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# Review of Forest Service Technology Transfer in Urban and Community Forestry





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*James Geiger*

*Forest Service*

*Cooperative Forestry Staff*



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## Executive Summary

Urban and Community Forestry (U&CF) Technology Transfer is the development and dissemination of products and technical information that interpret relevant research for States, communities, practitioners, and other users (customers). Technology transfer's role is to effectively share new science-based knowledge and new technologies to facilitate improved management and long-term sustainability of our urban ecosystems.

This document defines the current state of U&CF Technology Transfer in the Forest Service, U.S. Department of Agriculture (USDA), by describing the research and transfer/delivery process, listing key products, identifying gaps in product development and delivery, and presenting strategies for improvement.

### Importance of U&CF Technology Transfer

Technology transfer ensures that urban and community forests are better understood and that important principles are shared with and used by practitioners, community leaders, local residents, and others.

Of no lesser importance is the impact U&CF Technology Transfer can have on creating healthier forests. With increasing population growth and urbanization, U&CF programs are now more mission critical than ever, and well positioned to not only help mitigate natural resource issues within urban and suburban areas but also influence attitudes about all forestry practices. A healthy and sustainable urban forest is a frontline solution to helping manage other natural resource problems. Through greater awareness and understanding, fostered by U&CF Technology Transfer, a broader base of support will result in more sustainable ecosystems, whether rural or urban.

Forests can no longer be treated as discrete parcels that are independently managed, given rampant landscape change and urbanization. Forests are now a continuum of variable types and health in many U.S. regions, distributed from the urban core to suburbs, rural areas, and wildlands. All forested landscapes are linked by both ecological and social dynamics.

### Current U&CF Research

Urban trees and forests are considered integral to the sustainability of cities. Sustainable urban forests do not arise at random, but rather result from a communitywide commitment to their creation and management. Providing science-based knowledge that creates commitment and guides action may represent our most significant challenge.

Urban forest sustainability has been an intense focus of research since 1997, as evidenced by the primary areas of research at the various Forest Service research stations across the country: The Pacific Southwest Research Station in Davis, CA; the Northern Research Station in Syracuse, NY, Burlington, VT, and Evanston, IL; and the Southern Research Station in Athens, GA, Gainesville, FL, and Lincoln, NE. Primary areas of research include: quantifying ecosystem services of urban trees, quantifying urban forest structure and change, quantifying changes in basic ecological functions due to urbanization, urban tree canopy analysis, environmental justice, natural environments for urban populations, analysis of urbanization effects on forest vegetation, cultural dimensions of landscape change, and ecological functions of buffers. The research results produced by these research stations are presented in Appendix A as main areas of research and current research emphasis.

It is important to mention two research centers that are not Forest Service organizations but have had a significant impact on U&CF research in recent years and, in fact, many of their results are used in Forest Service technology transfer products: the Human Dimensions of Urban Forestry and Urban Greening Center in Seattle, WA, and the Landscape and Human Health Laboratory at Champaign, Urbana, IL. Their primary areas of research include: urban forestry and human services benefits, trees and transportation, nature and consumer environments, policy and planning, civic ecology, impacts of the urban forest on individual health and healthy functioning, and impacts of the urban forest on neighborhood health and functioning.

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## U&CF Technology Transfer Centers

U&CF Technology Transfer is being conducted by all U&CF staff and through specialists in seven centers located across the country: Center for Urban Forest Research, Davis, CA; Urban Natural Resources Institute, Amherst, MA; Midwest Center for Urban and Community Forestry, St. Paul, MN; Mid-Atlantic Center for Urban and Community Forestry, La Plume, PA; Southern Center for Urban Forestry Research and Information, Athens, GA; Southern Center for Wildland-Urban Interface Research and Information, Gainesville, FL; and the USDA National Agroforestry Center, Lincoln, NE.

The products produced by these centers are presented in Appendixes B through D as a listing of their most recent and successful products, along with a detailed description of their key national and key regional products.

## How Is New Technology Being Transferred?

With the advent of new computer technologies, the opportunities for technology transfer have been greatly expanded. Even though staff has a more challenging and complicated role in this expanded technological environment, it provides the opportunity to get our messages to more people with less effort and money. The biggest challenge seems to be in keeping up with, and affording, all the new advances that are constantly becoming available.

Currently, more than 30 methods are being used to transfer Forest Service research technology: assessment summaries (municipal forest resources analysis; urban tree and forest risk assessments), blogs, books, brochures/booklets (including tree guides), case studies, customer service, decision-support systems, displays, DVDs/CDs, e-learning Webcasts, fact sheets/leaflets, LISTSERV e-mailing, management tools, manuals, models/software, news briefs/bulletins/notes, newsletters/updates/e-news, photo galleries, posters, presentations, press releases, promotional items, scientific reports, repackaged information, research summaries, trade publication articles, training/workshops/conferences, urban tree and forest risk assessments, tree guides, Web-based exchange forums, and Web sites.

## What Is Working?

From this investigation, it is quite clear that Forest Service U&CF Technology Transfer is very active and successful. Technology transfer programs have operated with limited staff and budgets, and yet they have been extremely productive. This success is due largely to the staff's ability to innovate, adjust quickly to changing customer needs, and work well with partners.

This report accounts for more than 30 different technology transfer methods being used by Forest Service staff to get U&CF research and informational products into the hands of customers. But four methods stand out over the rest: center Web sites, e-mail/LISTSERVs, speeches/presentations, and e-learning Webcasts. These are the top four methods because they have been highly effective at reaching audiences, keeping new products and methods in front of customers, and delivering maximum knowledge with minimal costs.

## Where Could Changes Be Made?

While inventorying the various research and technology transfer units for this report, it has become apparent that technology is rapidly changing and that some specific areas in our delivery process are outdated. We need to stop doing some things, adopt new methods, and refocus to reach our full potential or we will become irrelevant. The future of U&CF depends on it. The Internet and Google have opened up a new world of instant access, but people have become more impatient and expect to have links and information at their fingertips. Because of these extremely rapid changes in technology and the way people want or get information, U&CF Technology Transfer must continually adapt its approach to transferring research technology or risk weakening its ability to influence positive changes to urban forests.

The specific areas in which gaps exist and improvements could be made are National Technology Transfer Team leadership, performance and feedback measures, reaching all the right people, cobranded products, TechNet, application programming interface (API) update tool, UFind, Treesearch, TreeLink Web site, availability of U&CF challenge cost-share program projects,

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LISTSERVs, U&CF Web site inconsistencies, marketing, U&CF partnerships, Webcasts, podcasts, environmental news services, Webinars, teleconferences, blogs, and privatization of software.

## Recommendations for Improvement

The following recommendation is offered as the next step. The right combination of strategies will meet future needs, make more efficient use of resources and partnerships, capitalize on new technologies and opportunities, avoid duplication, and streamline the way we do business. This new way of doing business will significantly improve the ability of technology transfer specialists to deliver technology to all U&CF customers.

### Recommendation: Convene a Technology Transfer Summit

Convene a Technology Transfer Summit that invites key Forest Service U&CF staff, Sustainable Urban Forest Coalition members, U&CF partners, and technology and communications experts from the high-tech industry to strategize the best approach to bringing better efficiency and effectiveness to Forest Service U&CF Technology Transfer. The Summit's deliberations should be guided by the following questions:

- Has the U&CF audience changed and, if so, who is the intended audience of Forest Service U&CF Technology Transfer?
- What combination of new strategies will improve technology transfer?
- Should a procedure be implemented to review proposed technology transfer products before they are developed?
- Are the National Technology Transfer Team Goals still relevant?
- What should be the role of NUCFAC, TreeLink, UFind, and Treesearch?

- Where should technology transfer plug in (timing) for products that are in the Research and Development pipeline?
- How can duplication in research and technology transfer be avoided?

An extensive list of possible strategies for improvement to be considered during summit deliberations is provided on page 12 of this review.

## The Appendixes

The bulk of this report is contained in the appendixes, pages 15 through 106.

**Appendix A. The Research.** Presents the current U&CF research and highlights the main areas of research along with the current research emphasis. For those stations that do not have a direct link to a technology transfer center, their technology transfer products are also listed.

**Appendix B. Transferring the Technology.** Presents the current U&CF Technology Transfer processes and products. Because literally thousands of products are available, only the most recent and successful products are listed.

**Appendix C. Key National Technology Transfer Products.** Lists the most recent technology transfer products that have had the biggest impact nationally. Each entry includes a description of the product, the benefit to urban forestry, the funding source, the location in which it can be found, and a list of the partners who were involved in the development of the product.

**Appendix D. Key Regional Technology Transfer Products.** Lists the most recent technology transfer products that have had the biggest impact regionally. Each entry includes a description of the product, the benefit to urban forestry, the funding source, the location in which it can be found, and a list of the partners who were involved in the development of a product.



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**Appendix E. National Technology Transfer Team.** Lists the 23 members of the team, along with their affiliations. The team's ongoing role is to periodically review the technology transfer activities of the Forest Service, establish new directions and goals as needed, and provide project leadership in accomplishing the various team objectives.

**Appendix F. National Urban and Community Forestry Advisory Council.** Lists and describes the 15 members of the council, which was established to advise the Secretary of Agriculture on the national U&CF Program. One purpose of the council is to submit recommendations for funding the U&CF challenge cost-share program. The 160 current and completed projects are listed in this appendix.

**Appendix G. Sustainable Urban Forests Coalition.** Lists the 20 coalition members, 2 ex officio members, and 2 pending members, with contact information. The coalition was established to advance a unified urban forest agenda for our Nation's communities.

**Appendix H. Select List of Partners.** Lists more than 60 partners that represent not only many of the traditional partners, both government and nongovernmental organizations but also new alliances that are just being formed or need to be formed to create more sustainable urban forests for the future. Each entry includes contact information and a description of the partner's purpose.

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# Review of Forest Service Technology Transfer in Urban and Community Forestry

A comprehensive examination of the research and technology transfer process, the Technology Transfer Team, and other partners, and a recommendation for improving delivery.

**December 2007**

Our knowledge of urban and community forestry is expanding daily as research increases our knowledge base and demonstrates the important role that urban forests play in improving our quality of life and the environment in urban areas. This document defines the current state of urban and community forestry technology transfer in the Forest Service, U.S. Department of Agriculture (USDA), by describing the research and transfer/delivery process, listing key products, identifying gaps in product development and delivery, and presenting strategies for improvement.

## What Is U&CF Technology Transfer?

Urban and Community Forestry (U&CF) Technology Transfer is the development and dissemination of products and technical information that interpret relevant research for States, communities, practitioners, and other users (customers). Technology transfer's role is to effectively share new science-based knowledge and new technologies to facilitate improved management and long-term sustainability of our urban ecosystems.

U&CF's Technology Transfer's objective is to accomplish the following:

Encourage the wise use of innovative, cutting-edge technology and science-based resources that results in improved management and sustainability of urban ecosystems.

The U&CF Technology Transfer strategy is to improve access to research findings and overall service to forestry professionals, practitioners, end users, and the public and to ensure

the stewardship of natural resources where people live, work, learn, and play. This strategy includes special emphasis on increasing State and municipal program capacity, quantifying forest functions and benefits, expanding partnerships, managing impacts of urban sprawl, and strengthening applied research and technology transfer beyond the current level.

## Role of the National Technology Transfer Team

The National Technology Transfer Team was established to strategically integrate research and technology transfer activities that address regional U&CF issues and provide practical results at the local level. The team provides a shared vision, focuses resources across regions, and identifies needs and key opportunities. The key technology transfer issues that were identified as part of their recent 5-Year Plan are as follows:

- **Increase our partnerships beyond the U&CF community. (Customers)** Collaboratively use U&CF technology to include green infrastructure in sustainable community planning.
- **Improve delivery of U&CF products and information. (Delivery)** Use market research to develop and disseminate user-friendly U&CF material.
- **Implement feedback process to determine success of technology transfer. (Feedback)** Ensure that the right messages and products reach intended audiences.
- **Introduce marketing to the U&CF community. (Marketing)** Promote the use of market research and marketing strategies to improve delivery of U&CF products and knowledge for targeted audiences.

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## Why Is U&CF Technology Transfer Important?

Technology transfer ensures that urban and community forests are better understood and that important principles are shared with and used by practitioners, community leaders, local residents, and others. Technology transfer provides a mechanism to further enhance the viability and sustainability of our urban ecosystems through more effective delivery of science-based knowledge and state-of-the-art technologies.

Of no lesser importance is the impact U&CF Technology Transfer can have on creating healthier forests. With increasing population growth and urbanization, U&CF programs are now more mission critical than ever and well positioned to not only help mitigate natural resource issues within urban and suburban areas but also influence attitudes about all forestry practices. A healthy and sustainable urban forest is a frontline solution to helping manage other natural resource problems. Through greater awareness and understanding, fostered by U&CF Technology Transfer, a broader base of support will result in more sustainable ecosystems, whether rural or urban.

Forests can no longer be treated as discrete parcels that are independently managed, given rampant landscape change and urbanization. Forests are now a continuum of variable types and health in many U.S. regions, distributed from the urban core to suburbs, rural areas, and wildlands. All forested landscapes are linked by both ecological and social dynamics. For instance, invasive species may enter a region via urban trade destinations such as ports. Rapid detection and eradication is needed to prevent invasive species movement into wildland areas.

## Current U&CF Research

As Jim Clark concluded in 1997 in his paper on *A Model of Urban Forest Sustainability*, urban trees and forests are consid-

ered integral to the sustainability of cities. Sustainable urban forests do not arise at random, however, but result from a communitywide commitment to their creation and management. This success may represent our most significant challenge: to provide science-based knowledge that creates commitment and guides action. See the entire article at <http://www.cfr.washington.edu/research.envmind/Policy/ClarkSstnabityModel.pdf>.

Urban forest sustainability has been an intense focus of research since 1997, as evidenced by the primary areas of research at the various Forest Service research stations across the country. See **Appendix A** for detailed information on research station staff, primary areas of research and current research emphasis.

### **Pacific Southwest Research Station, Center for Urban Forest Research, Davis, CA**

#### **Dr. Greg McPherson, Lead Scientist**

The primary areas of research include quantifying the ecosystem services that urban trees and forests provide including benefits and costs, energy conservation, air quality, and water quality and quantity. In some pioneering research, the center is examining the vegetation component in the wildland-urban interface to determine what landscaping choices will make communities more firesafe while still retaining benefits like beauty, shade, privacy, and wildlife habitat.

The center's current research emphasis is being placed on the Sacramento Urban Forest for Clean Air Project, Oakland Watershed Restoration and Protection, Green Streets—Stormwater Management for Paved Areas, and the San Francisco Bay Canopy Cover Project. Center models being developed are Street Tree Resource management and Analysis Tool for Urban forest Managers (STRATUM), included in the i-Tree suite of tools; ecoSmart Design Software; and Tree Growth Visualization.

“Ways must be found to successfully transfer research knowledge to field applications where they can have a real and measurable effect.”\*

\*National Urban and Community Forestry Advisory Council's Ten-Year Action Plan for 2006–2016

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**Northern Research Station, Syracuse, NY****Dr. Dave Nowak, Lead Scientist**

The primary areas of research in Syracuse include quantifying urban forest structure and change; quantifying changes in basic ecological functions due to urbanization; and quantifying urban forest functions, benefits, and values. The station is also conducting research on urban forest health monitoring, effects of urban development on soil formation, effects of urban forest on air pollution and their role in State Implementation Plans, and urban forests' effects on reducing greenhouse gases. Recently developed products include the Urban Forest Effects (UFORE) model, included in i-Tree, and OUTCOMES (OUTdoors COMfort Expert System) for urban forest effects on outdoor human comfort.

