

Berkeley Lake Urban Forest Assessment

Executive Summary

Overview Berkeley Lake is a unique city in Gwinnett County and the state of Georgia. The focus on maintaining a healthy environment for the wealth of native plants and animals that live within city limits is of the highest caliber. This is accomplished through one of the most restrictive tree ordinances in the state as well as the emphasis placed on managing the wildlife population by using humane and natural techniques.

It is easy to take our Urban Forest for granted and assume that it is “self-maintaining”. In reality it is a living, growing and dynamic resource that needs a plan for a healthy life and evolution over time.

Our Urban Forest consists of:

- ♦ 70 acre forest, our greenspace
- ♦ trees located on public right of way along our city streets
- ♦ trees located on private property growing over our city streets and located in the yards of our private homeowners

What is the value of our Urban Forest and how do we responsibly maintain this asset? The USDA Forest Service has developed a suite of software programs, i-Tree, that assist in urban forest inventory, analysis, assessment and forecasting. These tools are available to the public for free but it takes more than the tools to have a successful outcome. A group of individuals experienced in tree identification, tree health assessment, tree age assessment, etc. is required.

Eric Kuehler, Technology Transfer Specialist with the USDA Forest Service, Southern Research Station, would like to use Berkeley Lake for an i-Tree pilot project.

Benefit to Berkeley Lake Berkeley Lake will get an assessment of its street trees and its entire urban forest conducted by professional arborists at no cost to the city. The documents that will be generated include but are not limited to:

- ♦ Maps of all trees impacting the roads
- ♦ Trees that the professional arborists suggest for removal
- ♦ All trees on the public right-of-way that impact the road and are greater than 30” in diameter
- ♦ Species distribution
- ♦ Size class distribution, condition
- ♦ Environmental services
- ♦ Benefit/cost analysis

A sample of an assessment is included in the document “GA_itree_pilot_project.doc” created for the city of Lexington, GA.

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Executive Summary, *continued*

How the pilot will be conducted

Eric would like to conduct the pilot in April 2008 to train urban forestry professionals to use the various i-Tree applications. The two day training event would show professionals how to plan and set up a project, collect the necessary data, use those data to run the models, and generate necessary reports needed for planning and forest management.

Approximately eight, 3-person teams would fan-out over the streets of Berkeley Lake and the Greenspace on those two days to collect the data. Residents of Berkeley Lake could sign-up to participate in the project.

Conclusion

It is requested that the Berkeley Lake City Council approve this project and allow Eric Kuehler to proceed with advertising this training opportunity and organizing this pilot project.

The document titled "*How much are those trees worth that are growing in your yard.doc*" is the workshop advertisement Eric is proposing and would be open to any editing changes Berkeley Lake would want to make.

Additional information has been included in this document and one other document which includes:

- ♦ Definitions
- ♦ References & Links
- ♦ About UFORE
- ♦ About STRATUM
- ♦ What Is i-Tree.pdf

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Additional Information

Definitions **i-Tree**

A USDA Forest Service state-of-the-art, peer-reviewed, urban and community forestry analysis and benefits assessment software suite. i-Tree currently integrates four urban and community forestry inventory, analysis, assessment and forecasting tools: UFORE (Urban Forest Effects Model), STRATUM (Street Tree Resource Analysis Tool for Urban Forest Managers), MCTI (Mobile Community Tree Inventory), and the Storm Damage Assessment Protocol.

STRATUM

An acronym for “Street Tree Management Tool for Urban forest Managers”. This program is used to assess street tree populations. Developed by researchers at the Center for Urban Forest Research -- a research unit of the USDA Forest Service's Pacific Southwest Research Station -- STRATUM is a computer application that uses tree inventory data to quantify the structure, function, value and management needs of any street tree resource.

UFORE

An acronym for "Urban Forest Effects" and refers to a computer model that calculates the **structure**, environmental effects and values of urban forests. The UFORE model was developed in the late 1990s by researchers at the United States Department of Agriculture (USDA) Forest Service, Northeastern Research Station in Syracuse, NY. UFORE Model program development was funded by the USDA Forest Service Northeastern Research Station, USDA State and Private Forestry's Urban and Community Forestry Program and the USDA National Urban and Community Forestry Advisory Council. The UFORE software is in the public domain and available at no cost to all interested individuals and organizations.

