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Introduction

Putting a Value on the Urban Forest

URBAN FORESTERS have long known of the benefits that urban trees provide to communities from reducing the heat island effect, controlling runoff, and improving air quality. However, most have struggled to get other city officials to view urban forestry programs as much more than a beautification program. Now, using a suite of software tools called i-Tree, urban foresters can put a dollar figure on the environmental services that the tree canopy provides to a city, and provide support for their argument that the urban forest is a valuable part of the urban infrastructure, and, as such, deserves substantial investment for improvement and maintenance. This issue of *Leaves of Change* focuses on the work that Urban Forestry South and partners are doing to put i-Tree to use in support of urban forestry programs and communities across the South.

Technology

i-Tree

TWO YEARS ago, Gene Hyde, the city forester for Chattanooga, TN, was driving home from work when an announcement came on the radio. The CEO of Volkswagen was announcing that Chattanooga was chosen for a new assembly plant that would bring thousands of jobs to the city. The CEO mentioned the city's green infrastructure and commitment to sustainability as one of the deciding factors in the decision.

"I had to grab the steering wheel and pull over I was so excited," says Hyde. "This was incredible news in the middle of a recession—it confirmed the value of the urban forest as a recruitment tool for business and industry."

Hyde has been working tirelessly for twenty years to convince city leaders of the value of Chattanooga's trees as an important part of the city's infrastructure, but recently, backed by a simple, yet powerful software program called i-Tree Streets, Hyde has been able to clearly demonstrate the importance of the urban forests' environmental benefits with hard data, scientific analysis, and dollar values.

Eric Kuehler and Dudley Hartel of Urban Forestry South (UFS) have been working with state urban and community forestry coordinators and other urban foresters, such



Urban foresters can put a dollar figure on the environmental services that the tree canopy provides to a city using a suite of software tools called i-Tree.

The i-Tree Suite of Software Tools

i-Tree is actually a suite of software tools, each designed for a different type of urban forest analysis. **i-Tree Eco** is the most comprehensive of the tools. The program uses data from complete tree inventories or plot sampling across an entire city. It can be used to get a picture of the structure of the urban forest (to identify potential health problems and management needs) and to quantify environmental effects and values. **i-Tree Streets** focuses specifically on the benefits provided by a municipality's street trees. Like i-Tree Eco, i-Tree Streets uses inventory or sample data, to describe the forest structure and the value of the environmental and aesthetic benefits city trees provide such as air pollution, removal, energy savings, CO₂ reduction, stormwater control, and property value enhancement. Eco and Streets are the core of the i-Tree suite of programs, but there are other models:



- **i-Tree Storm** is a program designed to estimate potential vegetative debris volumes in a municipality before a natural disaster so that disaster plans can be made and rapidly estimate downed biomass volume and hazardous standing trees in the aftermath of a storm to help cities' with debris removal plans.
- **i-Tree Vue** uses existing landcover datasets to assess a community's tree cover. Vue is a "gaming system" that allows users to increase and decrease percent tree cover and impervious surface in their cities and view the resulting changes in environmental benefits.
- **i-Tree Species** aids users in selecting the right species for a specific location based on hardiness, environmental benefits, and a range of other functions.

More than 6,000 copies of i-Tree have been distributed (for free) since 2006, with about a 30 percent increase per year. The program has been distributed to users in 83 countries, and non-U.S. users now make up about 30 percent of all distributions.

Training Activities

i-Tree Eco Workshop in Texas

IN NOVEMBER 2010, Urban Forestry South conducted an i-Tree Eco workshop in Dallas, Texas in conjunction with the Society of Municipal Arborists and the Texas Forest Service. This extensive training workshop demonstrated the i-Tree Eco software and the kinds of information that it can provide to a community, how to prepare for and set-up a sample inventory project, and how to collect and enter the data into the software application. The Texas Forest Service videotaped the entire workshop, which will be made available on both the i-Tree Tools website (www.itreetools.org/) and the Society of Municipal Arborist's website (www.urban-forestry.com/). For more information about this workshop and the i-Tree Eco software, please contact Eric Kuehler (706-559-4268, ekuehler@fs.fed.us) or Dudley Hartel (706-559-4236, dhartel@fs.fed.us).



Eric Kuehler conducting an i-Tree Eco workshop.

Second Changing Roles Fall Webinar Series

THE SECOND Changing Roles fall webinar 4-part series topics included green infrastructure, forest cooperatives, ecosystem services and climate change. Approximately 477 participants from 12 of the southern states and from 14 states from other regions participated. Webinar participants requested at least 174 hours of Society of American Foresters continuing forestry education credits. The webinar sessions were recorded and archived and continuing education credits can be earned for viewing the archived session for up to one year from the date of the live session. The archived sessions can be accessed at: <http://www.forestrywebinars.net/search?SearchableText=emerging+issues>. The next Changing Roles webinar series will take place in the fall 2011 and we would like to know what emerging issues you want to learn about in this next series. Please send suggestions for the next webinar series to Nicole Wulff at 352-378-2451, nmwulff@fs.fed.us.

