Sustainability and Urban Forestry

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What is the Urban Forest?

A collection of mostly healthy, mostly tall trees

The engine that creates a range of ecosystem benefits

The regulator/barometer of the urban ecosystem

A collection of mostly healthy, mostly tall trees

Risk Assessment

IN DEFENSE OF TALL TREES

Identify the valuable and strongest large trees in cities and towns. Then work to keep them.

BY CHRIS DONNELLY

In the wake of recent storms in Connecticut, residents have criticized tall trees as threats to public safety and the reliability of electricity and cable lines. Yet, tall trees are very much a natural part of the Connecticut landscape.

It is true that trees are large, living organisms and that, when they grow in close proximity to people and structures, they need careful attention and maintenance. However, tall trees also contribute to the quality of life. They provide a wide range of benefits—from cooling buildings to soothing tempers—not available through other practical means. The growth and retention of healthy, structurally strong, and properly located tall trees should be a priority goal of all municipalities in the state.

My emphasis is deliberately *tall* trees because it's easy to equate a tree with a tree with a tree, and so to accept as a trade-off the safety of short-stature trees for the benefits of tall trees. Although shorter trees such as crabapples, dogwoods, and flowering cherries have their place, they are not able to make the same contributions as do tall trees such as oaks, elms, maples, and pines.

Tall trees' canopies and leaf surface areas measure larger than do those of smaller trees. Taller trees have more leaves, trap more pollutants, take in more carbon dioxide, transpire more water through the soil, and cast greater shade than smaller trees do.

Tall trees also do all those things that make trees so valuable to us. For the same ground footprint, tall trees deliver more working leaf surface areas. Also, their heights provide greater ability to shade the roofs and upper stories of buildings. Taller trees provide a broader range of habitats and they

"Boston was selected after a careful evaluation of the business ecosystem…" - Jeffrey Immelt, CEO of General Electric, on why GE is moving to Massachusetts

The engine that creates a range of ecosystem benefits

Hartford's Urban Forest – the Challenge

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

Urban Heat Island Effect

A well-known benefit of trees is their ability to reduce ground-surface temperatures, both by direct shading and retention of soil moisture. In areas where tree canopy has been removed, surface temperatures can be substantially higher than adjacent forested areas. The effect may be most pronounced in areas with extensive impervious surfaces, which absorb and hold thermal radiation from the sun. Analysis of recent thermal data (Landsat, October 3, 2014) illustrated this effect in the Greater Bridgeport region (Figure 8). This relationship was further confirmed by plotting surface temperature versus Existing Tree Canopy (Figure 9). A statistically significant inverse relationship exists between tree canopy and surface temperature providing clear evidence that trees help to reduce the urban heat island effect. The large forest patches in the western and northern portions of the study area results in substantially lower temperatures. Areas in and around the City of Bridgeport with limited Existing Tree Canopy have much higher surface temperatures.