**Northern Research Station, Burlington, VT****Dr. Mark Twery, Lead Scientist**

The primary areas of research include Urban Tree Canopy (UTC) Analysis, Forest Opportunity Spectrum (FOS), environmental justice, ecosystem services, and stewardship. The research involves social structures and processes that will help improve the understanding of relationships among social institutions and organizations, forest management, and forest ecosystem processes to achieve their policy and management goals.

Their current research emphasis is in two areas. The first is the Baltimore Ecosystem Study, which is part of the [National Science Foundation's Long-Term Ecological Research Program](#) focusing on watershed management issues in an established urban area. The unit's focus is on human ecosystem and landscape studies, particularly the Forest Opportunity Spectrum (FOS) for urban and community forestry. Their second research emphasis is the New York City Urban Field Station project, which focuses on New York's urban tree canopy, ecosystem services and social impacts, ecosystem disturbance, public health and well-being, urban livability, ecological literacy, and stewardship.

**Note:** The Baltimore Ecosystem Study is under the general supervision of the [Institute of Ecosystem Studies](#), Millbrook, NY. The Forest Service is involved as site manager and supplies several permanent and temporary staff from both the Burlington, VT, and Syracuse, NY, units. Also visit the Long-Term Ecological Research Web site at <http://www.lternet.edu/>.

**Northern Research Station, Evanston, IL****Dr. Lynne Westphal, Lead Scientist**

The primary area of research is on natural environments for urban populations that will help improve the understanding of how natural resources affect quality of life in urban and urbanizing areas.

Current emphasis is being placed on landscape and demographic change, management and restoration of natural landscapes, environmental perception and values, rustbelt landscape of the Calumet region, and fire management.

**Southern Research Station, Gainesville, FL****Dr. Cassandra Johnson, Acting Lead Scientist for both Centers*****Southern Center for Urban Forestry Research and Information, Athens, GA***

This unit's research focus is on understanding the biophysical relations and human dimensions of urban forests. Their primary areas of research are an assessment of the potential for urban carbon markets, assessment of the economic value of conservation subdivisions in urban and suburban areas, examination of the interactive effects of turf and tree cover on suburban property values, forecasting future recreational use on urban proximal national forests, and examining spatial modeling of economic values associated with urban amenities.

They are also examining/comparing Hispanic with non-Hispanic attitudes/knowledge/meaning of the urban forest in Gainesville, FL, and conducting a study of the rural/urban interface in South Carolina.

***Southern Center for WUI Research and Information, Gainesville, FL***

This unit's research focus is on understanding changing social and natural systems. Their primary areas of research are an analysis of urbanization effects on forest vegetation along with a study of the cultural dimensions of landscape change in the Florida Panhandle and one that monitors how the urban forest changes over time in Gainesville, FL.

They are also studying the flammability of natural vegetation and home landscapes, fuel reduction options for landowners, and postfire assessment of interface landscapes.

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**Southern Research Station, *National Agroforestry Center*,  
Lincoln, NE**

**Dr. Michele Schoeneberger, Lead Scientist**

The center's primary areas of research focus on ecological functions of buffers to understand how riparian and upland tree buffers protect water quality, enhance aquatic and terrestrial environments, and sequester carbon; site design and management to determine how to design and manage individual buffers to attain desired production and conservation benefits; and landscape integration to develop an improved basis for decisionmaking relative to design criteria and expected water quality benefits, along with other resource considerations, from tree-based buffer systems.

Current emphasis is being placed on the need for "green infrastructure." Communities see that trees can be put to work to meet their environmental, social, and economic goals. Agroforestry helps connect the urban community to the surrounding rural landscape. This connectivity helps filter stormwater runoff, provides travel corridors for wildlife, creates recreational space, and improves air and water quality for the whole watershed. Cumulatively, these functions contribute to the overall health and sustainability of a community and its neighbors.

## **Important Non-Forest Service Research Centers**

It is important to mention two research centers that are not Forest Service organizations but have had a significant impact on U&CF research in recent years and, in fact, many of their results are used in Forest Service technology transfer products. See **Appendix A** for a detailed listing of their research and technology transfer products.

**Human Dimensions of Urban Forestry and Urban Greening,  
College of Forest Resources, University of Washington,  
Seattle, WA**

**Dr. Kathleen L. Wolf, Lead Scientist**

Dr. Wolf's primary areas of research are urban forestry and human services benefits, trees and transportation, nature and consumer environments, policy and planning, and civic ecology.

**Landscape and Human Health Laboratory, University of  
Illinois at Urbana-Champaign, Urbana, IL**

**Dr. Frances E. Kuo, Lead Scientist**

Dr Kuo's primary areas of research are on impacts of the urban forest on individual health and healthy functioning and impacts of the urban forest on neighborhood health and functioning.

## **U&CF Technology Transfer Centers**

U&CF Technology Transfer is being conducted by all U&CF staff, and through specialists in seven centers located across the country. See **Appendix B** for information on what each center does along with a complete listing of their most recent and successful products. **Appendix C** has a detailed description of each Key National Product produced by the centers. **Appendix D** has a detailed description of Key Regional Products produced by the centers.

### **Pacific Southwest Research Station**

Center for Urban Forest Research, Position Vacant, Davis, CA  
<http://www.fs.fed.us/psw/programs/cufr/>

### **Northeastern Area (State & Private Forestry)**

Midwest Center for Urban and Community Forestry, Jill Johnson, St. Paul, MN  
<http://www.na.fs.fed.us/urban>

Mid-Atlantic Center for Urban and Community Forestry,  
Donna Murphy, La Plume, PA  
<http://www.na.fs.fed.us/urban>

### **Northern Research Station**

Urban Natural Resources Institute, Dave Bloniarz, Amherst, MA  
<http://www.unri.org/>

### **Southern Research Station**

Centers for Urban and Interface Forestry

- Urban Forestry South, Dudley Hartel, Athens, GA  
<http://www.urbanforestrysouth.org/>
- InterfaceSouth, Annie Hermansen-Baez, Gainesville, FL  
<http://www.interfacesouth.org/>

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USDA National Agroforestry Center, Richard Straight,  
Lincoln, NE

<http://www.unl.edu/nac/>

## How Is New Technology/Knowledge Being Transferred?

Many different methods are currently being employed by technology transfer staff, including Web sites, newsletters, fact sheets, press releases, and displays. And rightly so, because psychological research has shown that the more different ways people get a message, the more likely it is to stick with them; in addition, the more times they receive the same message, the better.

With the advent of new computer technologies, the opportunities for technology transfer have been greatly expanded. Even though staff has a more challenging and complicated role in this expanded technological environment, it provides the opportunity to get our messages to more people with less effort and money. The biggest challenge seems to be in keeping up with, and affording, all the new advances that are constantly becoming available.

Over the last several years we have seen blogs, Webcasts, LISTSERVs, and online forums appear for the first time. Some of the technology transfer staff have embraced these technologies while others have held to the tried-and-true methods or are working to incorporate them into their communications arsenal.

What is important to note is that the word is getting out. The Internet and computers are giving many more customers access to Forest Service research and technology transfer. A great number and variety of products have been produced, but that does not necessarily spell success. What we also know is that there is no one right way. Nor do all methods lead to success. One of the keys is finding the right combination of methods and strategies that make the biggest impact on our customers and result in the biggest positive changes to our urban forests. Another key is to identify the target audience and develop key messages that compel the audience to want to use the technology, even if it costs them money to implement. We cannot pay them to use it, however, with decreasing budgets we need to

spend money and time wisely targeting those who will use it or influence others to use it.

A goal of the Technology Transfer Team for 2007 is to implement a feedback process to determine success of technology transfer. Coupled with a new National Urban and Community Forestry Advisory Council (NUCFAC) recommended U&CF challenge cost-share project to evaluate the effectiveness of U&CF Technology Transfer, this effort by the team should enable them to effectively establish benchmarks for production and distribution of future technology transfer products and methods.

Currently, the methods described below are the ones being used to transfer U&CF research technology. A listing of the most recent and successful products for each technology transfer center can be found in **Appendix B** along with a description of their key national (**Appendix C**) and key regional products (**Appendix D**).

- **Assessment Summaries**

- **Municipal Forest Resources Analyses**

These reports provide detailed information on a particular city's tree resource. They include urban forest structure, function, and value along with resource management needs. A summary of annual benefits is provided that includes energy conservation, air quality, stormwater runoff control, and property value increase.

- **Urban Tree and Forest Risk Assessments**

Risk assessments can be used after a particular storm event to assess tree damage and report back to the community. During the assessment, trees on both public and private property are evaluated that represent a risk. The outcome is often a report of recommendations designed to help communities reduce or eliminate tree risk.

- **Blogs**

A blog is a Web site in which entries are made in journal style and displayed in a reverse chronological order. Blogs provide customers with a commentary or news on a particular research project or related subjects and they are something that they can visit at any time. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. The term "blog"



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is a contraction of “Web log.” Use in the Forest Service might be considered a type of e-journal.

- **Books**

Often a research finding or a new U&CF technique is best distributed as a book that can be periodically referenced. The importance of the credible reference in the literature justifies the extra expense.

- **Brochures/ Booklets**

Brochures/booklet most often provide a general overview of a unit, research project, or technology transfer activity. They are generally short, inexpensive items printed in large quantities for a wide distribution. A specific booklet is—

- **Tree Guides**

Tree Guides identify and describe the benefits and costs of planting trees in a specific climate region to assist community officials and tree managers increase public awareness and support for tree programs.

- **Case Studies**

A case study examines or tests a limited number of variables and involves an indepth examination of a single instance or event: a case. They provide a systematic way of looking at events, collecting data, and analyzing information. As a result, the researcher may gain a sharpened understanding of why the instance happened as it did and what might become important to examine more extensively in the future or refine a particular product.

- **Customer Service**

Research and technology transfer staff respond to individual requests from homeowners, reporters, urban forestry professionals, etc., by providing verbal or written answers to questions and often send other information products that help them to do a better job or extend research and technology transfer knowledge to their customers. Such client-specific knowledge transfer can place key information where and when it is needed most.

- **Decision Support Systems**

Decision support systems are computerized systems for helping make decisions. They are user-driven tools that take local input to generate a series of choices. A decision is a choice between alternatives based on estimates of the values of those alternatives. Supporting a decision means helping people working alone or in a group gather intelligence, generate alternatives, and make choices.

- **Displays**

Displays are designed to get the attention of customers and encourage them to pick up literature and/or talk to the presenter for more indepth information. Eye-catching visuals in the display are key to drawing in customers. In today’s competitive conference environment, a polished, professional display that is easily portable is an important technology transfer tool.

- **DVDs/CDs**

These products offer the ability to use new information in a real setting. The customer can see and/or hear the instruction on their own terms on either a DVD or CD that describes a process or technique in detail. Their application or use of the principles in the DVD/CD becomes a positive transference or learning experience.

- **e-Learning Webcasts**

Webcasts are periodic, online educational presentations on timely topics and current research and development initiatives. Any number of national or global customers can join in.

- **Fact Sheets/Leaflets**

One- or two-page fact sheets provide a quick reference to urban forestry research facts. They are designed to be easily photocopied and distributed.

- **LISTSERV e-mailing**

Subscription to these electronic mailing lists provides customers with periodic contact from the research or technology transfer unit regarding new products such as publications, electronic newsletters, periodic news briefs, presentations, and press releases.

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- **Management Tools**

These tools are developed and packaged to address a specific issue or problem, or provide individualized education. These tools are often adapted from science to be applicable to field situations.
  - **Manuals**

Manuals are a compilation of the best, most up-to-date information and are generally designed as a hands-on tool for resource professionals and those who work with communities on urban forestry issues. They are often used for self-guided learning, provide specific information on a topic, or are used to develop workshops and presentations.
  - **Models/Software**

These are computer models/software that can be used by communities, individuals and private consultants to make informed decisions regarding urban forest management. They often require input of data about local conditions to provide summaries of current conditions of a resource, or provide projections of future conditions.
  - **News Briefs/Bulletins/Notes**

News briefs, bulletins or notes are sent electronically to customers when things occur that are newsworthy but not lengthy enough to justify creating a newsletter.
  - **Newsletters/Updates/e-News**

Periodic newsletters, updates and e-news are produced that discuss current research findings, regional activities, and other timely products or events. Some are printed but most are now distributed electronically to save the costs of printing and mailing.
  - **Photo Galleries**

Photo galleries contain pictures that depict a variety of U&CF activities that can be browsed and downloaded, including tree planting, tree care, and volunteers. Images are effectively used to portray desired practices as well as the negative consequences of poor practices.
  - **Posters**

Technology transfer staff sometimes use posters to display a particular research topic or new technology at a large event or conference. The posters generally express points in graphical terms with main headings stating the message and the theme supported by “visual grammar.”
  - **Presentations**

Presentations are generally PowerPoint talks that researchers and staff give at various conferences, workshops, etc. They provide either technical knowledge or promote technology transfer resources that are available to the audience.
  - **Press Releases**

Press releases are designed for the press corps to alert them of new research or technology. They are also given to customers to use with their local media when research is conducted in their city.
  - **Promotional Items**

Researchers and technology transfer staff take advantage of opportunities to get the word out when approached by reporters, national newsletters, NPR, etc. Promotional items can be used with displays at national conferences with a take away message the customers can use in their daily life.
  - **Scientific Reports**

Research findings are published in journals, conference proceedings, and periodicals as well as General Technical Reports and dissertations. These reports describe the research methodology, present the findings, and discuss the value of the results to urban forestry and can be referenced in the literature.
  - **Repackaged Information**

The number one job of some of the technology transfer centers is repackaging of scientific findings in a form or format that is appealing, accessible and useful to their target audience. Repackaged products also present facts within a local or specific context and can include tool boxes and handbooks.

- **Research Summaries**  
Research summaries are one- to four-page documents that provide a quick look at a research project, and its findings, in an easy-to-read comprehensible format.
- **Trade Publication Articles**  
Researchers or technology transfer staff publish articles in journals and magazines targeted at practicing professionals. Scientific findings and facts are translated into ideas and practices that are practical for everyday needs and can be applied in resource planning and management.
- **Training/Workshops/Conferences**  
Hands-on training on new technology or applications is provided so that customers can obtain a better understanding of how to apply the research or technology transfer knowledge and/or product to their unique situation in their community or consulting practice.
- **Web-Based Exchange Forums**  
These Web-based bulletins and discussion boards promote the timely exchange of information related to U&CF. Participation in the Exchange Forum provides the opportunity to share interests, questions, research, and thoughts with other urban natural resource practitioners and interested partners.
- **Web Sites**  
Online information is the global standard for technology transfer, allowing immediate news and knowledge to be transferred and updated.

## What Is Working?

From this investigation, it is quite clear that Forest Service U&CF Technology Transfer is very active and successful. Over the last decade in particular, customers have benefited from an increased number of quality products, as well as an increase in the diversity of transfer methods. This increase in products has led to a vastly improved understanding of the benefits of trees and urban forests nationwide throughout the urban forest community, especially local elected officials. It is safe to say that without the presence of U&CF Technology Transfer and

the role it has played in the advancement of the benefits of urban forests and the connection they have to our quality of life, U&CF awareness would not be what it is today.

Technology transfer programs have operated with limited staff and budgets, and yet they have been extremely productive. This success is due largely to the staff's ability to innovate, adjust quickly to changing customer needs, and work extremely well with partners. Together, the various staffs and their partners produce hundreds of new products that benefit millions of people every year. Especially encouraging are new initiatives to bring together Forest Service Research and Development, State and Private Forestry, and for-profit and not-for-profit organizations to combine talents and resources to improve delivery and support of Forest Service Research tools in the community.

