plant material and curbed planters in the downtown business district, larger landscape setbacks and structural soil requirements.

2003 Satellite images of Chicago were analyzed to determine urban tree canopy cover (13.8%), impervious areas and elevated surface temperatures.

2003 The Bureau of Forestry conducted another 100% tree census and counted a total of 528,000 street trees.

2005 The City unveiled its first *Environmental Action Agenda*, committing to a wide range of environmental initiatives with the goals of conserving, protecting and restoring natural resources, encouraging healthy environmental practices and leading by example. Two of the many long-term initiatives outlined in the Agenda are to increase tree planting by 15,000-20,000 trees per year and create a Tree Health Program to assist trees in growth.

2006 The City published the *Chicago Nature and Wildlife Plan* as a framework to protect, expand and enhance the 4,800 acres of natural areas throughout the city.

2007 More than eight hundred and fifty 1/10 acre plots were sampled and analyzed to identify the health and ecological function of the urban forest using the U.S. Forest Service's Urban Forest Effects (UFORE) Model.

2007 The City published *A Habitat Guide for Chicago Land Owners: Enhancing Your Property for Birds* to promote planting appropriate trees and vegetation.



Urban Forest Benefits

The benefits of an urban forest, beyond its aesthetic appeal, are well documented and include the following:

- *Improved Air Quality.* Trees absorb air pollutants and help reduce smog.
- *Reduction of Greenhouse Gas Emissions.* As a tree grows, it sequesters carbon dioxide and converts it to woody and leaf biomass.
- *Reduction of the Urban Heat Island Effect.* Tree shade reduces the amount of solar energy absorbed and stored by buildings and pavement. Trees can also cool the air by evapotranspiration.
- *Improved Wildlife Habitat.* Urban forests provide food and shelter to many important native and migratory birds and animals.



Photo credit: Jerry Kumery

- *Stormwater Management.* Street trees intercept and absorb rain, reducing and slowing the amount of runoff that makes its way to the sewer system.
- *Noise Abatement.* Trees can form a barrier that partially deadens urban noise, while providing the background sound of rustling leaves and branches that muffles other street sounds.
- *Increased Psychological Well Being.* Exposure to trees has been shown to reduce stress, rates of violence and symptoms of children with Attention Deficit Disorder, while increasing feelings of belonging and hospital patients' recovery rates.
- *Improved Energy Conservation.* Trees can cut heating and air conditioning use by providing shade and cutting the wind, reducing energy costs.
- *Increased Property Values.* The value of homes in neighborhoods with trees tends to be higher than those of comparable neighborhoods without trees.



Tree Facts

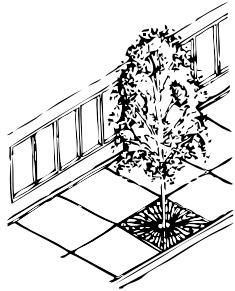
These tree facts are summarized from the Chicago Gateway Green's literature review; for more details visit www.treepartnership.org.

- A mature tree can absorb CO₂ at a rate of 48 lbs/year.
- Each mature tree releases enough oxygen to support 2 adults.
- Trees can reduce summer cooling costs by up to 20-50%.
- Research indicates that a mature tree intercepts about 1,000 gallons of rainfall per year in their crowns, reducing runoff and providing cleaner water.
- Healthy, mature trees can increase property values by as much as 10%.



The City of Chicago will make it a priority to grow and sustain a healthy urban forest. To do so, this Agenda outlines four central goals:

1. Maintaining and Conserving Trees
2. Expanding Our Forest
3. Integrating Green Infrastructure
4. Fostering Stewardship



Sidewalk Openings

Urban trees are often planted in sidewalk openings – holes in the sidewalk, usually square in shape, with bricks, curbs or metal grates surrounding the trunk base. The minimum dimensions for a tree opening in Chicago are 5' x 5', but the bigger the better. Continuous sidewalk openings are preferable because they provide more room for roots to grow. Also, the greater mass of soil keeps the soil temperature relatively stable. Since bricks and concrete can keep water from penetrating the ground, metal grates, permeable paving or an opening with mulch are preferable.