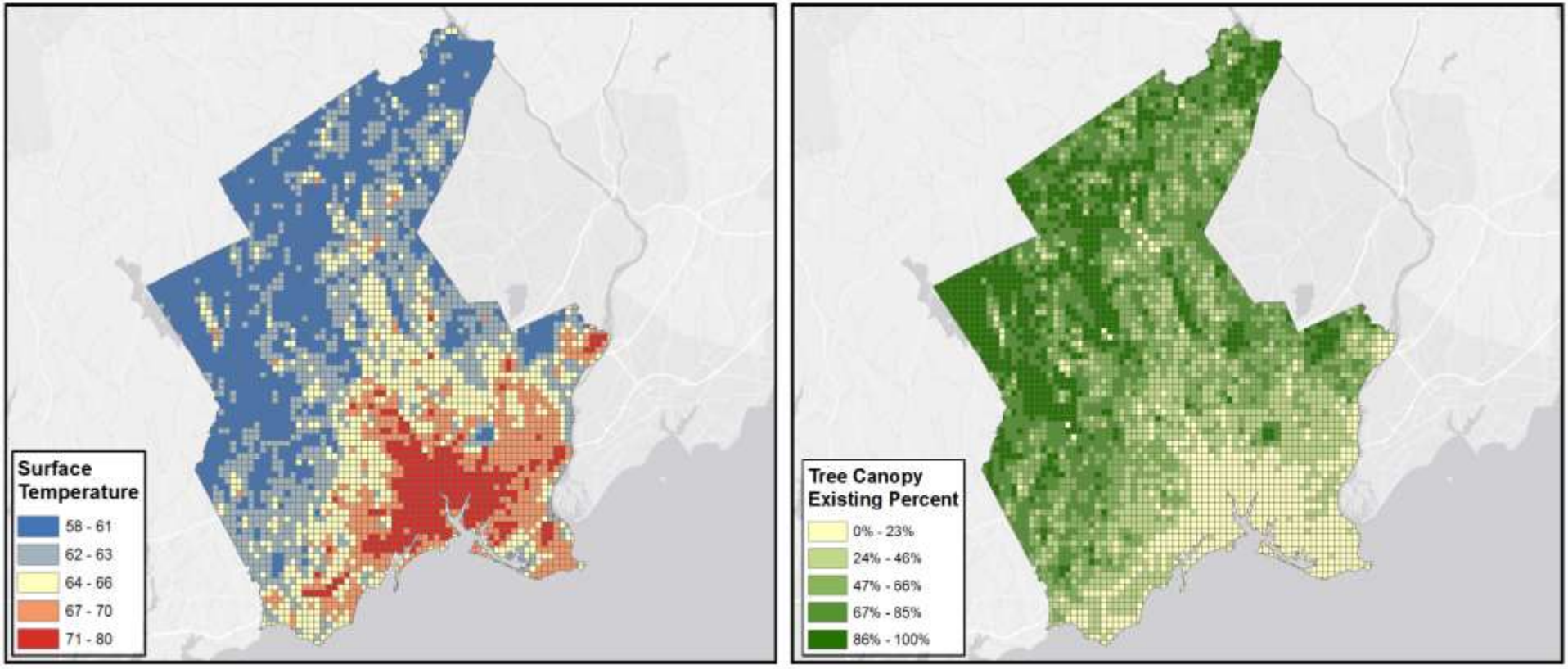


Figure 8: Surface temperature, degrees Fahrenheit on October 3, 2014 (left) in comparison with Existing Tree Canopy (right).


STOP

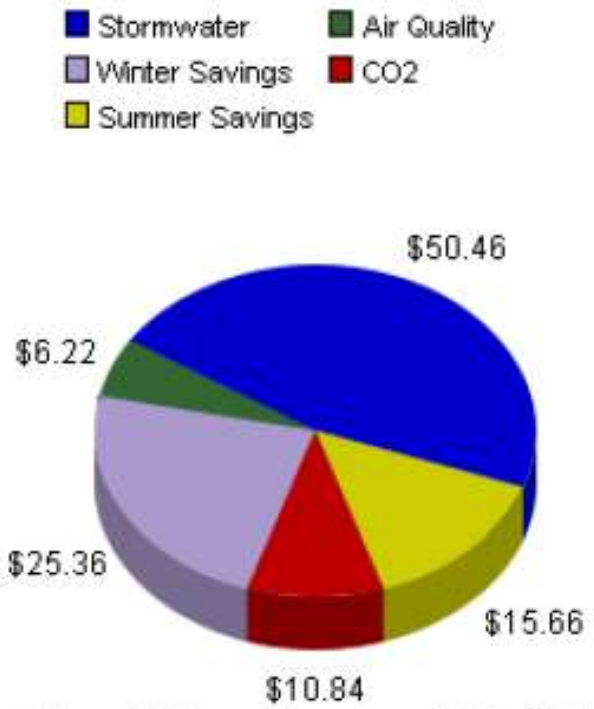


Figure 2. Annual tree benefits for 2017

Current Year - For 2017, i-Tree Design estimates annual tree benefits of $108.54:

- $50.46 of stormwater runoff savings by intercepting 6,308 gallons of rainfall
- $6.22 of air quality improvement savings
- $10.84 of carbon dioxide reduction savings
- $15.66 of summer energy savings
- $25.36 of winter energy savings