This report accounts for more than 30 different technology transfer methods being used by Forest Service staff to get U&CF research and informational products into the hands of customers. The following four methods, however, stand out over the rest for a number of reasons:

- **Center Web Sites**  
Web sites are essentially warehouses or clearinghouses of all the products and information that have either been produced by a center or have significant value as a resource to those serviced by a center. Each site is available to any customer at any time and requires only minimal staff time for input and maintenance.
- **e-Mail/LISTSERVs**  
The use of e-mail lists has greatly expanded the ability of staff to reach a large number of customers instantly with new products or important information. Referrals and hyperlinks to the center Web site, which are important steps in this process, help keep customers accustomed to using the Web site for new items.
- **Speeches/Presentations**  
Nothing is more efficient than the transfer of technology in person and to many people at one time. Technology transfer staff members have taken advantage of every opportunity to speak to audiences, regarding this method of delivery a high priority.

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- **e-Learning Webcasts**

The Webcasts being delivered through the Urban Natural Resources Institute (UNRI) are well attended and effective. UNRI could provide this service for the national team.

## Where Could Changes Be Made?

As listed above, many great products and delivery mechanisms have been developed by the U&CF Technology Transfer staff. In addition, U&CF customers have benefited tremendously from this service. What has become apparent while inventorying the various research and technology transfer units for this report, however, is that technology is rapidly changing and some specific areas in our delivery process are outdated. We need to stop doing some things, adopt new methods, and refocus to reach our full potential or we will become irrelevant. The future of U&CF depends on making these changes. The Internet and Google have opened up a new world of instant access, but people have become more impatient and expect to have links and information at their fingertips.

Because of these extremely rapid changes in technology and the way people want or get information, U&CF Technology Transfer must continually adapt its approach to transferring research technology or risk weakening its ability to influence positive changes to urban forests.

The specific areas in which gaps exist and improvements could be made include the following:

- **National Technology Transfer Team Leadership**

The team needs to be specifically chartered, have quarterly meetings to review and catalog new products, and assure the best use of available funds nationally to coordinate and enhance ongoing work internally and in partnership with universities. The team also needs to coordinate their efforts with NUCFAC to ensure that more of the right research is being conducted and that technology transfer is brought more to the forefront.

- **Performance and Feedback Measures**

U&CF should take the lead in establishing methods that measure success and help track progress and improve products and technology transfer methods over time. These should be based on outcomes (changed behavior) over time (months or years). Partner organizations should be encouraged to submit progress reports to U&CF/NUCFAC on an annual basis. We also need a standing, online survey to facilitate feedback on all products developed for specific target audiences and purposes.

- **Reaching All the Right People**

We are creating terrific technology transfer products, but, because of limited e-mail contact lists, inadequate downline sharing, and missing links in some networks, many good products are not reaching some of the intended audiences. Contact lists need to be shared, downline contacts encouraged to forward on material, and missing links established, particularly with partner organizations. In addition, TechNet (discussed below) needs to be created.

- **Cobranded Products**

U&CF needs to begin cobranding all of products developed with industry to ensure the products are peer reviewed and supported by professional groups who will ultimately pay for reprints and sell successful products to sustain and update them over time.

- **TechNet**

Right now, all the technology transfer specialists keep their own mailing lists and, as technology transfer products are distributed, many customers get multiple copies or none at all if products are not forwarded on. It is a haphazard approach to distribution. The creation of TechNet will rectify this situation by establishing a Web-based mechanism that will allow access to all Forest Service U&CF mailing lists and with the push, of “one button,” distribute products to all customers while eliminating duplicates. It will also have a customizing feature that will enable senders to choose specific lists for targeted audiences.

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- **Application Programming Interface (API) Update Tool**

Two kinds of updates are needed. First: every week new technology transfer products are developed, added to Web sites, and distributed. This new update tool will ensure that new products are added to the UFind catalog, TreeLink, and any other selected site. The process will be Web-based and act in conjunction with the product developer's Web site uploading mechanism—an API process that automatically “pulls” new products from the developer's site to the destination site. Second: every day staffing changes, etc., occur in partner organizations (State coordinators, State foresters, extension, nonprofit) that appear on their Web site but are not transmitted to Forest Service sites (e.g., regional Forest Service, TreeLink). An API system is needed that connects/links computers together so that simultaneous updates occur to all Web sites.

- **UFind**

UFind is an electronic catalog, a central repository, of all U&CF science-based knowledge and education material. It needs to be marketed to gain exposure. It is a great resource and will need ongoing support to keep it current and maintained. One feature that is critical to keeping the Web site catalog current is an automated update process. See API Update Tool.

- **Treesearch**

Treesearch is a database of Research and Development Publications authored by Forest Service personnel. Research publications by Forest Service urban scientists do not seem to be well represented. Scientific products recommended by NUCFAC should also be included.

- **TreeLink Web Site**

TreeLink should remain the predominant Web site for U&CF customers, but it needs to be upgraded with new features, special areas for State U&CF coordinators and State foresters, “hot topics” corner, “Google-like” search, the latest links, direct links to Forest Service U&CF pages, etc. In addition, a search mechanism, using RSS (Really Simple Syndication) feeds, needs to be added that will search for new items of interest in a particular topic/

category (e.g., tree benefits, water quality, urban climate) that is, selected by the user/customer—a by-permission-only agreement. TreeLink will then send them the links of new items as they become available. These items could be newsletters, research documents, research summaries, etc.

- **NUCFAC and the U&CF Challenge Cost-Share Projects**

Currently, none of the U&CF challenge cost-share completed projects are electronically available on TreeLink or UFind. A camera-ready copy needs to be obtained from the project administrator and loaded on both sites. Duplication of projects funded over the past 10 years also exists. NUCFAC and the research community should be required to coordinate types of projects funded and methods for transferring the technology.

- **LISTSERVs**

LISTSERVs like URBNRNET are already providing a real service to U&CF customers, but the audience is limited. The concept is good, but it needs to morph into specialized LISTSERVs like arboriculture, urban forest management, and nonprofits, as well as State-specific LISTSERVs. They could all be hosted by TreeLink. In addition, an archive of the LISTSERV discussions, by topic, needs to be created.

- **U&CF Web Site Inconsistencies**

An inconsistency in the way technology transfer material is presented on the various U&CF Web sites could possibly lead to confusion and frustration when customers are searching for items on different sites.

- **Marketing**

Marketing goes hand in hand with the feedback process. It is a continuous loop process that first finds out what our customers need (market research), filling that need while letting them know they “can't live without it” (marketing), and then following up to find out how effective it was (feedback). And then doing it all over again. Dr. Kathy Wolf recently received a U&CF challenge cost-share grant that will enable her to conduct new market research. The results should be available next year, providing critical

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knowledge in the quest to persuade local elected officials to invest in urban forests. Dr. Wolf's work will go hand in hand with the Technology Transfer Team's fourth objective of promoting the use of market research and marketing strategies to improve the delivery of U&CF products and science-based knowledge for targeted audiences.

- **U&CF Partnerships**

Forest Service U&CF needs to be more aggressive in its efforts to collaborate with States that have community development programs by providing resources to State coordinators and/or extension, etc. that will assist them in including green infrastructure in their sustainable community planning processes.

- **Webcasts**

The generally accepted use of the term Webcast is the "transmission of linear audio or video content over the Internet." The Northern Research Station currently uses this technique, which enables the staff to reach a large audience without all the associated time and travel costs that come with traditional in-person conferences and workshops. The technology provides an unlimited customer base with a valuable, real-time experience with a presenter at no cost. Some Webcasts can be made available in real time via live streams with question and answer sessions; they can then move to OnDemand. Others can be made available for post-event viewing via OnDemand.

- **Podcasts**

A podcast is a media file that is distributed by subscription over the Internet using syndication feeds for playback on mobile devices and personal computers. The publish/subscribe model of podcasting is a version of push technology, in that the information provider chooses which files to offer in a feed and the subscriber chooses from among available feed channels. Although the user is not "pulling" individual files from the Web, a strong "pull" aspect is suggested because the receiver is free to subscribe to (or unsubscribe from) a vast array of channels. None are currently distributed.

- **Environmental News Services**

Environmental news services are daily international wire services on the environment. They exist to present late-breaking environmental news in a fair and balanced manner. The audience is far reaching and includes most environmental news reporters. Forest Service research technology should use these news services to get the word out. Examples include the following:

- Environmental News Service.  
<http://www.ens-newswire.com>
- Environmental Media Services.  
<http://www.ems.org/>
- Earth Vision.  
<http://www.earthvision.net/>
- Greenwire.  
<http://www.eenews.net/gw/>

- **Webinars**—Webinar is short for **Web**-based seminar, a presentation, lecture, workshop or seminar that is transmitted over the Web. A key feature of a Webinar is its interactive elements—the ability to give, receive, and discuss information. Contrast this feature with the format of a Webcast, in which the data transmission is one way and does not allow interaction between the presenter and the audience. None are currently being conducted.

- **Teleconferences**—A teleconference is a "virtual meeting" via television. A teleconference can be received simultaneously by people, especially small groups, in various sites around the country, or even the world. A teleconference is also live and interactive; the audience can communicate with the presenters, via phone, fax, or e-mail, while the teleconference is being broadcast. Teleconferences can also be taped for viewing later. This technique is underused.

- **Blogs**—A blog is another name for a Web log, which is really a simple Web site in which items are posted on an ongoing basis. New items show up at the top so visitors can read what's new, comment on it, or link to it. Only one blog has been developed so far. It was developed by the National Agroforestry Center. Blogs could provide

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U&CF customers, especially the younger ones, a much more personalized look at the research process as well as findings. It is important to consider this media, because younger users are accustomed to communicating in it. In addition, blogs increase search engine popularity and attract new customers.

- **Privatization of Software**—U&CF research and technology transfer staff are good at fundamental research and transferring the technology but lack the expertise to develop software products. This specialty is best left to software development companies. Too much time and money have been spent attempting to perfect software products internally.

## Recommendation for Improvement

The following recommendation is offered as the next step to ensure that the right combination of strategies is implemented. Given the ever growing complexity of communication technology, it is increasingly more important to partner with communications and technology experts when assessing various alternatives. The right combination of strategies will meet future needs, make more efficient use of resources and partnerships, capitalize on new technologies and opportunities, avoid duplication, and streamline the way the Forest Service does business. These solutions will significantly improve the ability of technology transfer specialists to deliver technology to all U&CF customers.

### Recommendation: Convene a Technology Transfer Summit

Convene a Technology Transfer Summit that invites key Forest Service U&CF staff, Sustainable Urban Forest Coalition members, U&CF partners, and technology and communications experts from the high-tech industry to strategize the best approach to bringing better efficiency and effectiveness to Forest Service U&CF Technology Transfer. This summit could potentially become a biennial event that is structured to maintain the quality and integration of new material.

The Summit's deliberations should be guided by the following questions:

- Has the U&CF audience changed and, if so, who is the intended audience of Forest Service U&CF Technology Transfer?
- What combination of new strategies will improve technology transfer?
- Should a procedure be implemented to review proposed technology transfer products before they are developed?
- Are the National Technology Transfer Team Goals still relevant?
- What should be the role of NUCFAC, TreeLink, UFind, and Treesearch?
- Where should technology transfer plug in (timing) for products that are in the Research and Development pipeline?
- How can duplication in research and technology transfer be avoided?

The following possible strategies for improvement should be considered during deliberations:

### Highest Priority

- Provide leadership through the National Technology Transfer Team.
- Establish performance and feedback measures.
- Reach more of the right people.
- Cobrand products/develop product format templates.
- Create TechNet.
- Create Application Programming Interface (API) update tool.
- Manage UFind.
- Upload all urban forestry scientific publications on Treesearch.
- Upgrade TreeLink Web site.
- Upload completed U&CF challenge cost-share projects on UFind and TreeLink and coordinate new project funding with the research community.

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## High Priority

- Morph existing LISTSERVs.
- Create consistency among U&CF Web sites.
- Introduce marketing to the technology transfer process.
- Increase U&CF partnerships beyond the U&CF community.
- Centralize and continue Webcasts.
- Create podcasts.
- Implement the use of Environmental News Services.

## Priority

- Conduct Webinars.
- Conduct teleconferences.
- Add blogs to the repertoire.
- Privatize development of all software.

## Important Partners

It is important to note that many key entities and organizations assist in delivering technology transfer products and information. Some, as with the National Technology Transfer Team, assist in setting the direction for the entire U&CF Technology Transfer program.

### National Technology Transfer Team (Appendix E)

The National Technology Transfer Team of 23 members is composed of urban forestry professionals, technology transfer specialists, research scientists, university professionals, not-for-profit organizations, and other external partners. The team's ongoing role is to periodically review the technology transfer activities of the Forest Service U&CF Program, establish new directions and goals as needed, and provide project leadership in accomplishing the team's various objectives.

The team currently serves at the pleasure of the director of U&CF and is administered by the National Technology Transfer Team Leader (Jim Geiger, Acting). An annual face-to-face meeting is held in conjunction with periodic conference calls and special subgroup meetings as needed.

### National Urban and Community Forestry Advisory Council (Appendix F)

The 15-member National Urban and Community Forestry Advisory Council was established to advise the Secretary of Agriculture on the national U&CF Program. The purpose of the Council is to develop a comprehensive national U&CF action plan, evaluate the implementation of that plan, and to develop criteria for and submit recommendations for funding the U&CF challenge cost-share program. More than 160 projects have been completed in the 15 years since NUCFAC was authorized.

The U&CF challenge cost-share program directly supports national level projects that intentionally translate and apply science to local situations. The U&CF challenge cost-share program is also an unusual grant source in that investigators are expected to do technology transfer as part of their research outcomes. This technology transfer component has encouraged a direct link between knowledge building and fact sharing.

### Sustainable Urban Forests Coalition (Appendix G)

The Sustainable Urban Forests Coalition (SUFC) is a national coalition to advance a unified urban forest agenda for our Nation's communities. The Coalition views urban forests as the aggregate of all vegetation and green spaces within communities that provide benefits vital to enriching the quality of life.

In a time of both increasing demand for urban forest benefits and tightened budgets, Coalition members seek to work together to enhance the impact of urban forest organizations on communities nationwide. They have prepared concise, science-based products that are intended to inform national policy and budget leadership. SUFC also encourages or develops products that are suited for the leadership and members of a coalition of organizations with interest in urban greening.

Individually, each Coalition member organization is strong and serves its constituencies well. However, a unified national coalition will strengthen relationships, take better advantage of synergies between like-minded organizations, and raise the national profile of urban forests, their benefits, and the people who help keep urban forests healthy.



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More than 100 local and State organizations signed on in support of the SUFC's FY 2007 funding recommendations for Federal investments in urban forests, a reflection of the broad nationwide support for U&CF.

### **Select List of Partners (Appendix H)**

The partners listed in the appendix represent not only many of the traditional partners but also new alliances that are just being made or need to be forged to create more sustainable urban forests for the future. Some of these partners have turned out very attractive secondary and tertiary products that conscientiously report the science and address concerns and issues specific to very influential audiences.

Even though these partners are not directly generating the science or knowledge, they are instrumental in placing it before the people who can act on it. Most of them help connect the research to the language and issues that are important to local leadership. Many invite scientists to their regional and national meetings, enabling direct sharing and interaction. This networking often results in further partnering and even future research collaborations.

The list of partners is representative of nongovernmental organizations, trade associations, the green industry, and Federal agencies. Contact information, Web addresses, and descriptions of each partner are provided in the appendix.