Recommended Resource



i-Tree Tools Website

The i-Tree Tools website includes a wealth of resources, such as the i-Tree software applications, manuals and workbooks, presentations, training information, newsletters, and much more. The website is a cooperative initiative between the U.S. Forest Service, the Davey Tree Expert Company, the Arbor Day Foundation, the Society of Municipal Arborists, the International Society of Arborists, and Casey Trees. Visit i-Tree Tools at: www.itreetools.org.

Technology: i-Tree

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as Hyde, across the South in using i-Tree to support urban forestry programs. Kuehler has been holding training sessions and workshops for urban foresters who are interested in using the technology, and UFS currently provides support and conducts all data analysis for i-Tree Eco users in the South.

For cities like Chattanooga, the analysis generated by i-Tree has opened the eyes of municipal officials to the hidden value of urban forests, and in some cases, has been instrumental for securing continued and expanded support for programs.

In 2006, Chattanooga became a signatory to the U.S. Conference of Mayor's Climate Protection Agreement, and the city pledged to reduce the city's carbon footprint by 7 percent below 1990 levels by 2012. Using i-Tree Streets, Hyde was able to show that urban trees could play a large role in offsetting carbon emissions. i-Tree also allowed Hyde to describe in concrete and monetary terms the value of the urban forest in controlling stormwater (\$3.79 billion/year) and cleaning air pollution (\$12.9 million/year). Overall, he found that for each dollar that the community invested in its managed urban forest, it received \$12.18 in benefits.

City leaders were impressed and they decided to make urban forestry a large part of their strategy to reduce carbon emissions. Expansion and maintenance of the urban canopy cover became a central plank in the city's Climate Action Plan, and the city's commitment to that effort are part of what helped to bring Volkswagen to Chattanooga.

"Going green doesn't restrict growth," says Hyde. "It enhances it."

Hartel and Kuehler are working to make it easier for other communities to put the technology to use through a number of projects that will increase the applicability and ease of use of the program. For example, Urban Forestry South and collaborators at the University of Georgia have completed work

on an ArcMap tool that allows field data collected with a Geographical Positioning System (GPS) unit to be converted into an i-Tree Eco project database for analysis. This tool allows urban forest managers to keep existing, familiar data collection systems and still take advantage of the i-Tree Eco ecosystem analysis model.

Another research project supported by Urban Forestry South is currently underway at Auburn University. Auburn researchers led by Dr. Art Chappelka completed a 100 percent inventory of trees on campus and are using the results to validate the i-Tree Eco ecosystem model with southern tree species (the program was originally developed for use with northern tree species). They are also working to improve efficiencies in data collection as well as investigating new sampling design and procedures.

"Auburn was a great location for the study since it is small enough to do a complete inventory and large enough to have a dataset that will allow more complex analysis," says Chappelka. Results from the study are expected to be released this fall.

Urban Forestry South used the Auburn project and campus for an i-Tree Eco training workshop in June 2010 that brought in urban foresters from across the region.

According to Kuehler, i-Tree Eco is being used by both small and large cities, such as Houston, Arlington, Miami, Tampa, Pensacola, Charleston, and Savannah, as well as rural and developing communities such as De Soto County, MS.

Joy Anderson, the DeSoto County director for the Mississippi State University Extension Service, says she became interested in doing an i-Tree Eco analysis because of air quality issues. The county, located across the state line from Memphis, TN, is rapidly changing from rural to urban, and in recent years has been in "non-attainment" (not meeting) with EPA ground-level ozone standards. "The county Ozone Action Group was not talking about trees. I wanted green infrastructure to be considered as part of the solution," says Anderson.

Anderson says that there is interest among the county leadership about expanding the urban forestry program, but she really "needs hard facts to dive deeper into the discussion."

The county is collecting data for analysis and reports, and Anderson believes that the potential of the tree canopy as a part of the solution to the air quality problem is going to be hard to ignore.

"I am hoping i-Tree will surprise some people and show that we are overlooking the biggest potential air cleaning system we have," says Anderson.

Article written by Josh McDaniel, Benmarks Research and Safety, Inc.



Participants learn about i-Tree Eco at a training workshop held on the Auburn University campus.

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Upcoming Events

Date	Description	Location	Contact
February 3-5, 2011	10th Annual New Partners for Smart Growth Conference	Charlotte, NC	www.newpartners.org/
February 19-22, 2011	ISA Southern Chapter 2011 North American Tree Conference and Trade Show	Savannah, GA	www.isasouthern.org/annualconference.htm
February 23-25, 2011	National Green Infrastructure Conference 2011	Sheperdstown, West Virginia	www.conservationfund.org/GIC2011
March 26, 2011	Texas Wildlife and Woodland Expo 2011	Conroe, Texas	texasforests.tamu.edu/main/popup.aspx?id=12078 , expo@tfs.tamu.edu, 936-273-2261



This issue can be found online at: www.interfacesouth.org/swuinet/files/LeavesofChangeIssue8.pdf

*Note: InterfaceSouth and Urban Forestry South are the technology transfer centers of the USFS Southern Research Station work unit, SRS-4952: *Integrating Human and Natural Systems in Urban and Urbanizing Environments* (www.humanandnaturalsystems.org) and are collectively called the Centers for Urban and Interface Forestry. InterfaceSouth focuses on wildland-urban interface issues while Urban Forestry South focuses on urban forestry issues.