Maintaining and Conserving Trees

Issues

Our Urban Environment Can Be Harsh for Trees.

Forest trees can live for hundreds of years. Unfortunately, a street tree in Chicago has an average lifespan of just 32 years, and often even less for those grown in sidewalk openings and medians. The urban environment can be unforgiving to trees. Because of the impact of pollution, poor soil conditions, winter salt treatments and other factors, the ongoing maintenance of an urban tree is vital to its longevity. In light of climate change, the threats are only expected to worsen. For instance, with more mild winters our urban forest will be exposed to new diseases and invasive species because the hard freezes that inhibits certain pests may no longer occur. Also projected are more frequent and prolonged droughts, extreme precipitation events and higher temperatures, which will cause periods of reduced soil moisture, water inundation and heat waves, further contributing to tree stress. Given the delicate lives of city trees, we must make a commitment, from funding to policy changes, to their maintenance and conservation.



Photo credit: Kris Bachtell, The Morton Arboretum

The Value of Existing Trees is Currently Underestimated.

A tree's value should be reflected in our efforts to maintain and conserve it. However, as the city continues to grow and undergo land use changes, the value of a tree is not always understood or acknowledged during the development process. Often, safety concerns and perceived liability of a tree in construction and site development may be overstated and result in its unnecessary removal. The value of an existing mature tree is exponentially higher than a smaller, younger tree, when one considers ecological services, property values and other measures. However, an existing tree is often only valued for its appearance, making it a difficult case for keeping it in new construction and development. Tree replacement is seen as the most convenient option, undermining the City's ability to expand canopy cover.

There are many who influence the urban forest, from home and business owners to large governmental agencies. This mosaic of management creates a variety of maintenance procedures and standards based on the intent and priorities of the landowner. These differences can range from aesthetic opinions and cultural preferences to resource allocation and liability concerns. Thus, identifying all stakeholders and their respective motivations will allow us to target our messaging and ensure everyone sees the value of maintaining and conserving our urban forest.

The Sustainable Use of Our Urban Forest Resource

The City of Chicago is committed to the long-term health of our urban forest and will prioritize the maintenance and conservation of existing trees in addition to aggressively planting new ones. Because the loss of some trees is inevitable, we must also foster sustainable harvesting and reuse of lumber: an inherent component of a sustainable urban forest. In 2008 and 2009, the City hosted *Rising from Ashes*, a show of fine furniture made from ash trees that were fallen due to Emerald Ash Borer infestation. This is but one example of how the City can promote the sustainable use of this valuable resource.

Recommendations and Actions

The City of Chicago can continue to maintain and conserve our urban forest by committing to the following actions:

1. The City of Chicago **will set the standard for tree maintenance practices** by:
 - a. creating best management practices for the watering, pruning and general maintenance of trees;
 - b. cross-training inspectors and maintenance staff to understand tree-related concerns and laws;
 - c. developing adaptive extreme weather and invasive species response plans; and
 - d. implementing hazard/risk assessment inventory and dead tree survey protocols and timelines that reduce liability and maintenance costs.
2. The City of Chicago **will continue our commitment to tree maintenance** by:
 - a. identifying consistent, long-term funding for tree maintenance (both labor and resources) including improved tree grates, young tree care and pruning standards;
 - b. prioritizing resources for positions that protect trees and for services that reduce tree-related hazards;
 - c. engaging in cooperative maintenance agreements with community-based organizations, Chambers of Commerce and neighborhood associations to share maintenance cost; and
 - d. continuing to support policies that emphasize tree maintenance, in addition to tree planting.
3. The City of Chicago **will encourage the preservation of existing trees** by:
 - a. providing comprehensive tree and soil protection guidelines;
 - b. updating regulations and providing incentives to ensure current and future development projects are designed to preserve existing trees and to expand and diversify the tree canopy cover;
 - c. expanding the street tree protection area to include private property near the public right-of-way;
 - d. improving the enforcement protocol to sustain and expand resources to limit city tree damage and removal; and
 - e. designating landmark and historic trees and creating a memorial tree planting program.
4. The City of Chicago **will support urban tree reuse** by:
 - a. incentivizing urban wood reuse;
 - b. raising awareness among stakeholders and the public on the benefits of using local wood;
 - c. allowing for the sale of municipal wood products, such as wood chips; and
 - d. integrating urban tree reuse into climate change mitigation strategies as a way to sequester carbon beyond the life of a tree.