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## Appendix A: The Research

### Forest Service, Urban and Community Forestry Research Centers

#### Pacific Southwest Research Station

Center for Urban Forest Research  
1731 Research Park Drive  
Davis, CA 95618  
530-759-1700

**Lead Scientist:** Dr. Greg McPherson

**Other Researchers:** Dr. James Simpson, Forest Service, U.S. Department of Agriculture (USDA), and Dr. Qingfu Xiao, University of California Davis, Department of Land, Air and Water Resources

<http://www.fs.fed.us/psw/programs/cufr/>

#### **Primary Areas of Research:**

<http://www.fs.fed.us/psw/programs/cufr/research/>

- 1. Benefits and Costs**—Trees pay back more than what is spent on care and maintenance. Research that quantifies the net benefits of municipal forests as well as tree planting and stewardship programs is essential in an era of dwindling municipal forest management budgets and rising costs. Benefit-cost analyses contrast the net expenditures associated with tree planting and stewardship with the benefits provided by trees, modeled over a 40-year time period. Center scientists developed models that assign dollar values to the benefits provided by trees, such as energy savings, air pollutant reductions, water quality improvements, and aesthetics. Climate-specific tree planting guidelines were developed for regions throughout California, the West, the Northeast, and the South to enable communities to plant trees using the most cost-effective strategies.
- 2. Energy Conservation**—Trees shade homes, conserve energy, and provide savings on utility bills. Quantification of energy benefits is an important part of the center's research. Healthy urban forests have the ability to cut heating and air conditioning use, resulting in reduced

costs and atmospheric emissions from power plants. Tree shade reduces air temperature and the amount of radiant energy absorbed and stored by built surfaces. In addition, trees reduce the velocity of wind, slowing the infiltration of outside air. The center's research shows that properly selected, located, and managed trees can drastically reduce city and residential energy costs and lessen the reliance on new power plants.

- 3. Air Quality**—Trees filter air borne pollutants and remove carbon dioxide from the atmosphere. Emissions from energy use and atmospheric carbon dioxide are shown to contribute to the greenhouse effect and global warming. Urban forests improve air quality by reducing atmospheric carbon dioxide levels and absorbing air pollutants. Trees can directly sequester carbon dioxide as woody and foliar biomass while they grow. The center's research has quantified that amount of carbon dioxide sequestration and that properly planted and managed trees can reduce the need for heating and air conditioning, resulting in fewer emissions into the atmosphere.
- 4. Water**—Trees intercept rainfall and reduce stormwater runoff. Water quality improvements are one of the main benefits provided by trees. Tree crowns intercept rainfall, thereby reducing the amount of runoff. Tree roots make the ground more porous. As a result, water runoff from storms can be more readily absorbed by soil. In most cases, models of hydrological processes in forests cannot be applied to cities for a couple of reasons: (1) forest stands typically consist of fewer species than the number of species found in urban forests and (2) trees in cities rarely occur in large groups of trees like those that grow in large tracts of forested land. For this reason, the center's research has developed rainfall interception models for single, open-grown trees and, most recently, for trees in urban watersheds.
- 5. Fire**—Trees in the wildland-urban interface can provide benefits and still be firewise. Urbanization of rural areas creates a plethora of problems, ranging from increased

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pollution from cars to wildlife habitat destruction from new construction. In the West, expanding populations in the wildland-urban interface create areas with increased fire risk and a loss of the natural ecosystem functions. The center's research is investigating the vegetation component to determine how different landscaping choices affect homeowners' or the communities' fire safety.

### **Current Research Emphases:**

#### **1. Sacramento Urban Forest for Clean Air Project**

[http://www.fs.fed.us/psw/programs/cufr/products/cufr\\_668\\_SacAirQualityInit6-21-06.pdf](http://www.fs.fed.us/psw/programs/cufr/products/cufr_668_SacAirQualityInit6-21-06.pdf)

The center is working with the Sacramento Tree Foundation and the Sacramento Air Quality Management District to evaluate the effectiveness of large-scale tree planting (5 million trees) on the future air quality of the Sacramento Region. Using this information, the center is developing a preliminary revision to the State Implementation Plan that includes tree planting as an ozone reduction strategy. The U.S. Environmental Protection Agency (EPA) will evaluate this revision from a policy and technical perspective and a more detailed study may result from the findings.

#### **2. Los Angeles One Million Trees Initiative**

[http://www.fs.fed.us/psw/programs/cufr/products/cufr\\_666\\_LA1MilTreeProject6-20-06.pdf](http://www.fs.fed.us/psw/programs/cufr/products/cufr_666_LA1MilTreeProject6-20-06.pdf)

The center is working with the city of Los Angeles, Department of Water and Power, and the TreePeople to produce science-based knowledge on the extent of the current tree canopy cover and planting opportunities for planning purposes as part of the center's canopy cover assessment for Los Angeles. The center is calculating the future urban forest's role in improving air quality, reducing energy costs, intercepting rainfall, reducing runoff, and providing important social and economic benefits. The satellite imagery acquired for this study will be used later to identify greening opportunities on a parcel-by-parcel scale as well as to track future canopy cover and impervious surface change.

#### **3. Oakland Watershed Restoration and Protection**

[http://www.fs.fed.us/psw/programs/cufr/products/cufr\\_667\\_OaklandInterceptionStudy6-20-06.pdf](http://www.fs.fed.us/psw/programs/cufr/products/cufr_667_OaklandInterceptionStudy6-20-06.pdf)

Oakland's Ettie Street watershed is a 1.8-square-mile watershed and contains predominately commercial, industrial, and residential land uses. The center is studying the ability of 1,800 new trees to reduce contaminated stormwater runoff and improve runoff quality. The center will also model how annual and peak runoff will change as trees mature over a 40-year period.

#### **4. Green Streets—Stormwater Management for Paved Areas**

[http://www.fs.fed.us/psw/programs/cufr/products/cufr\\_665\\_GreenstreetsStructuralSoilsPub6-20-06.pdf](http://www.fs.fed.us/psw/programs/cufr/products/cufr_665_GreenstreetsStructuralSoilsPub6-20-06.pdf)

The center is developing and evaluating a stormwater management system that directs water to a reservoir of engineered soil under pavement. Key to Green Streets is its ability to be used in ordinary situations with no additional land area required. All developers and municipalities should be delighted to have a beautiful, compact, shaded parking lot with plenty of parking spaces but no runoff—or a shady broad avenue with arching trees and little or no runoff. The Green Streets system will increase space for trees by integrating them into the engineered stormwater management system in ways that minimize conflicts and make efficient use of valuable land.

#### **5. Benefit/Cost Valuation and Strategic Planting**

[http://www.fs.fed.us/psw/programs/cufr/tree\\_guides.php](http://www.fs.fed.us/psw/programs/cufr/tree_guides.php)

The center's Tree Guides identify and describe the benefits and costs of planting trees in a specific climate zone to assist community officials and tree managers increase public awareness and support for tree programs. They answer a number of questions about the environmental and aesthetic benefits community trees provide: (1) What is the potential of community trees to improve environmental quality, conserve energy, and add value to communities? (2) Where should residential and public trees be placed to maximize their cost-effectiveness? (3) Which tree species will minimize conflicts with power lines, sidewalks, and buildings? Future guides include Northeast, Interior West, Temperate Interior West, Tropical, and Lower Midwest. In addition to the guides, Municipal Forest Resource Analyses will be completed for New York City, Albuquerque, Boise, Honolulu, and Indianapolis. Projects are also being

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conducted in Lisbon, Portugal and Canberra, Australia. Companion products include [Municipal Forest Resource Analyses, i-Tree/STRATUM](#), which are associated with 19 national climate zones.

## 6. San Francisco Bay Canopy Cover Project

The urban environment in the San Francisco Bay Area has rapidly expanded into predominately rangeland and agricultural areas. A population increase of 30 percent has driven a 73-percent increase in urban area. The increase in urban area is associated with increased canopy cover, but this 10-percent increase has not kept pace with the 17-percent increase in impervious surfaces. The goal of this study is to describe the region's urban forest structure and quantify the value of ecosystem services it produces. This information will help communities understand the relevance of regional urban forest impacts to the environmental and economic health of Bay Area communities and the potential return on investment in planning and management. Deliverables include historic canopy cover change; the value of annual benefits produced by the current tree canopy; the value of future tree canopy; and benefit-cost tables for typical large, medium, and small trees.

## 7. Governmental Accounting Standards Board (GASB) 34—Methodology for Using General Plans To Classify Trees as Capital Assets

This project is part of a National Urban and Community Forestry Advisory Council (NUCFAC) recommended U&CF challenge cost-share grant awarded to Goleta Valley Beautiful. It is identifying a methodology and case study for incorporating public trees as capital assets. The center's contribution is defining the value of trees in a municipal capital improvement program. Using long-range general land use planning techniques and infrastructure replacement procedures that supplement the GASB 34 accounting standard, the proposed outcome of the project is a long-term municipal tree management program based on financial as well as political values. The primary difference of this approach is that the process works backward from a defined urban forest goal instead of the usual projection methods.

## 8. Models

### a. STRATUM and i-Tree Development

[http://www.itreetools.org/street\\_trees/introduction\\_step1.shtm](http://www.itreetools.org/street_trees/introduction_step1.shtm)

Within i-Tree, street tree populations are assessed using STRATUM (Street Tree Resource management and Analysis Tool for Urban forest Managers). STRATUM is a computer application that uses tree inventory data to quantify the structure, function, value, and management needs of any street tree resource and to calculate the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, carbon dioxide reduction, stormwater control, and property value increase. It is an easy-to-use, computer-based program that enables 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 inventory or an existing inventory of street trees, this software enables managers to evaluate current benefits, costs, and management needs. STRATUM uses tree growth and benefit models for predominant urban tree species in 19 national climate zones and will aid managers in improving the return on their investment dollars.

### b. ecoSmart Design Software

<http://www.ecosmart.gov/>

ecoSmart is a Web-based software program designed to evaluate the economic tradeoffs among different landscape practices on residential parcels. The program estimates the impacts of strategic tree placement, stormwater runoff management, and fire prevention practices. Users work in a computer-simulation environment to test various landscape and hydrologic alternatives to arrive at environmentally and economically sound solutions. ecoSmart-Fire simulates an actual fire to demonstrate how landscaping and structural decisions affect fire safety. Version 2.0 is expected to be released for Los Angeles and Lake Tahoe in late 2006. ecoSmart-Water and ecoSmart-Energy are still in development.

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### c. Tree Growth Visualization

[http://www.fs.fed.us/psw/programs/cufr/products/psw-cufr641TreeGrowthVisualization\\_wscg.pdf](http://www.fs.fed.us/psw/programs/cufr/products/psw-cufr641TreeGrowthVisualization_wscg.pdf)

Actual Animation: <http://www.fs.fed.us/psw/programs/cufr/search.php?TopicID=&ProductTypeID=&Authors=&Title=tree+growth+visualization&OrderBy=&Submit.x=23&Submit.y=9>

This model provides visual representation of the growth of a prototypical tree of certain species. It looks realistic but, more importantly, conforms to real, measured data. The model was constructed by coupling the branching production rules with dynamic tree-growth rules. The latter are based on equations derived from measured street tree data for London plane tree (*Platanus acerifolia*) such as tree height, diameter at breast height, crown height, crown diameter, and leaf area. The global, measured parameters are mapped to the local parameters used in the tree model. The mapping couples knowledge from plant biology and arboriculture and deals with trees that are trained and manipulated to achieve desired forms and functions within highly urbanized environments.

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### Primary Areas of Research and Current Emphases (conducted in collaboration with numerous cooperators):

#### 1. Quantify Urban Forest Structure and Change

Basic data on urban forest structure (e.g., number of trees, species composition, tree size, diversity, leaf surface area) are sparse yet are crucial to understanding the magnitude and diversity of this resource and to monitoring changes in urban forest structure and health.

##### a. Analyze National Urban Tree and Impervious Surface Cover

Using national tree and impervious cover maps being developed by Earth Resources Observation Systems (EROS) Data Center and numerous partners (including NRS-4952), the goal of this research is to analyze local urban tree and impervious cover at the place, county subdivision, county, and State level. These data are to be combined into State reports on urban forest cover and functions. Urban areas will be delimited using U.S. Census definitions of urban. This research will investigate numerous factors that affect tree cover nationally (e.g., ecoregion, city size, population density, land use type) to determine the most significant factors that affect urban tree cover, average urban tree cover, potential maximum urban tree cover, and average tree cover or green space per capita.

Much of this information could be used to set regional cover goals, provide knowledge as to why urban forest structure varies, and help develop means to enhance urban tree cover where desired. The data will also provide a good baseline to determine changes in urbanization and urban tree cover in the future. In addition, this spatial structural database can be used to help determine many of the forest functions and values described in the following goals and elements. This research is part of the Resource Planning Act<sup>1</sup> Assessment of Urban Forests and provides a detailed top-down approach to understanding urban forest structure nationally.

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<sup>1</sup> Resource Planning Act (<http://svinet2.fs.fed.us/pl/rpa/index.htm>).

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## **b. National Urban Forest Health Monitoring**

In addition to information that is needed on urban tree cover nationally from satellite mapping, detailed knowledge from field plots are needed to assess more specific details about urban forest structure (e.g., species composition, tree size, tree health). To aid in the bottom-up approach, pilot testing of a national urban forest health monitoring (UFHM) program was begun in 1999. To date, five States have had statewide plot data. This type of permanent plot data allows for the assessment of statewide urban forest structure, functions, and value. In addition, long-term monitoring data will provide information on urban forest change (mortality and natality rates). A national urban forest health monitoring program can provide essential data to improve urban forest management and policies at the State and national levels. NRS-4952 has been part of a team that is investigating and developing a means to implement an urban forest health monitoring program nationwide.

## **c. Analyze Urban Forest Structure and Functions Using UFORE Model**

In addition to understanding structure at the State and national levels, it is important for managers to understand urban forest structure at the local level. To help urban forest managers quantify urban forest structure, functions, and value, the Urban Forest Effects (UFORE) model was developed and included in the i-Tree suite of tools. The unit plans to continually provide support to users who wish to use UFORE to assess local urban forest structure, functions, and values. Data provided from these studies supply needed knowledge on urban forest structure at the local land use level. To date, more than 30 urban areas have been analyzed across the globe.

## **d. Analyzing and Projecting Changes in Urban Forest Structure**

Long-term data sets are essential to help quantify how ecosystems change through time. Permanent plots are being established in some cities and States as part of the UFORE or UFHM programs. NRS-4952 plans to analyze remeasurement data when available from these

studies to assess change rates (e.g., mortality and natality rates) and factors that lead to variation in change (e.g., what factors lead to increased mortality). To date, only Syracuse, NY, and Baltimore, MD, have remeasured plots that will be analyzed. In addition, a growth projection model is being developed to aid in projecting future effects so that proper management decisions can be made now to guide the urban forest to a desirable outcome in the future.

## **2. Quantify Changes in Basic Ecological Functions Due to Urbanization**

The process of urbanization alters the physical landscape (e.g., altering of soils and vegetation structure, changes in microclimates and mesoclimates, introduction of exotic vegetation and pest species) and creates many byproducts that alter the chemical landscape (e.g., air pollution, excess nitrogen deposition, water pollution). The byproducts of human activity affect the health and structure of urban trees, natural forest stands, and urban streams. By understanding what type of alterations occur due to urbanization and the impact of these alterations on forest structure and health, management plans can be developed to minimize adverse impacts of urbanization.