References & Links

Eric Kuehler
Technology Transfer Specialist - Urban Forestry South
Centers for Urban and Interface Forestry
USDA Forest Service, Southern Research Station

Dale Higdon
Senior Forester
Georgia Forestry Commission

www.urbanforestrysouth.org

www.itreetools.org

www.ufore.org

www.gfc.state.ga.us

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About UFORE

What is UFORE?

UFORE is a model suite that allows users to collect data on the entire urban forest and estimate the ecosystem services the resource provides to the community. From project start to finish, UFORE is a complete package that provides users with the following components:

- Detailed, statistically based sampling and data collection protocols. These protocols allow for estimation of total and variation related to urban forest structure and population effects.
- A customizable PDA Utility that supplies data collection applications to run on low-cost, Windows-based Pocket PCs.
- A central computing engine that makes scientifically sound estimates of the effects of urban forests based on peer-reviewed scientific equations to predict environmental and economic benefits.

What does UFORE do?

After tree data are collected and entered into the UFORE database (either by uploading from PDAs or by doing manual entry), they are merged with local hourly weather and air pollution concentration data. These data make it possible to calculate structural and functional information using a series of scientific equations or algorithms. If a complete inventory is conducted (i.e., all trees are measured; a 100% sample), then UFORE calculates values for each tree and for the total population. If only a sample is examined (i.e., plots are randomly located within the area of analysis), then UFORE calculates estimates for the total population along with estimate error.

The UFORE model is currently designed to provide accurate estimates of:

- Urban forest structure (e.g., species composition, number of trees, tree density, tree health, etc.), analyzed by land-use type.
- Hourly amount of pollution removed by the urban forest, and associated percent air quality improvement throughout a year. Pollution removal is calculated for ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide and particulate matter (<10 microns).
- Hourly urban forest volatile organic compound emissions and the relative impact of tree species on net ozone and carbon monoxide formation throughout the year.
- Total carbon stored and net carbon annually sequestered by the urban forest.
- Effects of trees on building energy use and consequent effects on carbon dioxide emissions from power plants.
- Compensatory value of the forest, as well as the value of air pollution removal and carbon storage and sequestration.
- Tree pollen allergenicity index.
- Potential impact of pests such as Gypsy moth, emerald ash borer, or Asian longhorned beetle.

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About Stratum

What is STRATUM?

STRATUM is a street tree management and analysis tool for urban forest managers that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO₂ reduction, stormwater control, and property value increase. It's an easy-to-use, computer-based program that allows any community to conduct and analyze a street tree inventory. Baseline data can be used to effectively manage the resource, develop policy and set priorities. Using a sample or an existing inventory of street trees, this software allows managers to evaluate current benefits, costs, and management needs. Use STRATUM to:

- Improve the return on your investment dollar by determining which trees maximize canopy cover and provide the benefits that are important to your community.
- Determine the management needs of your street tree resource to foster and perpetuate a healthy municipal forest.
- Leverage investment from partners for such things as carbon credits or energy conservation.
- Gain public support by demonstrating the value of trees to the quality of life in your community.
- Perform economic evaluations of tree performance using annual budget and expenditure data.
- Assess costs of management -- rather than benefits alone -- to provide a platform for strategic planning.

What does STRATUM do?

STRATUM uses tree growth and benefit models for predominant urban tree species in 19 national climate zones. Users import data collected in a sample or complete inventory and enter community specific information (e.g., program management costs, city population, and price of residential electricity) to customize the benefit-cost data.

STRATUM uses this information to calculate:

1. Structure (species composition, extent and diversity)
2. Function (the environmental & aesthetic benefits trees afford the community)
3. Value (the annual monetary value of the benefits provided and costs accrued)
4. Management needs (evaluations of diversity, canopy cover, planting, pruning, and removal needs).

Reports consist of graphs, charts, and tables that managers can use to justify funding, create program enthusiasm and investment, and promote sound decision-making. With STRATUM, users can answer the most important question related to their tree program: Do the accrued benefits of street trees outweigh their management costs? In addition, STRATUM will aid managers in improving the return on their investment dollar