

Hartford's Urban Forest – the Challenge



Hartford is a city in a forest. Over a quarter of its area is covered by trees, and that is remarkable because about half of the city is covered with buildings, pavement, or water.

A “tree canopy survey” conducted during the summer of 2007 provided that information and more. It indicated how valuable our urban forest is for pollution reduction, energy conservation and other purposes.

Based on survey results, Hartford is challenged to learn more about our urban forest, to plant many more trees in a thoughtful and effective way, to maintain its stock of large, valuable trees, and to protect important trees from damage or loss.

The Survey of Hartford's Trees

The City of Hartford, Knox Parks Foundation, the US Forest Service and the Department of Environmental Protection's Division of Forestry participated in this tree canopy survey of the

City's urban forest. The data collection and analysis method, called UFORE (Urban Forest Effects), has the potential to inform and direct efforts on behalf of the trees of Hartford for a while to come – if we take advantage of what the survey shows us.

Four college interns hired by the Knox Parks Foundation collected the data used in this survey. Data came from 200 sample points randomly selected throughout the city by the City of Hartford's Department of Public Works, using the City's Geographic Information System (GIS) technology. The US Forest Service provided the funding for this project through a grant awarded and administered by DEP Forestry. DEP Forestry also contributed its technical expertise to the survey.

Hartford's Urban Forest - a Summary

Number of Trees: 568,000

Number of Larger Trees (over 20" in diameter): 55,000

Most Common Trees: red maple, tree of heaven, black cherry, American elm and red oak

Tree Canopy Cover: 26%

Amount of Carbon Removed by Hartford's Trees Annually: 2,440 tons

Amount of Major Air Pollutants Removed Annually: 73 tons

Oil Saved due to Energy Reduction by These Trees: 2,400 barrels a year

Replacement Cost for These Trees: \$590 million dollars

What We Learned

Viewed from above, about 26% of the total surface area of Hartford is covered by trees. This canopy cover compares favorably with other major cities in the Northeast, including Boston (22%), New York (21%) and Washington DC (29%). Of the remaining surface area, about 16% could be planted with trees and so, potentially, be used to increase the city's canopy cover.

As for the actual ground cover, the survey showed that 28% of Hartford is maintained grass, while 26% is covered by asphalt. Buildings make up 11% of Hartford's surface area while water, including the Connecticut River, makes up 4% of the rest. Approximately 40% of the City's surface area is covered by materials impermeable to penetration by water.

Hartford has roughly 568,000 trees, counting every tree trunk greater than 1 inch in diameter (dbh). If only the larger trees (above 4 inches in diameter) are counted, the city has about 268,000 trees; of these approximately 55,000 are greater than 20 inches in diameter. These largest trees, although less than 10% of the total number of trees, account for about

50% of the total tree canopy. The largest tree found during the sample is a silver maple that is 54 inches dbh, while the tallest tree is a 138 foot tall cottonwood. The replacement value for these trees in sum total would run about \$590,000,000!



The most common tree in Hartford is the red maple, followed by the tree of heaven, black cherry, American elm and red oak. If the criterion is greatest leaf area rather than most individuals (important because leaves do the

most to reduce pollution and provide shade) – red maple still ranks first, followed by silver maple, pin oak, American beech and red oak. Interestingly, Norway maple, often mentioned as a tree that is over-planted and invasive, only comes in 7th on the list of most common trees, and does not make the top ten for leaf area.



What These Trees Do

While the benefits of Hartford's trees based on this survey are still being analyzed, some early results are apparent. Hartford's trees store about 143,000 tons of carbon, and continue to remove carbon from the atmosphere at about



the rate of 2,440 tons per year. An average car in the U.S. produces about 6 tons of carbon each year, so Hartford's trees could be said to balance the effects of over 400 cars. The City's trees also help reduce energy consumption within the City by about 1,800 Megawatt hours per year. Since the average Connecticut household uses about 8.4 Megawatt hours per year, this balances the energy impact of over 200 households. This is a saving of about 2,400 barrels of oil not burned in local power plants.

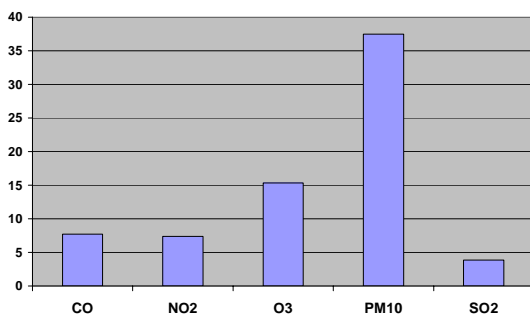
The air quality benefits provided by the trees in Hartford also include substantial reductions in ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate matter. The survey showed that the trees of Hartford filter out about 37 tons of particulate matter a year. They also remove about 8 tons of carbon monoxide, 7 tons of nitrogen dioxide and 4 tons of sulfur dioxide annually. By shading and cooling our streets, trees also remove or help prevent the formation of about 15 tons of ozone each year.

In improving the quality of the air, trees directly improve the health and physical well-being of those who live and work in Hartford. Particulate matter (PM10) are those small pieces of dust and other irritants that penetrate deep into the lungs and cause respiratory problems, including increasing the effects of asthma and heart disease. Without trees, many of these air pollutants would be breathed in by people in the city. Air pollution reductions are particularly important in Hartford, which has the highest rate of emergency room admissions for asthma in the state.

The overall value of the services provided by trees in cleaning our air is estimated to be on the order of \$305,000 each year.



Hartford - Air Pollutants Removed Annually - Tons



Trees also contribute to the reduction of storm-water runoff, noise abatement and increases in property value – benefits not quantified as a part of this survey.

The Challenge

The challenge for the City and citizens of Hartford is to take action – to do what is needed to plant, preserve, protect and maintain our trees – including those on both public and private properties. Specifically, we should:

1. Plant a lot more trees, with the goal of achieving a 30-35% canopy cover. Large, tall trees are better for achieving this goal than are smaller trees.
2. Choose where we plant these trees with care and with awareness as to the benefits these trees can provide, including the removal of pollutants, reductions in energy use and the improvement trees make to the quality of life in our city.
3. Devote greater resources to the maintenance of the city's larger and more valuable trees – including the city's very important street tree resource.
4. Undertake further studies of our forest. Hartford should have a full street tree inventory to guide maintenance efforts. A full inventory and a canopy cover analysis will help modernize our approach to urban forest management.
5. Continue the work already under way on developing a strong and consistent Hartford tree ordinance.

All of this can be done. It will require efforts, of the city of Hartford and its citizens, the State Legislature and those state agencies that work with the city.

As is often said about trees – we need to take care of the trees, not just for ourselves but for the benefit of those future generations who will gain from the trees we leave to them.



The following organizations are participating in Hartford's Urban Forest Effects (UFORE) analysis:



For further information, please contact the Knox Parks Foundation at (860) 951-7694, the Hartford City Forester at (860) 543-8765 or the CT DEP Forestry Urban Forester at (860) 424-3178.