Expanding Our Forest

Issues

Tree Diversity is Important for a Healthy Urban Forest.

Over its history, Chicago has made the health of its urban forest a priority, notwithstanding the city's rapid growth and urbanization. However, Chicago has learned a number of vital lessons along the way. One example can be found in the American Elm legacy. American Elms were the predominant street tree planted for decades in the Midwest, until the 1970s – when most were removed due to a devastating vascular fungus (Dutch elm disease). A positive outcome of that loss was a renewed commitment to species diversity. Maples, elms, lindens, oaks, and honey locusts are among the many species which now enrich our streetscapes and help ensure a healthy and resilient urban forest. Today, however, we are on the verge of losing 17% of our urban forest to the Emerald Ash Borer. Areas of single species concentration or “monocultures” still exist, while improved varieties of trees are available every year. Therefore, ongoing tree planting and species diversification must occur on both public and private lands to sustain our healthy urban forest over time.



Opportunities Exist to Expand Our Forest.

Based on Chicago's Urban Forest Effects (UFORE) Model, private property – specifically single-family homes and industrial sites – represent a significant percentage of potential tree planting opportunities in the city. Private landowners are vital partners in Chicago's tree planting efforts. To date, there have been few tree planting outreach campaigns or policy incentives targeting these stakeholders. In order to expand and sustain its forest, the City must now engage private landowners, the green industry, volunteers, community leaders and partners to participate in an ongoing initiative to plant and better maintain trees in all areas of the city.

The overall quality of trees provided from a nursery is paramount to the tree's health and maintenance requirements over its lifespan. Northeastern Illinois is home to some of the highest quality nursery-grown trees in the United States. However, improved communication is needed at all levels of the local supply chain – from growers to garden centers to purchasers – to ensure that the best and most appropriate trees are being produced and planted for Chicago's urban conditions.

Opportunities exist to improve the life of the tree at each step of the tree planting process; from purchasing and transporting the young tree, to digging the hole, to choosing the planting spot. The strategic placement of a tree can benefit both the tree and its surroundings. For instance, a well-placed tree near a building can provide energy efficiency benefits, saving over 10% annually on energy costs through shading and micro-climate cooling.

Improving the soil and environmental conditions for city trees is also important in the expansion of a healthy urban forest. Without the minimum requirements for rooting and growing areas, soil fertility, moisture and drainage, our city trees will not be strong enough to withstand stresses like winter salt, compacted soils and climate change.

Recommendations and Actions

The City of Chicago can expand our urban forest by committing to the following actions:

1. The City of Chicago **will continue to prioritize new tree planting** by:
 - a. dedicating more resources to tree planting;
 - b. updating the Chicago Landscape Ordinance to be performance-based and allow fewer exemptions; and
 - c. continuing to implement context-specific solutions such as Department of Transportation's Sustainable Streets Design Standards, Calumet Design Guidelines, and the Adding Green to Urban Design Plan.
2. The City of Chicago **will set the standard for tree planting practices** by:
 - a. establishing site-specific tree planting standards and design specifications to be used by all agencies (e.g., allowing for variability of tree size, container type, species, tree form and recommended use);
 - b. engaging the green industry to promote best practices and standardize nursery production and planting practices;
 - c. prioritizing the placement of trees to maximize energy efficiency benefits and minimize bird collisions with buildings;
 - d. ensuring planting locations have adequate soil and environmental conditions through performance-based standards; and
 - e. increasing and reclaiming growing space (e.g., pavement reduction, setting aside vacant land, updating the Chicago Landscape Ordinance).
3. The City of Chicago **will incentivize tree planting on private land** by:
 - a. increasing the availability and affordability of trees for Chicago residents;
 - b. providing information to property owners, real estate developers and agents on the benefits of trees, especially energy savings and property value improvements; and
 - c. providing incentives for tree planting at commercial and industrial sites.
4. The City of Chicago **will improve the diversity, resiliency and function of the urban forest** by:
 - a. planting a diverse palette of tree species, utilizing existing guidelines such as the Bureau of Forestry's Tree Diversity Guidelines;
 - b. prioritizing tree species that provide multiple benefits such as screening, shading, food, wildlife habitat and stormwater management;
 - c. identifying low maintenance, long-lived, pollutant- and pest-resistant, urban-tolerant and non-invasive species for planting such as those highlighted in the Bureau of Forestry's Top 10 Tree Guide;
 - d. sharing research on urban-tolerant trees and species that will be more likely to adapt in a changing climate with local nurseries to ensure the most appropriate plant material is available; and
 - e. purchasing trees from regional growers.

Integrating Green Infrastructure

Issues

Trees are an Important Component of Green Infrastructure.

Green infrastructure, and the associated ecological services, is increasingly valuable as regional growth, urban redevelopment and the impacts of climate change become more evident. On the large scale, the existing green infrastructure in Chicago is the interconnected network of the urban forest and open space such as wetlands, parks and forest preserves. At a smaller scale, our green infrastructure includes trees as well as soil, rain gardens, porous pavement and green roofs. As the many values of trees are overlooked and undervalued and municipal budgets are reduced, the associated costs to plan, plant and maintain trees are often neglected in favor of hard infrastructure such as roads and buildings. A new paradigm of integrated infrastructure that includes both gray (built) and green (living) is needed to sustain our urban growth as well as to mitigate and adapt to the changing climate. Trees will play a significant role in this new paradigm. In a number of special cases, designers and landowners are developing new tools and strategies



to integrate trees into the built environment and optimize the social and environmental benefits. One innovative example is the Chicago Center for Green Technology, which integrates cisterns, rain gardens, porous pavement and a green roof.

The city's wildlands, such as those in vacant lots and along riverbanks and railroads, provide many ecological services through natural regeneration but are often perceived to serve a minor role by the public. On the other hand, our highly managed landscapes, such as parks, have many public benefits but, as currently developed and managed, provide unrealized ecological services. There is great opportunity for improving how trees and other green infrastructure elements are managed in the city's wildlands, nature preserves, constructed landscapes and public open spaces.

We Must Better Understand Our Urban Forest System.

The 2008 Chicago Climate Action Plan calls for increasing tree canopy. A strategic plan to set and meet this goal by 2020 is needed to limit the impacts of a changing climate. Additionally climate change's forecasted impacts of extreme heat and precipitation will affect trees in profound ways. These projections need to be included in the planning, planting and maintenance of trees to make them more resilient. Just as the impacts of, and adaptation to, climate change require additional study, there are many unanswered questions concerning the green infrastructure of Chicago. Research and monitoring is needed to have stronger assessments of urban forest function and value and to set new policies and practices protecting and promoting these resources.

Recommendations and Actions

The City of Chicago can continue to integrate green infrastructure by committing to the following actions:

1. The City of Chicago **will regularly inventory the urban forest** by:
 - a. creating an inventory and monitoring standard that utilizes geographic information systems, field sampling and aerial imaging;
 - b. creating a centralized tree database and standardizing data collection and analysis methods;
 - c. tracking tree installation trends; and
 - d. developing tree health assessment reports to monitor the spread of invasive species, diseases, climate change impacts and other threats.
2. The City of Chicago **will design a strategic plan to meet our tree planting goals** by:
 - a. setting canopy cover targets tailored to various land use and zoning areas;
 - b. identifying and prioritizing tree-deficient areas in the city with specific needs (e.g., urban heat islands and areas of poor air quality);
 - c. integrating more tree planting in land development and green infrastructure projects; and
 - d. working with Chicago-area partners on regional efforts to support all trees that benefit Chicago.
3. The City of Chicago **will provide guidance in planning and maintaining our wildlands** by:
 - a. creating best management practices for maintaining the urban forest in natural areas and wildlands and allowing for natural regeneration;
 - b. implementing tree-related actions of the Chicago Nature and Wildlife Plan and Chicago Wilderness' Biodiversity Recovery Plan; and
 - c. controlling the spread of invasive trees in natural areas and wildlands.
4. The City of Chicago **will better understand the urban forest system by actively partnering with research and academic institutions to investigate the urban forest** by:
 - a. experimenting with new tree planting and growing conditions;
 - b. identifying urban-tolerant tree species and species that will be more likely to adapt in a changing climate;
 - c. monitoring emerging technologies; and
 - d. evaluating policies and practices for their ability to achieve multiple ecological, economic and social goals.

Fostering Stewardship

Issues

The Perceived Value of Trees Varies Greatly Among Chicagoans.

Trees have been found to reduce air pollution, increase property values, improve human health and well-being, decrease energy costs when properly sited, and create a sense of community among residents, thereby lowering crime rates. For these reasons alone, the city will benefit from more trees. Furthermore, some residents appreciate the intrinsic value of trees as icons of nature's health and place great importance on individual trees for their historic context.

The fact is that the perceived value of trees varies greatly among Chicago residents and communities. City trees can be seen as a nuisance or an asset. Some residents prefer a treeless landscape for aesthetic, cultural or perceived safety reasons. Others may prefer to maximize recreational open space by limiting or even omitting trees entirely. Trees may be considered easily replaceable or non-essential by some, and integral components of neighborhoods by others. Some residents focus solely on the maintenance requirements of trees, while others recognize the environmental, aesthetic,

social, psychological and economic benefits. Trees have many associative values, but not always positive especially in a culturally and economically diverse city. As the first step in fostering stewardship, we must continue to raise awareness about the benefits of trees to residents, and promote the planting, monitoring, care and conservation of trees throughout Chicago.

We Can't Do It Alone.

Education and engagement are key in fostering urban forest stewardship. The work required to sustain a healthy urban forest cannot be done by the City and its sister agencies alone. Inherent in the goal of growing our forest is the need for growing the number of stewards. Caring for our urban forest, addressing climate change and contributing to the major environmental efforts of our time will require all Chicagoans to take part. The Chicago Conservation Corps and Chicago Public Schools' 2009 *Environmental Action Agenda* are exemplary efforts in engaging adults and children as environmental stewards. At all ages, new generations of tree stewards need to be trained to help the City monitor, plant, care, conserve and raise awareness of trees as living organisms, with health and growth requirements. Our stewardship commitment must be passed on to future generations and sustained over the life of our trees.

A network of stewards that builds upon current volunteer programs such as Openlands' TreeKeepers, Chicago Park District's Natural Areas Stewards and the Calumet Stewardship Initiative will help us reach our goals. But we also need individual homeowners to plant and conserve trees, and promote the positive values associated with our urban forest to their neighbors. Community leaders and citizens do not always have the tools necessary to help (e.g., practical information, access to trees, tree planting opportunities, etc.). We must empower residents and work together to improve the health of our urban forest.