### **a. Carbon and Nitrogen Dynamics in Urban and Urbanizing Landscapes**

Urban areas differ from rural areas in several environmental factors that can affect, either directly or indirectly, ecosystem processes. Environmental factors that can influence biogeochemical processes in urban areas include a modified mesoclimate (“urban heat island effect”), increased concentrations of atmospheric pollutants, modified disturbance regimes, and compositional changes of plant and animal species. Urban ecosystems, therefore, provide an excellent opportunity to study how multiple stressors interact to affect ecosystem processes, such as the dynamics of carbon (C) and nitrogen (N), and ultimately vegetation health and change. By understanding local variation in soil communities and how these communities affect nutrient cycling, management plans and designs can be developed to optimize soil nutrient levels and plant health while minimizing excess nutrients that may leach or run off into stream environments.

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#### **b. Effects of Urban Development on Soil Formation**

Urbanization contains many processes that directly and indirectly alter urban soil chemical, physical, and biological properties and processes. Because soils are a critical medium that directly affects the health and structure of the urban forest, these alterations can have significant impacts on forests and the types of management needed to sustain forest structure and health in urban and urbanizing landscapes. Unfortunately, due to the complexities of the urban environment, little is known regarding attributes and variation in urban soil properties and processes. Understanding urban soil characteristics is critical to developing management schemes to improve urban forest health and to understanding the impact of urban soils on various urban ecosystem processes (e.g., urban hydrology).

#### **c. Functional Role of Soils in Urban Biogeochemical Cycles and Human Exposure to Toxins and Pathogens**

The goal of this research is to understand how urban environments and land use affect soil functions and biogeochemical cycles and how these alterations affect the movement and fate of urban contaminants. Soil temperatures influence organic-matter decomposition and carbon storage, the length of the growing season, earthworm populations and activity, nutrient availability, and other soil biological processes. Stream temperatures influence mortality and life cycle patterns of aquatic organisms, dissolved oxygen concentrations, rates of organic matter decomposition, and the toxic effects of water pollutants. Tree cover influences air temperature and also the temperatures of soil, stormwater runoff, and streams. Furthermore, tree and urban influences on soil temperature are influenced by soil water. Ultimately, this research will contribute to investigations of human exposure to toxins and pathogens.

#### **d. Role of Vegetation and Land Use in Determining Urban Stream Ecosystem Structure and Functions**

The uniqueness of urban hydrology arises in great part from the preponderance of impervious surfaces that generate large quantities of surface runoff, contaminants, and thermal loads. Stream organisms are

therefore subject to conditions vastly different from those found in other land uses (forested, agricultural). The effects of temperature extremes and spikes, nutrient loading, toxins, bed instability and current velocity extremes, and disturbance frequencies all are magnified in urban watersheds. In addition, urban trees affect water quantity by intercepting precipitation, slowing water infiltration rates, and transpiring water. Research on the impact of urban trees on water quantity and stream ecosystem structure and function is limited but of critical importance in terms of environmental quality. Research in this element focuses on terrestrial-aquatic ecosystem linkages in urban landscapes and examines the pools and fluxes of water, organic matter, nutrients, pathogens, and contaminants and how they affect stream systems.

### **3. Quantify Urban Forest Functions, Benefits, and Values**

Urban forests can provide various benefits to society and the environment (e.g., air temperature reduction, air pollution removal, reduction in building energy use) but can also have various negative impacts (e.g., plant chemical emissions, increased building energy use) that must be considered in determining the net benefits of urban forests. Urban forest management should consider the combined net effects of vegetation and human vegetation management activities to develop management strategies to optimize net benefits and enhance human health and environmental quality.

#### **a. Effects of Urban Forests on Air Pollution and Their Role in State Implementation Plans**

Trees affect air pollution levels by altering the microclimate, directly removing air pollutants, emitting volatile organic compounds that contribute to ozone and carbon monoxide formation, and altering building energy use that consequently affects power plant emissions. In addition, urban forest management practices (e.g., chain saws, trucks, chippers) emit air pollutants. Understanding each of these factors and quantifying their combined net effect on air pollution levels is critical to developing urban forest management plans to improve air quality. Accomplishments planned:



- Work with States across the country in quantifying the effects of urban trees on ozone and other pollutants, and developing State Implementation Plans that include urban canopy cover as a means to meet the clean air standards.
- Quantify how urban tree management affects net air quality by contrasting the positive (e.g., pollution removal) and negative (e.g., emissions) effects of urban forests and their management.

**b. Urban Forests Effects on Reducing Greenhouse Gases**

Trees affect atmospheric carbon dioxide levels (the dominant greenhouse gas) by directly sequestering carbon (via carbon dioxide) from the atmosphere and storing it in the tree biomass. However, when a tree dies and decomposes, carbon dioxide is emitted back to the atmosphere through the decomposition process. Urban forest management also leads to emission of carbon through fossil fuel use associated with various management tools (e.g., chain saws). Trees also alter building energy use that consequently affects carbon dioxide emission from fossil fuel-based power plants. Understanding the net effect of these factors is important for understanding the role and impact of urban forests on global climate change.

**c. Urban Forest Effects on Stream Water Flows and Water Quality**

Urban forests and urbanization can have a significant effect on stream flow and water quality. To help understand and quantify these effects, a new UFORE hydrologic program has been developed in cooperation with State University of New York, College of Environmental Science and Forestry (SUNY-ESF). This program is the first hydrologic program specifically designed for urban forests and incorporates several tree-specific routines. It is designed to be easy to operate with base inputs from standard spatial data sets (e.g., digital elevation model [DEM]) and UFORE field plot results. The model is calibrated against measured stream data to ensure accurate model outputs. Code development (Version 1) is near completion.

**d. Urban Forest Effects on Below-Canopy Temperature and Wind Speed**

Tree effects on air temperature and wind speed have significant impacts on air quality, human comfort, and human health. This research investigates the effect of urban trees and forests on local meteorology.

**e. Urban Forest Effects on Human Exposure to Ultraviolet Radiation**

Ultraviolet (UV) radiation causes basal cell carcinoma (the most common cancer in the United States), cutaneous melanoma (a frequently fatal cancer), and cataracts of the eye. Trees reduce UVB exposure for people, but, because the UVB radiation is widely scattered by the atmosphere, UVB tree shade is quite different from tree shade in the visible spectrum that is evident to people. Data and application provided by this research will enable epidemiologists to better evaluate the effect of routine exposure to UVB on human disease; understand how urban forests can alter the typical UV exposure by urban residents; and develop urban forest design recommendations to minimize UV exposure to humans, particularly susceptible populations (e.g., children in school yards). This research will involve increasing collaboration with scientists in medical fields.

**f. Risk of Pests to Urban Forests**

Numerous existing, recently introduced, and yet-to-be-introduced pests can have potentially significant influences on urban forest structure, functions, and values. Using host pest data and information from the UFORE model, the potential risk from numerous exotic and indigenous pests can be assessed for the urban forest. This knowledge can aid managers in determining which pests pose the greatest potential risk and, if a pest is present, the potential damage and value loss from the pest.

**4. Develop Tools To Quantify Environmental Effects of Urban Forest and Improve Urban Forest Management**

Various models developed for research purposes can be converted into user-friendly, easy-to-access programs to provide numerous clientele a cost-effective and easy mechanism to accurately quantify urban forest attributes.



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By developing these public domain programs, research applications are more readily accessible and applicable to a wide range of needs and environments.

Various urban forest models are currently being developed by this research unit, including (1) the UFORE model that combines field data with hourly meteorological and pollution concentration data to calculate urban forest structure, carbon storage and sequestration, and net effects of urban trees on air pollution and (2) an outdoor human thermal comfort expert system (OUTCOMES), designed to evaluate urban forest effects on human comfort. Model development will continue to integrate research findings into easy-to-use model applications to aid in developing management guidelines to improve environmental quality and associated human health in and around urban areas.

#### **a. The UFORE Model**

The UFORE model is designed to use standardized field data from randomly located plots and local hourly air pollution and meteorological data to quantify urban forest structure and numerous urban forest effects for cities across the world. The model currently quantifies:

- Urban forest structure by land use type (e.g., species composition, tree density, tree health, leaf area, leaf and tree biomass, species diversity).
- Hourly amount of pollution removed by the urban forest and its 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 Gypsy moth and Asian long-horned beetle infestation.

A field data collection manual and plot selection program have been developed along with handheld data collection programs for Personal Digital Assistants (PDAs) (e.g., Palm Pilots) to facilitate local data collection. UFORE is being developed in cooperation with the Davey Tree Expert Company, SUNY-ESF, and Clemson University.

#### **b. UFORE for GIS**

UFORE is also being developed to work within the Geographic Information System (GIS) environment to allow for the capability of spatial analysis and display. The base GIS data needed for UFORE are available from public domain sites (e.g., tree cover maps from EROS data center, DEM data, census data, and water gauging station data). These GIS data are combined with UFORE field plot data to produce some of the spatial analyses.

#### **c. UFORE Species Selector**

This module of UFORE is being developed in cooperation with SUNY-ESF and Horticipia. With a database of several thousand trees, users will be asked to select what tree functions are most desirable (e.g., pollution removal, carbon sequestration, low pollen allergenicity) and their location (city). The program will reveal the best trees for the functions they selected and their location.

#### **d. UFORE Growout**

UFORE Growout is a program currently developed in Microsoft Excel to project urban tree populations up to 100 years in the future based on UFORE or user-input tree data, along with user inputs of annual mortality rates. Projections of the number of trees (by diameter at breast height class) and tree cover are currently given. The number of trees needing to be established annually

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to sustain tree cover at some point in the future can also be calculated.

**e. i-Tree: Tools for Managing and Analyzing Community Forests**

i-Tree is a new program that has been developed by numerous cooperators to incorporate a suite of Forest Service urban forestry tools and models in one location (program). The first version of i-Tree incorporates UFORE, STRATUM, MCTI, and the Storm Damage Assessment Protocol. The UFORE program is designed to assess urban ecosystem structure, functions, and values; the other programs are designed to assess street tree structure, functions, and values. New programs and tools will be added to i-Tree as developed. i-Tree is designed to be the one place where users can go to assess their urban forests. NRS-4952 proposes to continue to work on the development and updates of i-Tree in the future.

**f. Urban Forest Effects on Outdoor Human Comfort**

The OUTCOMES model has been developed to predict human comfort based on weather data, user-defined location and time, and whether a person is in tree shade or not. Based on these inputs, OUTCOMES calculates a comfort index (based on the energy budget of a person) and estimates the percentage of people who would fall in different comfort categories (comfortable, too warm, too cool, much too warm, and much too cool).

**Northern Research Station**

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**Primary Areas of Research:**

**1. Urban Tree Canopy Analysis**

Urban tree canopy (UTC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed

from above. Although trees in cities are not thought of as a typical “forest,” these trees provide valued services to urban residents. These benefits include reducing the urban heat island effect, improving water quality, saving energy, lowering city temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, and providing aesthetic benefits. Scientists in the Northern Research Station are qualifying and quantifying the benefits of UTC. An increase in UTC brings an associated increase in the UTC benefits listed above.

Researchers in Burlington are helping communities to take steps to protect and enhance their urban forests through UTC goal setting processes. Although many communities have adopted land use strategies (e.g., Green Infrastructure, Smart Growth) to mitigate sprawl and urbanization, few have developed land cover strategies like UTC to mitigate urbanization effects regardless of land use type.

**2. Forest Opportunity Spectrum**

The Forest Opportunity Spectrum (FOS) offers a framework in which to integrate social and ecological data; achieve diverse social and ecological goals; facilitate collaboration among government agencies, community groups, and nongovernmental organizations; incorporate spatial heterogeneity; and address a variety of forest types that include, but are not constrained only to, street trees. FOS is a cooperative initiative of the [Baltimore Ecosystem Study \(BES\)](#), the [Forest Service Northern Research Station](#), and the [University of Vermont Spatial Analysis Lab](#).

**3. Environmental Justice**

Environmental justice describes injustices in the way natural resources are used. A condition of environmental justice exists when environmental risks and hazards and investments and benefits are equally distributed without direct or indirect discrimination. An environmental injustice exists when members of disadvantaged, ethnic, minority, or other groups suffer disproportionately at the local, regional, or national levels from environmental risks or hazards.

The focus of the Northern Research Station’s urban forestry research is primarily on environmental concerns in

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urban areas where people live. And, given the existence of the injustices in urban areas, researchers in Burlington are working to correct the injustices that exist in communities from lack of an adequate urban forest and the resulting impact on living conditions and individual health.

#### 4. Ecosystem Services

Ecosystem services are processes by which the natural environment produces resources useful to people, similar to economic services. They include provision of clean water and air, energy conservation, and carbon sequestration. The research accounts for the way in which ecosystems provide economic goods and qualifies and quantifies the benefits. The concept of ecosystem services is similar to that of natural capital.

#### 5. Stewardship

##### a. STEW-MAP (Stewardship Mapping and Assessment Project)

The project maps the urban environmental stewardship activities of thousands of groups from civil society, government, and the business sectors in New York City. It explores the networks among these stewards and the social, organizational, informational, and funding nodes that link them.

##### b. Harlem Health-Shed

This project provides critical knowledge necessary for policy and management incentives to transform the landscape in East Harlem, improving environmental quality, and increasing residents' access to enjoyable outdoor activities. Two primary outcomes are an accessible online research "library" and a series of sustainable design community roundtables to identify key locations to enhance urban greening and well-being

##### c. Urban Tree Mortality

The assessment focuses on determining the biological, social, and physical design factors that contribute to urban tree failure and success. A wide range of distinct neighborhood site types from each borough will be compared in an attempt to gain an understanding of the variation that exists with the city.

#### **Current Research Emphases:**

##### 1. Baltimore Ecosystem Study

The study is part of the [National Science Foundation's Long-Term Ecological Research Program](#) focusing on watershed management issues in an established urban area. The unit's focus is on human ecosystem and landscape studies, particularly the FOS for urban and community forestry (U&CF). Its research has dealt extensively on the relationship between environmental quality, neighborhood and life satisfaction, recreational behaviors, social capital, and community stability. It has developed innovative techniques and applications for the integration of remotely sensed data, field surveys, telephone surveys, and administrative data using advanced spatial and time-series analyses.

**Note:** The Baltimore Ecosystem Study is under the general supervision of the [Institute of Ecosystem Studies](#), Millbrook, NY. The Forest Service is involved as site manager and supplies several permanent and temporary staff from both the Burlington, VT, and Syracuse, NY, units. Also visit the Long-Term Ecological Research Web site at <http://www.lternet.edu/>

##### 2. New York City Urban Field Station

Completed and signed a Memorandum of Understanding establishing an Urban Field Station with New York City Department of Parks and Recreation to continue cooperation on urban and environmental research and program development. Developing a field lab station with residential units for visiting scientists to facilitate the development of Forest Service research in New York City. The memorandum of understanding allows for research to be immediately built into management practices. Research is organized into the following six local themes: Urban Tree Canopy; Ecosystem Services and Social Impacts; Ecosystem Disturbance; Public Health, Well-being, and Urban Livability; Ecological Literacy; and Stewardship Regimes.

#### **Technology Transfer Products:**

This unit conducts much of its own technology transfer; therefore, its products are listed here. Their main technology transfer products are handouts, presentations, publications, and CDs that help managers and the public understand and apply their research findings. Visit Dr. Grove's Web site: <http://web.mac.com/jmorgangrove/iWeb/Morgan/Products.html>.