Carbon | Air Pollution Removal | Hydrology

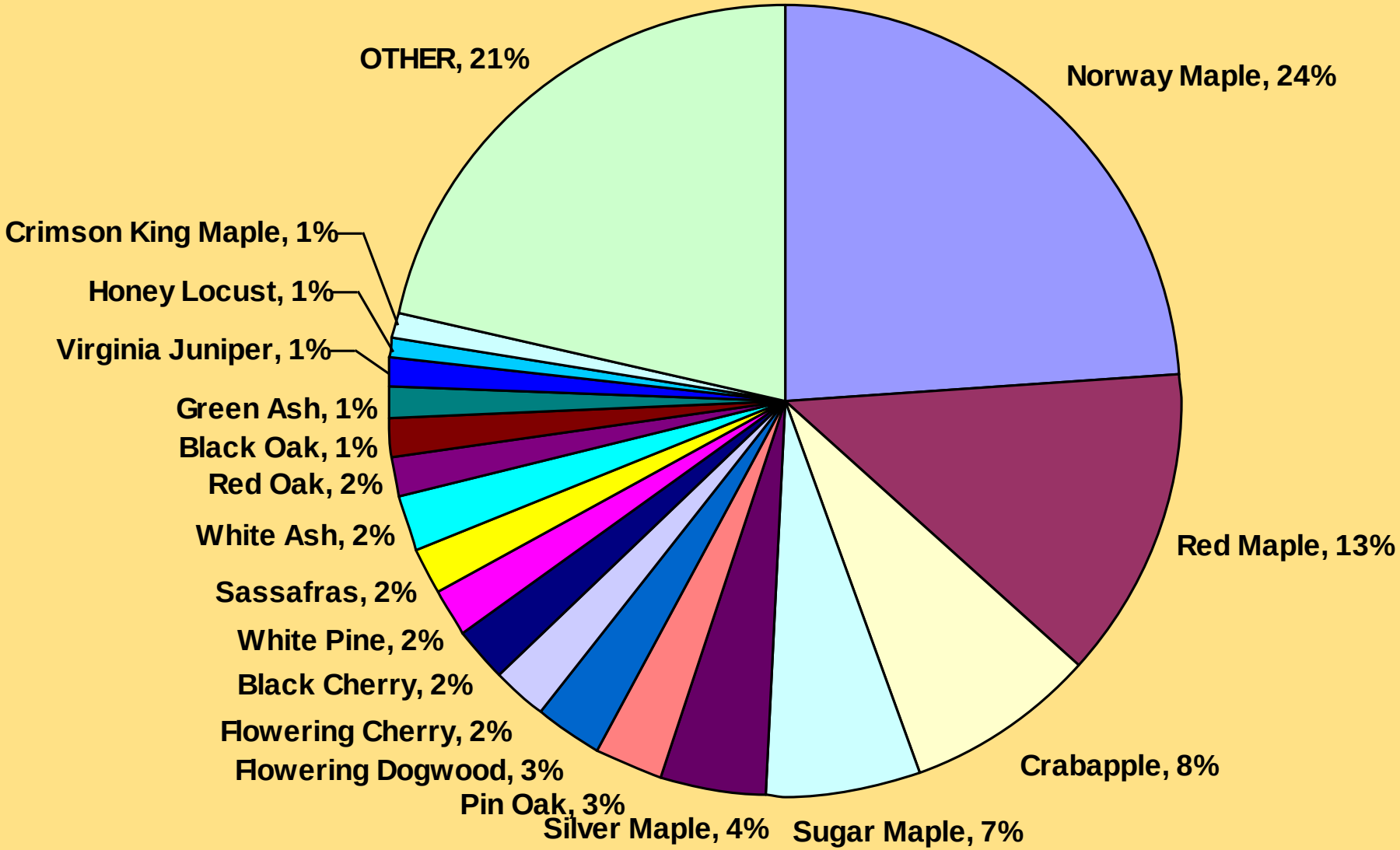
Remove	Type	ID	Swap	Highlight	CO		NO_2		O_3		$PM_{2.5}$		SO_2
					$/yr	lb/yr	$/yr	lb/yr	$/yr	lb/yr	$/yr	lb/yr	$/yr
✖	Block Group	090091414002	⇄	☐	24.0	35.7	95.0	439.8	3,218.0	2,041.7	5,755.0	88.4	11.0
✖	Block Group	090091414001	⇄	☐	31.0	47.0	125.0	577.2	4,223.0	2,678.8	7,551.0	116.2	14.0
✖	Block Group	090091414003	⇄	☐	9.0	13.7	36.0	167.1	1,222.0	775.1	2,185.0	33.5	4.0
✖	Block Group	090091413002	⇄	☐	11.0	17.2	46.0	210.5	1,541.0	977.5	2,756.0	42.3	5.0
✖	Block Group	090091414004	⇄	☐	11.0	17.2	46.0	210.1	1,538.0	975.5	2,750.0	42.3	5.0
▲	**Total Selection:**			☐	87.0	130.7	348.0	1,604.7	11,742.0	7,448.7	20,997.0	322.8	40.0

The regulator/barometer of the urban ecosystem

The Common Ground community—a partner in the **Schoolyard Habitat** and **Urban Oases Program** with Audubon Connecticut—planted an educational wetland habitat in New Haven.


LAKE COMPOUNCE
FISK

Milford Street Trees - Species Distribution




FREE
FREE
FREE
25


OPEN


PARK IS OPEN
FROM
DAWN TO DUSK
PLAY AT
YOUR
OWN
RISK


NY-CONN


ONE WAY
S. Church

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