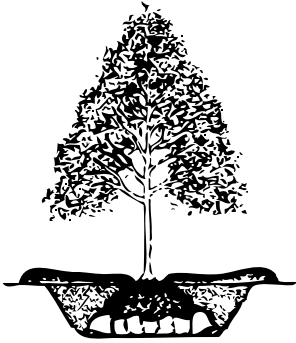


Photo credit: Chicago Gateway Green

Recommendations and Actions

The City of Chicago can foster tree stewards by committing to the following actions:

1. The City of Chicago **will raise awareness among key stakeholders** by:
 - a. working with community leaders and key partners on promoting the environmental, social and economic benefits of our urban forest;
 - b. highlighting tree planting, care and conservation as essential activities to sustain a healthy urban forest; and
 - c. fostering collaboration, information sharing and program development among sister agencies, nonprofits, businesses and community-based organizations throughout the city.
2. The City of Chicago **will promote the value of a healthy urban forest to residents** by:
 - a. publishing the inventories and research conducted on our urban forest;
 - b. distributing the City's best management practices for planting, watering, pruning and general maintenance to residents and private landowners; and
 - c. initiating an urban forest media campaign that highlights tree planting, care and conservation events.
3. The City of Chicago **will encourage citizen stewardship** by:
 - a. creating a network of stewards that builds upon current volunteer training programs;
 - b. coordinating with local schools, community centers and places of worship, to foster community involvement;
 - c. developing education programs for adults and children in coordination with existing programs and partners; and
 - d. building upon a citizen scientist network to contribute to further information.



Tree Care

Location

Making and choosing good planting sites and selecting the proper tree for the proper place are very important first steps. The location should take into consideration the height, shape, root structure, soil requirements and overall resilience of the tree species to be planted. A well-placed tree in relation to nearby buildings can reduce energy costs by providing shade and wind protection.

Planting

Spring and fall are the best times to plant trees. The most common tree planting mistake is digging a hole too deep and too narrow. A planting hole should be three times as wide, but no deeper than the root ball. Trees from nurseries come one of three ways: bare-root, balled and burlapped (B&B) or potted; each type has unique planting considerations. The B&B method is the most common way to transplant young trees. Once the B&B tree is planted in the hole, remove any wires or ropes around the burlap and trunk. Tuck the top 1/3-1/2 of the burlap down around the sides of the root ball. Fill in the hole with soil, up to the base of the trunk.



Photo credit: John Lough, Bureau of Forestry



What Chicagoans Can Do

Plant a tree!

You can help the City in a Garden flourish by requesting a tree near your home or workplace. Residents can request a new parkway tree by calling the City's non-emergency number at 311.

Participate in the tree-planting activities led by: Chicago Gateway Green's Tree Partnership, email trees@gatewaygreen.org to hear about volunteer opportunities; and

Friends of the Parks, visit www.fotp.org/signup/volunteer.asp to find out how you can volunteer at your neighborhood park.

Non-profit charitable organizations and local government agencies can apply for grants from the Urbs in Horto Fund to replace, add and maintain trees in order to enhance the streets, boulevards, parks, gardens and open spaces of

Chicago. The Urbs in Horto Fund, administered by the Chicago Community Trust, seeks to restore the vision of a verdant city. Grants may also be used to educate the general public about the benefits of expanding and maintaining a healthy urban forest. For more information, call 312-616-8000.

Care for a tree!

Become a TreeKeeper. TreeKeepers are volunteers who have been certified by Openlands to plant and give trees the care and maintenance they need to thrive in the urban forest. For more information, visit www.openlands.org.

Learn and demonstrate to your neighbors the proper ways to care for a tree, by watering, mulching and protecting the trees on your block. For more information, visit www.cityofchicago.org/Environment.



Sponsor a tree!

The Bureau of Forestry welcomes corporate or community sponsors to make a contribution in support of planting efforts throughout Chicago neighborhoods. To sponsor a tree planting in the city, contact the Bureau at 312-746-5254.

The Chicago Park District Green Deed Program allows you to have a tree planted in the park of your choice and provide lasting recognition of the significant people and occasions in your life. For more information, call the Green Deed Tree Hotline at 312-742-5414.

Through Chicago Gateway Green's Tree Partnership Program, you can sponsor tree plantings in vacant lands across the city to mitigate urban heat islands. For more information about partnership opportunities, call 312-540-9930.

Visit a forest!