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## 1. Publications

- Heterogeneity in Urban Ecosystems: Pattern and Process. [Band\\_heterogeneous\\_2005.pdf](#).
- People, Trees and Participation on the Urban Frontier. [Burch\\_people trees and participation.PDF](#).
- Ecosystem Management—some social, conceptual, scientific, and operational guidelines for practitioners. [Burch and Grove Ecosystem Mgmt.PDF](#).
- Life on the City Streets—Some Lessons from Baltimore for Reaching Out to Grow Trees, Kids, and Communities. [Burch\\_Life on the streets.PDF](#).
- Integrative Approaches to Investigating Human-Natural Systems: The Baltimore Ecosystem Study. [Cadenasso et al.\\_2006\\_Nature\\_Science\\_Societe.pdf](#).
- Social Science in the Context of the Long-Term Ecological Research Program. [Gragson\\_Grove\\_2006\\_SNR.pdf](#).
- Down by the Riverside: urban riparian ecology. [Groffman et al. 2003.pdf](#).
- Excuse Me, Could I Speak to the Property Owner, Please?
- Social Mosaics and Urban Forestry in Baltimore, Maryland. [Grove\\_et\\_al\\_Social Mosaics.pdf](#).
- Data and Methods Comparing Social Structure and Vegetation Structure of Urban Neighborhoods in Baltimore, Maryland. [Grove\\_et\\_al\\_SNR\\_06.pdf](#).
- GIS and Social Forestry. [Grove and Hohmann\\_social forestry and gis.PDF](#).
- Modeling Human-Environmental Systems. [Grove et al. 2001 Modeling Human-Env.pdf](#).
- Characterization of Households and Its Implications for the Vegetation of Urban Ecosystems. [Grove et al.\\_2006\\_Ecosystems.pdf](#).
- Urban-suburban Ecology. [Kinzig\\_urban-suburban ecology.PDF](#).
- Resilient Cities: meaning, models and metaphor for integrating the ecological, socio-economic, and planning realms. [Pickett et al.\\_2004\\_Resilient Cities.pdf](#).
- Open Source and Open Content: a Framework for Global Collaboration in Social-Ecological Research. [Scwheik\\_Evans\\_Grove\\_2005.pdf](#).
- Linking ecological and social scales for natural resource management. [Vogt et al. 2002 Landscapes.pdf](#).
- Svendsen, E. and Campbell, L. (2005): *The Living Memorials Project: Year 1 Social and Site Assessment*, Forest Service, GTR-NE-3333.

## 2. Reports

- Urban Tree Canopy Goal Setting: A Guide for Chesapeake Bay Communities, United States Department of Agriculture, Forest Service, Northeastern State & Private Forestry, Chesapeake Bay Program Office, Annapolis, MD. [UTC\\_Guide\\_Final\\_DRAFT.pdf](#).
- A Report on Baltimore City's Present and Potential Urban Tree Canopy, Maryland Department of Natural Resources, Forest Service: 17. [Baltimore UTC report FINAL.pdf](#).
- A Report on Annapolis City's Present and Potential Urban Tree Canopy, Maryland Department of Natural Resources, Forest Service: 17. [Annapolis UTC report FINAL.pdf](#).
- A Report on New York City's Present and Possible Urban Tree Canopy. Prepared for Fiona Watt, Chief of the Division of Forestry & Horticulture. New York City's Department of Parks and Recreation, Northern Research Station, Forest Service.
- Svendsen, Erika and Lindsay Campbell. "Land-Markings: 12 Journeys through 9/11 Living Memorials." Forest Service Northern Research Station Publication. NRS-INF-1-06. September 2006, 48p. And accompanied by a 1-hour multimedia DVD.
- Svendsen, Erika and Lindsay Campbell. "Urban Ecological Stewardship: Understanding the Structure, Function and Network of Community-based Urban Land

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Management” submitted to *Cities and the Environment* [online serial]. <http://escholarship.bc.edu/cate/>.

### 3. Technical Guides

- Urban Tree Canopy Goal Setting: A Guide for Chesapeake Bay Communities, United States Department of Agriculture, Forest Service, Northeastern State & Private Forestry, Chesapeake Bay Program Office, Annapolis, Md. [UTC\\_Guide\\_Final\\_DRAFT.pdf](#).
- LMP Web site toolbox:  
The Living Memorials Project Web site combines an “About” section, the National Registry, and a “Toolbox” section. The toolbox was created to be a first stop on the Web for information related to living memorials. It combines the expertise of the Forest Service and consultants in the fields of landscape design, placemaking, ethnobotany, and social science with the examples and lessons learned from our Living Memorial partner projects. It is organized around the principles of People, Plants, Plan, and Place in the belief that all these elements are vital to the creation and continued thriving of a living memorial. In addition, the Power section offers a resource list for further research.  
<http://www.livingmemorialsproject.net>
- Harlem Health-Shed virtual library:  
This project provides critical knowledge necessary for policy and management incentives to transform the landscape in East Harlem, improving environmental quality, and increasing resident’s access to enjoyable outdoor activities. Two primary outcomes are an accessible online research “library” and a series of sustainable design community roundtables to identify key locations to enhance urban greening and well-being.

### 4. Presentations

- Prospects and Perils for Urban Forestry and Ecosystem Services: Application and Research. 12th International Symposium on Society and Resource Management. Vancouver, British Columbia. June 3–8, 2006.
- Achieving an Urban Tree Canopy Goal for Baltimore City: Implications for sustainable forest management.

21st Annual Symposium of the United States Regional Chapter of the International Association of Landscape Ecology. San Diego, California, Tuesday, March 28, through Saturday, April 1, 2006.

- Parsons the New School lecture on LMP / mapping: Developed public exhibition *Land-Markings: 12 Journeys through 9/11 Living Memorials* that is incorporated in the curriculum of 500 undergraduate freshman at Parsons “The New School for Design.”
- ‘Modernizing Urban Open Space: Opportunities for Social Justice and New Environmental Governance,’ presented at the International Sociological Association (ISA), World Congress, Durban, South Africa, July 17, 2006.
- LMP e-learning Webcast through Urban Natural Resources Institute.

### 5. Education Courses

- Advanced Spatial Methods, Rubenstein School of the Environment and Natural Resources (NR 245). This course teaches various statistical and spatial analysis methods through weekly lab exercises and a final project. Students will be introduced to S-Plus (including S-Plus spatial module) and GWR software and will learn new methods in software they have already worked with, including ArcGIS and Microsoft Access. The course currently uses data from the Baltimore Ecosystem Study, a National Science Foundation-funded Long-Term Ecological Research Project, as the focus for all labs.
- Columbia Urban Design Studio:  
The studio has been replicated at various academic institutions and is designed to bring the evocative and creative power of design to urban ecosystem research towards the goal of achieving new models of sustainable cities. The studio has worked with local New York City regional partners to inspire new ecological design and socio-economic development along the Harlem River, Saw Mill River, New Jersey Meadowlands, and Raritan River.

- **Living Memorials Land-markings Exhibition:**  
Living memorials are spaces created, used, or reappropriated by people as they employ the landscape to memorialize individuals, places, and events. Ranging from single tree plantings, to the creation of new parks, to the rededication of existing forests, hundreds of groups across the country created a vast network of sites that continues to grow. Land-markings: 12 Journeys through 9/11 Living Memorials is a multimedia exhibition that compresses 4 years of research data and analysis on more than 700 living memorials into 12 digitally authored journeys. Social science researchers, urban ecologists, designers, and architects collaborated to collect, analyze, and present this dispersed collective response to the tragedy of September 11, 2001. This exhibition was held for 3 weeks at the National Park Service Federal Hall National Memorial in lower Manhattan and was visited by more than 5,000 people.

### **Northern Research Station**

1033 University Pl. Ste. 360  
Evanston, IL 60201-3172  
847-866-9311, ext. 11

**Lead Scientist:** Dr. Lynne Westphal

**Other Researchers:** Dr. Paul Gobster, Dr. Sarah McCaffrey, Dr. Susan Stewart, and Dr. Herb Schroeder  
<http://ncrs.fs.fed.us/4902/staff/>

### **Primary Area of Research:**

#### **1. Natural Environments for Urban Populations**

Improve the understanding of how natural resources affect quality of life in urban and urbanizing areas. As urban populations increase in size, extent, and diversity, natural resource planners and policymakers must address growing concerns about a wide range of environments. To make the best decisions—for people and for nature—they need better information about how urban people influence and are influenced by natural environments across the entire spectrum of urban to rural landscapes. That is the focus of the Natural Environments for Urban Populations unit.

The unit researches how urban people perceive, use, benefit from, and value natural environments across the landscape. They seek answers to resource management questions, and their findings help natural resource managers and policymakers make informed decisions in planning, designing, and managing places with people in mind.

### **Current Research Emphases:**

#### **1. Landscape and Demographic Change**

The research is designed to understand how the movement of people across the landscape changes natural resources and natural resource management. It looks at issues from the large-scale vantage—using census, land cover, and land use data—as well as from the site-specific and human scale—addressing people’s perceptions of places and issues. It also looks at the full range of how natural environments are impacted by change along with how change impacts people, both positively and negatively. Their research recognizes that landscape change results from people’s behavior and decisionmaking and, at the same time, influences it.

- a. Planning & Policy Strategies**—As landscapes change, elected officials and planners need to have the information and tools to be able to make wise decisions for their constituents.
- b. Changing Land Uses, Changing Landscapes**—Landscape change is closely tied to changes in land use.
- c. Demographic Change**—Where people live, how they live, their income and ethnicity, and what’s important to them are examples of characteristics that influence how people interact with the landscape.
- d. Urban Sprawl & Housing Growth**—The term “urban sprawl” suggests it applies only to big cities, but suburban and rural areas also confront development and land management issues.
- e. Landscape Design**—The choices people make about where to live and work have implications for landscape design.



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## 2. Management and Restoration of Natural Landscapes

The research will help to define and understand the issues and conflicts around restoration of natural areas. No matter how big or dense a city gets, nature is always part of it—and is important to the quality of life of the people who live, work, and spend their leisure time there. At the same time, these natural areas include unique, rare, and endangered native species and ecosystems that are under increasing stress from changes caused by pollution, urban development, and invasive plants and animals.

Sometimes natural areas become so degraded that they need to be restored or rehabilitated. At first glance, restoring a natural area may seem straightforward, at least from a purely ecological point of view: If exotic species have overtaken native plants, remove them. However, the people who live near or use natural areas may have very different ideas about the goals for a project than resource managers. Some stakeholders may think invasive plants are attractive and belong. Thus, restoring landscapes in urban areas with people in mind adds another dimension to the process.

This unit is working with a broad range of public and private interests to help understand and guide the restoration of natural areas and apply the findings nationally.

**a. Urban Parks & Natural Areas**—Even if they can vacation in distant wilderness areas, urban people benefit greatly from having green space close to home—whether it is a corner park, community garden or nature center. Many of these natural areas are highly valued and used, especially in dense urban centers.

**b. Brownfield Rehabilitation**—Whether the results of illegal dumping or former industrial uses, environmentally contaminated sites are part of the mosaic of most urban environments. Rehabilitation of these sites (can link with the Lake Calumet news write-up) comes with a host of social issues.

**c. Recreation Planning**—Whether planning for a national forest or a neighborhood tot lot, providing for the wide-ranging recreational needs of people is complex.

Site users come from different age groups and different racial and ethnic groups and represent varied income levels.

**d. Public Involvement**—Developing effective policies for using and managing landscapes requires meaningful dialogue between diverse individuals and groups. So does creating effective designs and plans for parks and natural areas.

**e. Social Aspects of Urban Greening**—Urban greening is a powerful tool for improving the quality of urban life. People gain from urban greening both as individuals and communities.

## 3. Environmental Perceptions and Values

The research tries to better understand how people experience the natural environment and how experiences of nature influence their lives. Many of the debates and controversies regarding management of natural resources stem from people's differing environmental perceptions and values—and in some cases the different perceptions they have of other people's values. This issue is magnified by the rapidly changing landscape; as people relocate and natural resources change, individuals respond to their surroundings in different ways.

The scientists in this unit work to identify and better understand how people experience the natural environment, what prompts those experiences, and how important they are to people. They seek to find out which attributes of places are important to people. One of the goals is to help natural resource managers understand that it is important to consider people's experiences of nature when establishing policies and practices. Knowing how people respond to a place is also important for arriving at truly sustainable approaches to managing the landscape.

**a. Natural-Environment Perception and Preference**—What are the ideal number and kinds of trees in a community park, from the human perspective? Can there be too many trees? Too few? The research shows that urban people's perceptions of landscapes are influenced by the types, sizes, and number of trees and other plants.

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**b. Values and Meaning of Places**—People have very strong feelings for and attachments to places and environments. This observation holds true for those who live in an area, people who visit it, and even those who may have never visited it.

**c. Demographic Differences and Diversity**—People of different backgrounds may experience the environment differently. Certain individuals or groups might have unique needs or, because they are in a minority, may not have their needs voiced in the larger public context of resource management and planning. In addition, just as differences may exist between groups (e.g., African Americans and Asian Americans), important variations may also exist within those groups.

#### 4. Rustbelt Landscape of the Calumet Region

The researchers are working with other agencies, organizations, and community groups to plan for and work towards the economic and ecological revitalization of this heavily industrialized region. The 160-square-mile Calumet region is a study in contrasts. Running along the southwest shore of Lake Michigan, Calumet includes a significant portion of the City of Chicago and sweeps east, encompassing Gary, IN, and the Indiana Dunes National Lakeshore. Once one of the largest wetland complexes in North America, Calumet later became the heart of U.S. industry. Its anchor was steel production.

This heavy industrial development dramatically altered Calumet's landscape and ecosystems. Slag, a byproduct of steel making, was disposed of along Lake Michigan and in the wetlands. Rivers were dredged and channelized, wetlands were filled, and natural habitat disrupted. Still—and surprisingly—threatened and endangered species also flourish in Calumet in remnant natural areas.

Many of the industries that transformed the Calumet region have disappeared and, with them, countless jobs have disappeared, too. Numerous industrial sites are now abandoned, dotting the landscape with properties that are contaminated or are perceived to be contaminated, known as brownfields.

Although the region is a classic rustbelt, many industries still thrive there. Meantime, the remaining natural areas draw recreationists who hope to see the rare bird, catch the big fish, or just enjoy the outdoors.

Calumet is undergoing an exciting revitalization. Our unit works with many partners to help local and regional planners and managers decide how to advance the region toward ecological and economic health. We provide information and technology in five key areas to help inform this dynamic, challenging process: Eco-Toxicity, Eco-Creativity, People-Land Connection, Roadmaps to Recovery, and Population Diversity.

#### 5. Fire Management

The research is studying factors that influence the wild-fire vulnerability of people, property, and communities and learning how to effectively communicate with people about fire. Focus is on the human dimension of fire management to help devise practices and policies that will be most successful in protecting people, property, and natural ecosystems. Fire management involves constant interaction with people, often under trying circumstances. The scientists study people's perceptions of wildland fires and of fire management practices, which often vary from region to region. They also examine human settlement patterns across the United States to help managers plan for fire-management needs.

The research provides insights, knowledge, and tools for fire managers to improve their success in dealing with people. These resources help guide fire-management policies and help managers determine where to most effectively target their resources for fuels management. Their efforts are concentrated in four study areas: Fuels Management, Defensible Space, Wildland-Urban Interface, and Postfire Restoration.

#### **Technology Transfer Products:**

This unit conducts much of its own technology transfer; therefore, its products are listed here. Its main technology transfer products are handouts, presentations, publications, and CDs that help managers and the public understand and apply their research findings.



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## 1. Publications

- The Public and Wildland Fire Management: Science Findings for Managers from National Fire Plan Research, edited by Sarah McCaffrey. Forthcoming publication.
- Fire in eastern oak forests: delivering science to land managers, edited by Matthew B. Dickinson. <http://www.nrs.fs.fed.us/pubs/8405/>.
- Customer Diversity and Future Demand for Outdoor Recreation, by John F. Dwyer. <http://www.treesearch.fs.fed.us/pubs/12678>.
- Restoring Nature: Perspectives from the Social Sciences and Humanities, edited by Paul H. Gobster and R. Bruce Hull. Introduction available at <http://www.treesearch.fs.fed.us/pubs/12071>.
- With People in Mind: Design and Management of Everyday Nature, by Rachel Kaplan, Stephen Kaplan, and Robert L. Ryan. 1998. Washington, DC: Island Press.
- Social science to improve fuels management: a synthesis of research relevant to communicating with homeowners about fuels management, by Martha C. Monroe, Lisa Pennisi, Sarah McCaffrey, and Dennis Mileti. <http://www.treesearch.fs.fed.us/pubs/13821>.
- Special Places in the Lake Calumet Area, by Herbert W. Schroeder. <http://www.treesearch.fs.fed.us/pubs/12858>.
- Connecting People with Ecosystems in the 21<sup>st</sup> Century: As Assessment of Our Nation's Urban Forests, by John F. Dwyer, David J. Nowak, Mary Heather Noble, and Susan M. Sisinni. <http://www.treesearch.fs.fed.us/pubs/12517>.
- Decision's at the Water's Edge: Sustaining Riparian Landscapes in the Midwest, by Lynne M. Westphal and Michael E. Ostry.
- From landscapes to lots: understanding and managing Midwestern landscape change, by Paul H. Gobster and Robert G. Haight. <http://www.treesearch.fs.fed.us/pubs/12617>.

- Nearby Nature in the City: Preserving and Enhancing Livability, by Rachel Kaplan, Eric Ivancich and Ray DeYoung. Available in March 2007.

## 2. One-Page Summaries

- Movement of People across the Landscape—Changes in Natural Resource Management. [http://ncrs.fs.fed.us/4902/local-resources/documents/movement\\_of\\_people\\_across\\_landscape.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/movement_of_people_across_landscape.pdf).
- Homeowners' Views of Wildfire Preparedness. [http://ncrs.fs.fed.us/4902/local-resources/documents/homeowner\\_perceptions\\_and\\_motivations.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/homeowner_perceptions_and_motivations.pdf).
- Predicting Public Acceptance of Forest Management Practices in Fire-Prone Areas. [http://ncrs.fs.fed.us/4902/local-resources/documents/predicting\\_public\\_acceptance\\_fuels\\_management.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/predicting_public_acceptance_fuels_management.pdf).
- Open Space Developments. [http://ncrs.fs.fed.us/4902/local-resources/documents/open\\_space\\_neighborhoods.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/open_space_neighborhoods.pdf).
- Human Dimensions of Urban Ecosystems. [http://ncrs.fs.fed.us/4902/local-resources/documents/human\\_dimensions\\_of\\_urban\\_ecosys.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/human_dimensions_of_urban_ecosys.pdf).
- Restoring Natural Landscapes with People in Mind. [http://ncrs.fs.fed.us/4902/local-resources/documents/restoring\\_natural\\_landscapes.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/restoring_natural_landscapes.pdf).
- Managing Urban Parks for Ethnically Diverse Populations. [http://ncrs.fs.fed.us/4902/local-resources/documents/ethnically\\_diverse\\_park\\_clientele.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/ethnically_diverse_park_clientele.pdf).
- Homeowner Views of the Pros and Cons of Street Trees. [http://ncrs.fs.fed.us/4902/local-resources/documents/street\\_trees.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/street_trees.pdf).
- Homeowners and Defensible Space: Managing Property to Resist Wildfire. [http://ncrs.fs.fed.us/4902/local-resources/documents/creating\\_defensible\\_space.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/creating_defensible_space.pdf).
- Analysis of the 2000 U.S. Census: Population Growth/Population Changes. <http://ncrs.fs.fed.us/4902/local-resources/documents/RacialComp.pdf>.

- Why Special Places Are Important to People. [http://ncrs.fs.fed.us/4902/local-resources/documents/special\\_places.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/special_places.pdf).
- Mapping the Wildland-Urban Interface in the United States. [http://ncrs.fs.fed.us/4902/local-resources/documents/mapping\\_wui.pdf](http://ncrs.fs.fed.us/4902/local-resources/documents/mapping_wui.pdf).
- Using Plants to Remove Contaminants from Soil and Groundwater. [http://ncrs.fs.fed.us/4902/one\\_pagers/NC4902Phyto.pdf](http://ncrs.fs.fed.us/4902/one_pagers/NC4902Phyto.pdf).

### 3. Mapping of the Wildland-Urban Interface

One of the biggest and most complex cooperative research projects has been the mapping of the wildland-urban interface in the United States, undertaken with partners at the University of Wisconsin-Madison. This multiyear project looked first at historic changes in housing density across the United States and then built on the housing data to identify the current locations and extent—and predict the future locations and extent—of the wildland-urban interface. Much of the work accomplished by this suite of projects—including maps, statistics, and data—has been made available online through the University of Wisconsin-Madison’s SILVIS Lab Web site: <http://www.silvis.forest.wisc.edu/Library/WUILibrary.asp>.

### 4. Trend Analysis

Another frequent research cooperator, demographer Ken Johnson of Loyola University-Chicago’s Sociology Department, has done extensive analysis of 2000 U.S. Census data to identify trends. Information about his research and a number of his publications are available on line:

- Child Poverty in Rural America. <http://www.luc.edu/depts/sociology/johnson/childpov.pdf>.
- Changing Demographic Trends in Metropolitan Chicago, 1990-2004. [http://www.luc.edu/depts/sociology/johnson/Chicago%20Report\\_111605.pdf](http://www.luc.edu/depts/sociology/johnson/Chicago%20Report_111605.pdf).
- Ken Johnson’s Loyola Web page: <http://www.luc.edu/depts/sociology/johnson/bio.html>.
- Coming soon: Demographic Trends and National Forests. This is an application in which the user can click

on any county in the country and get information summaries from census data and also landscape type, etc.

### 5. Calumet Initiative

Many of the Forest Service scientists and cooperators have been extensively involved in the Calumet Initiative, a coalition of stakeholders working to encourage an economic and ecological revitalization of the rustbelt Calumet region of southeast Chicago and northwest Indiana. In 2003, one Forest Service scientist compiled a CD, informally known as “Calumet-on-a-Disc,” that pulls together publicly available reports, planning and visioning documents, research findings, historic overview documents, recent and historic photos, newspaper and magazine articles, and a list of Calumet Initiative partners and their Web sites. Hundreds of Calumet CDs have been distributed for free at Calumet events or mailed out on request. A second, updated version of the CD will be available in late 2006 as an orderable product on the unit’s Web site.

### Southern Research Station

Research Work Unit—4952  
Integrating Human and Natural Systems in Urban and Urbanizing Landscapes  
Bldg. 164, Mowry Rd.  
Gainesville, FL 32611

Research and Technology Transfer locations:  
Centers for Urban and Interface Forestry  
Urban Forestry South  
320 Green St.  
Athens, GA 30602–2044  
706–559–4263  
  
InterfaceSouth  
Bldg. 164, Mowry Rd.  
Gainesville, FL 32611  
352–376–3213

**Acting Lead Scientist:** Dr. Cassandra Johnson, Research Social Scientist (currently rotates bimonthly among the unit’s research scientists.)

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**Other Researchers:** Dr. J. Michael Bowker (GA), Research Social Scientist (Economist); Dr. Cassandra Johnson (GA), Research Social Scientist (Social Science); and Dr. Wayne Zipperer (FL), Research Forester  
<http://www.interfacesouth.org/>

The research work unit's research focus is on integrating human and natural systems. Two technology transfer centers are under the umbrella of this unit are collectively called the Centers for Urban and Interface Forestry. The urban component in Athens, GA, is called Urban Forestry South and the interface component in Gainesville, FL, is called InterfaceSouth. This unit works in partnership with Region 8 Cooperative Forestry, the Southern Group of State Foresters, other Southern Research Station units, universities, industry, and other interest groups.

#### **Primary Areas of Research and Current Emphases:**

##### **1. Analysis of Urbanization Effects on Forest Vegetation**

<http://www.interfacesouth.org/products/research/ufore.html>

This research project will help to develop an integrated approach to monitoring changes from urbanization to ecological and social systems in the Florida Panhandle.

##### **2. Cultural Dimensions of Landscape Change in the Florida Panhandle**

<http://www.interfacesouth.org/products/research/cultdim.html>

This research examines the cultural dimension of landscape change in Franklin and Gulf Counties, FL.

##### **3. Gainesville Urban Forest Effects Project**

<http://www.interfacesouth.org/products/research/panhandlewriteup.html>

The primary objective of this project is to monitor how the urban forest changes over time in a small urban city in the South.

##### **4. Fire in the Wildland-Urban Interface**

###### **a. Flammability of Natural Vegetation and Home Landscapes**

[http://www.interfacesouth.org/products/research/flamm\\_natural\\_veg\\_and\\_home\\_landscapes.html](http://www.interfacesouth.org/products/research/flamm_natural_veg_and_home_landscapes.html)

This study comprises three research projects that were designed to address the issues of wildfire hazard in the wildland-urban interface (WUI) and investigate different facets of natural vegetation and home landscape flammability. They provide knowledge to help guide firewise planning and to improve fire behavior modeling for urban settings.

- Flammability of native understory species in pine flatwood and hardwood hammock ecosystems.
- Quantifying and ranking the flammability of ornamental shrubs in the Southern United States.
- Fire spread and structural ignitions from horticultural plantings in the wildland-urban interface.

###### **b. Fuel Reduction Options for Landowners at the Wildland-Urban Interface**

[http://www.interfacesouth.org/products/research/fuel\\_reduction\\_options.html](http://www.interfacesouth.org/products/research/fuel_reduction_options.html)

This study includes two parts: (1) a review of fuel reduction options available to small landowners and (2) a comparison of the effectiveness, longevity, and costs of three fuel reduction treatments in the South.

- Fuel Reduction Options Technical Report.
- Fuel Reduction Options for Landowners Study.

###### **c. Post-Fire Assessment of Interface Landscapes**

[http://www.interfacesouth.org/products/research/postfire\\_assessment.html](http://www.interfacesouth.org/products/research/postfire_assessment.html)

This study looked at how building materials and the arrangement and composition of landscape plants influence structural vulnerability during wildfires.

###### **d. Wildfire Risk Assessment Guide for Homeowners in the Southern United States**

[http://www.interfacesouth.org/products/research/wildfire\\_risk.html](http://www.interfacesouth.org/products/research/wildfire_risk.html)

This assessment and accompanying guidelines were designed to provide knowledge about fire risk focused on individual properties throughout the South as a complement to guidelines available for whole communities.

- Property characteristics.
- Home characteristics.
- The Wildfire Risk Assessment.
- Implications for WUI Homeowners.

## 5. Urban Forestry

### a. Biophysical Relations

- What are extent and impacts of invasive plant and animal species on urban forests in the South?
- How does changing land use directly affect Southern urban forest's ability to provide ecological goods and services?
- How can urban forests be better managed to mitigate the effects of natural disasters?
- What are the most informative methods (indicators) to measure and track the biophysical flow of goods and services from urban forests?
- What are the impacts of recreation on impervious urban forest settings?
- Evaluate carbon sequestration opportunities provided by urban forests in the South and to develop successful approaches to carbon credit trading?
- How does urbanization alter soil and hydrology and impact the health of urban forests?
- What rate of tree growth (leaf area, crown projection, other) can be expected/measured/predicted for the important Southern species in typical urban/development settings?

### b. Human Dimensions

- What are the human uses and social values of urban forests and how are they affected by urban forest management/change?
- How are values and benefits from urban forests distributed across population segments?

- What are urban residents' knowledge, perceptions, and opinions about urban conditions, urban expansion, and issues related to management of urban forests?
- What are urban residents' knowledge, perceptions, and opinions of forestry in general and what are the segments of urban publics based on their knowledge, opinions, demographics, lifestyles, and other differentiating characteristics for guiding forestry outreach and education.
- What are the economic effects of trees and urban natural landscapes, including urban forest stands, on urban property values—private, commercial, and public?
- What is the economic value of urban forest public goods and services in the South?
- What is the role that urban forests play in local and regional human health?
- What is the feasibility of establishing carbon markets in urban settings?
- What is the role and importance of urban forests to regional tourism in the South?
- How do urban forests affect commercial growth?
- What are the factors driving urban renewal and the new urbanism?
- How do urban forest professionals work with other allied professionals in urban planning, landscape ecology, hydrology, and engineering (and others)?
- How does local government management affect the extent and health of the urban forest?

### c. Science Delivery

- How can methods be developed to improve delivery of research and science-based knowledge to various urban forest stakeholders?
- What are the market segments among urban forest stakeholders and how can they best be accessed for outreach and education?

- How can the effect that the research delivery has on urban forest management and the program be evaluated/assessed?

#### d. Hispanic Engagement With the Environment

This research examines Hispanic involvement in a range of outdoor green spaces and seeks to understand better how Hispanics situate themselves in these various environments—that is, does the outdoor environment contribute to one’s ethnic or cultural identity. To what extent are ethnicity and/or culture expressed in these places? The research continuum ranges from the urban to the rural forest. It begins with the environment closest to one’s home—the yard and neighborhood park or other outdoor areas near one’s home and extends outward to the Chattahoochee National Forest in north Georgia.

#### Technology Transfer Products:

The Urban Forestry South conducts some of its own technology transfer; therefore, its products are listed here.

#### 1. Publications

- Cho, S. H., J.M. Bowker, and W.M. Park, *Measuring the Contribution of Water and Green Space Amenities to Housing Values: An Application and Comparison of Spatially-weighted Hedonic Models*, *Journal of Agricultural and Resource Economics* 31(2006): 485-507.
- Cho, S.H., D. H. Newman, and J. M. Bowker. *Measuring Rural Home Owners Willingness to Pay for Land Conservation Easements*, *Journal of Forest Policy and Economics* 7 (2005): 757- 770.
- Betz, C.J., J.C. Bergstrom, and J.M. Bowker (corresponding author). *A Contingent Trip Model for Estimating Rail-Trail Demand*, *Journal of Planning and Environmental Management* 46(2003): 79-96.
- Bowker, J.M., J.C. Bergstrom, J. Gill. *Estimating the Economic Value and Impacts of Recreational Trails: A Case Study of the Virginia Creeper Rail Trail*. *Tourism Economics* (forthcoming Sept. 2007).
- Bowker, J.M., D.H. Newman, R.J. Warren, D. Henderson. *Estimating the Economic Value of Lethal vs Nonlethal Deer Control in Suburban Communities*. *Society and Natural Resources* 16(2003): 143-158.
- Henderson, D.W., R.J. Warren, D.H. Newman, J.M. Bowker, J.S. Cromwell, and J.J. Jackson. *Human perceptions before and after a 50% reduction in an urban deer herd’s density*. *Wildlife Society Bulletin* 28(2000): 911-918.
- Sydor, T., D. H. Newman, J.M. Bowker, H. Ken Cordell. *Trees in residential landscape: a hedonic study of property valuation*. *Proceedings of the 33rd Annual Southern Forest Economics Workshop*, New Orleans, LA, March 16-18, 2003, 4p.
- Bowker, J.M., J.C. Bergstrom, J.A. Gill. 2004. *The Virginia Creeper Trail: An Assessment of User Demographics, Preferences, and Economics*. Report prepared for the Virginia Department of Conservation and Recreation, Richmond, VA, December, 46 p. <http://www.srs.fs.usda.gov/recreation/VCT.pdf>.
- Bowker, J.M., J.C. Bergstrom, J.A. Gill, U. Lemanski. 2004. *The Washington and Old Dominion Trail: An Assessment of User Demographics, Preferences, and Economics*. Report prepared for the Virginia Department of Conservation and Recreation, Richmond, VA, 35 p. <http://www.srs.fs.usda.gov/recreation/WOD.pdf>.
- Sydor, T., J.M. Bowker, D.H. Newman, H.K. Cordell. 2005. *Yard Sale: How Trees Affect the Selling Price of Houses*. *Natural Inquirer* 6(1): 50-56.
- Goodenbery, J. B. 2006. *Hedonic Valuation of Conservation Subdivisions in Athens-Clarke County, Georgia*. Unpublished Master of Science Thesis, University of Georgia, August.
- Coley, M.C. 2005. *House and Landscape Value: An Application of the Hedonic Pricing Technique Investigating the Effects of Lawn Area on House Selling Price*. Unpublished Master of Science Thesis, University of Georgia, December.