Chicago Park District offers many opportunities to explore woodlands across the city. Visit the North Park Village Nature Center, the Paul Douglas Nature Sanctuary

(Wooded Island) in Jackson Park or the Columbus Woodland and Lagoon. In addition to these nature areas, the Chicago Park District also offers a number of environmental programs that help you develop an awareness, appreciation and knowledge of Chicago's natural resources. For maps and more information, visit www.chicagoparkdistrict.com.

Visit the Forest Preserve District of Cook County, the nation's largest urban conservation preserve system, and discover Chicago's incredible forests. Within our city limits, there are miles of trails along the North Branch of the Chicago River. You can walk through Eggers Grove and Beaubien Woods in the Calumet region, one of Chicago's most important natural areas. For maps and more information, visit www.fpdcc.com.

Just outside the city, you can learn more about trees by walking through the beautiful forests, taking a classes or visiting the libraries at:

The Morton Arboretum
Lisle, IL
www.mortonarb.org

Chicago Botanic Garden
Glencoe, IL
www.chicagobotanic.org

Tree Care
(continued)

Watering

It is essential to make sure that newly transplanted and young trees get enough water, because their smaller root systems are especially vulnerable during times of drought.

Generally speaking, Chicago trees require one inch of water per week when in leaf. Care must be taken not to over-water mature trees; if the ground is moist, don't water. In the case of drought, homeowners are mandated to water street trees adjacent to their properties.*

Mulching

Mulching annually helps keep roots cool in summer and warm in winter. Aged or composted wood-chip mulch keeps weeds down, helps hold in moisture and fertilizes the soil as it breaks down. Mulch should be spread out in the shape of a saucer, not a mound. The saucer shape will hold and distribute rain water to a tree's roots more effectively. Mulch mounded up against a tree's trunk can cause bark rot, making the tree vulnerable to disease and insect problems.*

* The owner of property contiguous to a parkway shall be responsible for watering and fertilizing the parkway trees for a period of five years after it was planted and for the routine care of the parkway lawn. See the Chicago Landscape Ordinance for more information at www.cityofchicago.org.

Tree Care (continued)

Pruning

City trees must be pruned periodically for the health and safety of those around them, as well as for the general health of the trees themselves. The Bureau of Forestry is responsible for the management of all shade and ornamental trees growing along city streets and boulevards. Generally speaking, if pruning cannot be done with both feet on the ground, leave it to the arborists. For referrals for certified arborists, visit the Illinois Arborist Association at www.illinoisarborist.org.


Ground Covers

Trees and grass compete for water and nutrients. The roots of perennial ground covers, such as barren strawberry or woodland aster, don't compete as fiercely for water, making them more compatible with trees. And they never need to be mowed.**

**Chicago residents who want to garden in the City-owned parkway may need a permit from the Department of Transportation, visit www.cityofchicago.org. Any planters installed at the base of an existing tree must maintain the current soil level near the trunk, and should not disturb the fine-textured tree roots which are found immediately below the turf. Planting soil should be nutrient-rich and free-draining and plantings should be carefully selected for available sun and moisture.



Chicago must now engage private landowners to plant and better maintain trees in all areas of the city.



Trees will play an important role in the new paradigm of an integrated infrastructure.

Resources for Additional Information

Arbor Day Foundation
www.arborday.org

Chicago Botanic Garden
www.chicagobotanic.org

Chicago Department of Environment
www.cityofchicago.org/Environment

Chicago Gateway Green
www.gatewaygreen.org

Chicago Trees Initiative
www.chicagotrees.net

Illinois Arborists Association
www.illinoisarborist.org

Illinois Green Industry Association
www.ina-online.org

Illinois Landscape Contractors Association
www.ilca.net

Midwest Ecological Landscaping Association
www.melaweb.org

The Morton Arboretum
www.mortonarb.org

Openlands
www.openlands.org

Urban Natural Resources Institute
www.unri.org

U.S. Forest Service – Urban Forestry
www.fs.fed.us/ucf/

TreeLink
www.treelink.org

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Photo credit: Suzanne Carlson
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- | | | | |
|---|--|---|----------------------------------|
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