- Sydor, T. 2005. *Three Essays on the Economics of Forest Investments*. Unpublished Doctoral Dissertation, University of Georgia, May.

## 2. Presentations

- Cho, S-H., J.M. Bowker, W. Park. *Measuring the Contribution of Water and Green Space Amenities to Housing Values: An Application and Comparison of Spatially-weighted Hedonic Models*, Selected Paper, American Agricultural Economics Association (AAEA) Annual Meeting in Long Beach, July 23–26, 2006.
- Coley, M., W. J. Florkowski, J.M. Bowker, *House and Landscape Value: An Application of Hedonic Pricing Technique Investigating Effects of Lawn Area on House Selling Price*. Selected Presentation. 38<sup>th</sup> Annual Southern Agricultural Economics Association Meeting, February 5–8, 2006, Orlando, FL.
- Bowker, J.M., T. Sydor, D.H. Newman, H.K. Cordell, D. Hartel. *Residential Home Values: Do Trees Matter in Athens, GA?* Invited Presentation, I-85 North Board of Realtors, Jefferson, GA, and September 15, 2005.
- Bowker, J.M. *Economic Benefits of Trails in Virginia*. Invited Presentation, 2005 Governor’s Conference on Greenways, Blueways, and Trails. Richmond, VA, May 1–4, 2005.
- Sydor, T., D.H. Newman, J.M. Bowker. *Demand for Residentially Located Trees In Southeastern U.S.* Emerging Issues along Urban/Rural Interfaces: Linking Sciences and Society. Offered Presentation, Atlanta, GA, March 13–16, 2005.
- Sydor, T., D.H. Newman, J.M. Bowker. *Trees in Residential Landscapes: comparison of empirical data from two Southern States*. Selected Presentation, Southern Forest Economics Workers annual conference, St. Augustine, FL, March 7–10, 2004.
- Sydor, T, D.H. Newman, Bowker, J.M., H.K. Cordell. *Hedonic valuation of tree coverage on residential lots: A the tail@ of two counties*. Selected Paper, 2003

Midwest Forest Economists & Forest Mensurationists Joint Meeting, October 21–22, Forest Service, Forest Products Laboratory, Madison, WI 53726–2398.

- Sydor, T, D. H. Newman, J.M. Bowker, H. Ken Cordell. *Trees in residential landscape: a hedonic study of property valuation*. Selected Paper, Southern Forest Economics Workers Annual Meeting, New Orleans, LA, March 16–18, 2003.

### Southern Research Station

USDA National Agroforestry Center  
University of Nebraska—Lincoln-East Campus  
North 38th Street & East Campus Loop  
**Lincoln, NE 68583–0822**  
402–437–5178

**Lead Scientist:** Dr. Michele Schoeneberger

**Other Researchers:** Dr. Michael Dosskey and Gary Bentrup  
<http://www.unl.edu/nac/index.htm>

### Primary Areas of Research:

USDA National Agroforestry Center research places emphasis on providing a scientific basis for developing agroforestry on crop, range, and pasture lands in the Central United States. Tree-based buffers can improve water quality, enhance crop and livestock production, create wildlife habitat, and sequester carbon, among other benefits for private landowners and communities. <http://www.unl.edu/nac/research/index.htm>

- 1. Ecological Functions of Buffers** to understand how riparian and upland tree buffers protect water quality, enhance aquatic and terrestrial environments, and sequester carbon.
- 2. Site Design and Management** to determine how to design and manage individual buffers to attain desired production and conservation benefits.
- 3. Landscape Integration** to develop an improved basis for decisionmaking relative to design criteria and expected water quality benefits, along with other resource considerations, from tree-based buffer systems.



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### **Current Urban Forestry Emphases:**

Communities have long recognized the need to invest in infrastructure. Roads, power lines, storm drains, and sewers all provide a foundation for continuance and growth. Similarly, communities have recently begun to acknowledge the need for “green infrastructure.” They see that trees can be put to work to meet their environmental, social, and economic goals.

Agroforestry helps connect the urban community to the surrounding rural landscape. This connectivity helps filter stormwater runoff, provides travel corridors for wildlife, creates recreational space, and improves air and water quality for the whole watershed. Cumulatively, these functions contribute to the overall health and sustainability of a community and its neighbors.

#### **1. Experiments/Modeling**

- Filter Strip Performance and Processes for Different Vegetation, Widths, and Contaminants (EPA/University of Nebraska–Lincoln [UNL]).
- Importance of Tree-Based Buffers at the Landscape Level Under Shifting Climate Scenarios (UNL).
- Water Quality Functions of Vegetative Buffer Systems: Evaluation of Procedures and Enhancements (UNL).
- Advancing the Statistical Analyses of Agroforestry Systems: Scaling Impacts From Site to Landscape (UNL).

#### **2. Decisionmaking Tools**

- Calibration/Validation of the Riparian Ecosystem Management Model (REMM) (Agricultural Research Service, Natural Resources Conservation Service).
- A Comprehensive Landscape Planning Methodology for Designing Buffers (EPA/University of Missouri).
- Visualization Tools for Conservation Planning and Design (University of Illinois at Urbana-Champaign).
- Plant Selection Guide for Design of Multipurpose Riparian Buffers (UNL).

#### **3. Communications**

- American Society of Agronomy Special Symposium: Buffers for Water Quality (November 1999).
- Agroforestry Technical Note Series: Riparian Principles and Design; Agroforestry Planning and Design.

#### **4. Geospatial Analysis**

- Major Land Resource Area (MLRA) 109 Atlas.

### **Important Non-Forest Service Research Centers**

#### **Human Dimensions of Urban Forestry and Urban Greening**

College of Forest Resources  
University of Washington  
Box 352100  
Seattle, WA 98195–2100  
206–616–5758

**Lead Scientist:** Dr. Kathleen L. Wolf

<http://www.cfr.washington.edu/research.envmind/>

#### **Primary Areas of Research:**

##### **1. Urban Forestry and Human Services Benefits**

<http://www.cfr.washington.edu/research.envmind/urban.html>

Reported are studies and reports of the psychosocial benefits of trees, forests, and green spaces in cities. The studies are based on the principles and methods of environmental psychology.

##### **2. Trees and Transportation**

<http://www.cfr.washington.edu/research.envmind/transportation.html>

Transportation systems have traditionally been designed for traffic mobility and driver safety. Road systems and roadsides are now being designed to address a variety of other functions, including aesthetic, environmental, and community interests. Context Sensitive Design is a

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new approach in transportation planning that recognizes community values. This research confirms public values for roadside forests and landscape and analyzes safety outcomes of roadside trees.

### 3. Nature and Consumer Environments

<http://www.cfr.washington.edu/research.envmind/consumer.html>

Shoppers are increasingly interested in the experience of shopping, as well as the goods and services they expect to purchase. A series of studies has investigated associations between the urban forest and people's response to shopping settings. These studies show that providing for trees in the streetscape is an important investment for a business community. The presence of a quality urban forest positively influences shoppers' perceptions and, probably, their behavior.

### 4. Policy and Planning

<http://www.cfr.washington.edu/research.envmind/policy.html>

A lag exists in general public awareness of U&CF science information and in integration of evidence-based knowledge into local government policy and planning. This research focuses on how "best available science" can be communicated and distributed in ways that may motivate communities to achieve better urban forest planning and management.

### 5. Civic Ecology

<http://www.cfr.washington.edu/research.envmind/civic.html>

The lives of people in urbanized areas are intertwined with natural environments and urban ecosystems. Traditional ecological science has, for the most part, not included human behavior as an integral study. An emerging research program is exploring how people in cities and communities benefit from being actively involved in environmental projects and how to encourage conservation behavior through ecological activity.

## **Current Research Emphases:**

### 1. Trees and Transportation

<http://www.cfr.washington.edu/research.envmind/transportation.html>

- Urban Trees and Traffic Safety.
- Improved Roadside Design for Trees and Traffic Safety.
- Trees and Parking Lots—Green Law for Urban Sustainability.
- Beyond the White Line: Public Response to the Urban Freeway Roadside.
- Freeway Roadside Landscape and Community Perceptions.

### 2. Policy and Planning

<http://www.cfr.washington.edu/research.envmind/policy.html>

- Urban Forestry Technology Transfer Evaluation.
- Trees and Community Economic Development.
- Assessment of Urban Forest Management in Washington Cities.

### 3. Civic Ecology

<http://www.cfr.washington.edu/research.envmind/civic.html>

- Psychological Dynamics of Nonpoint Source Pollution Control.
- Youth and Urban Nature Experiences: Assessing Impacts, Benefits and Behaviors.
- International Urban Greening.
- Urban Forestry and Urban Greening Nonprofits—fiscal conditions, leadership, and capacity.

### 4. Urban Forestry and Human Benefits

<http://www.cfr.washington.edu/research.envmind/urban.html>

- Economic Valuation of U&CF Human Services.

### 5. Nature and Consumer Environments

<http://www.cfr.washington.edu/research.envmind/consumer.html>



- Trees and Business—Growing Together: A National Research Program.
- Trees Are Good for Business: Guidelines for Planning, Planting, and Managing Trees in Business Districts.
- Trees and Revitalizing Business Districts in Large Cities: A Survey of Consumers & Merchants.
- Trees in Small City Business Districts: Comparing Responses of Residents & Potential Visitors.
- The Urban Forest in the Athens, GA Business District: Case Study Research on Consumers and Trees in a Mid-Size City.

### **Technology Transfer Products:**

Neither the Forest Service nor the University of Washington provide technology transfer support for the above research. Dr. Wolf carries out that function in addition to her research. The following is a listing of Dr. Wolf's technology transfer products:

#### **1. Professional Publications**

<http://www.cfr.washington.edu/research.envmind/products.html>

Research findings that are published in conference proceedings (13) or in technical publications (24), including guide books, newsletters, agency publications, and bulletins.

#### **2. Scholarly Publications**

<http://www.cfr.washington.edu/research.envmind/products.html>

Peer-reviewed articles that are published in a professional journal: 8 manuscripts in review, revision, or in press; 12 articles published.

#### **3. Fact Sheets**

<http://www.cfr.washington.edu/research.envmind/products.html>

Twenty-two fact sheets have been written, produced, and printed. These two-page publications, which provide concise summaries of research outcomes, are intended to be widely shared with community decisionmakers and constituencies who typically have not been involved in urban forestry and urban ecosystems.

#### **4. PowerPoint Presentations**

<http://www.cfr.washington.edu/research.envmind/presentations.html>

Presentations have been made to report the research and outcomes at scientific meetings, professional conferences, manager trainings, and citizen learning sessions. Presentations are available for download at the Web site above.

### **Landscape and Human Health Laboratory**

University of Illinois at Urbana-Champaign  
1103 South Dorner Dr.  
**Urbana, IL** 61801-4778  
217-244-0393

**Lead Scientist:** Dr. Frances E. Kuo

**Other Researchers:** Dr. Johanna Weber, Dr. Andrea Faber Taylor, Hongxia Fan, Amy Ritter, and Emma Bruehlman-Senecal  
<http://www.lhhl.uiuc.edu/>

### **Primary Areas of Research/Current Research Emphases:**

- 1. Impacts of the Urban Forests on Individual Health and Healthy Functioning**, including violence and aggression, cognitive functioning, effective coping, effective life functioning, healthy development in children, physical health and vitality in older adults, and obesity and walking.
- 2. Impacts of the Urban Forest on Neighborhood Health and Functioning**, including crime, safety and sense of safety, vitality and use of open spaces, levels of supervision in neighborhood spaces, littering, loitering, "pre-crime indicators," and strength of community.

### **Technology Transfer Products:**

Technology transfer is an integral part of Dr. Kuo's research and, therefore, her technology transfer products are presented here:

#### **1. Professional Publications**

Research findings are published in conference proceedings or nonprofessional publications.

#### **2. Scholarly Publications**

Peer reviewed articles are published in a professional journal.

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### 3. Fact Sheets

Short summary of research findings.

### 4. PowerPoint Presentations

PowerPoint presentations are available for download:  
<http://www.lhhl.uiuc.edu>.

### 5. Newsletters

Trade journals and tree advocacy outlets have featured the lab's work in a number of newsletters.

### 6. Press Releases

Press releases are written and released via the University of Illinois News & Information Bureau.

### 7. Promotional Items

The lab regularly receives requests from reporters from print, radio, TV, and Web outlets. It takes advantage of as many of these as possible. In the past few years, it has reached roughly 80 million readers/listeners/viewers through a diverse range of outlets.

#### **Key Technology Transfer Products:**

#### **1. Green Streets, Not Mean Streets—in an Inner City Neighborhood, the Greener the Residence, the Lower the Crime Rate**

**Description:** Flyer (also available in the following forms: one-page graphic and blurb, PowerPoint presentation, scientific journal articles, and four-page technical bulletin—all available on CD and also for download from the Web site below).

**Benefits:** In a 2001 study in one Chicago public housing development, buildings with high levels of greenery had 48-percent fewer property crimes and 56-percent fewer violent crimes compared with buildings that had little or no vegetation. Even modest amounts of greenery were associated with lower crime rates. The greener the surroundings, the fewer the number of crimes that occurred. Greenery lowers crime through several mechanisms. First, greenery helps people to relax and renew, reducing aggression. Second, green spaces bring people together outdoors, increasing surveillance and discouraging criminals. Relatedly, the green and groomed appearance

of an apartment building is a cue to criminals that owners and residents care about a property and watch over it and each other.

**Funded by:** University of Illinois, USDA Hatch; U&CF challenge cost-share program.

**Location:** Landscape and Human Health Laboratory, University of Illinois, Urbana, IL.  
<http://www.lhhl.uiuc.edu/>

**Partners:** Royce Wagner, Inc.

#### **2. ADD Kids: Go Out and Play—ADD symptoms Are Relieved After Spending Time in Nature**

**Description:** Flyer (also available in the following forms: one-page graphic and blurb, PowerPoint presentation, scientific journal articles, and four-page technical bulletin—all available on CD and also for download from the Web site below).

**Benefits:** Two surveys of parents of children with attention-deficit/hyperactivity disorder (AD/HD) have shown that performing activities in green settings can reduce the symptoms of AD/HD, which affects up to 7 percent of children. These behaviors often result in family conflict, peer rejection, and academic failure. Current treatments, drugs, and behavioral therapy do not work in all cases and, in many cases, offer only limited relief. Adding trees and greenery near homes and schools and encouraging kids with AD/HD to go outside may help supplement established treatments to improve their capacity for functioning.

**Funded by:** University of Illinois, USDA Hatch; U&CF challenge cost-share program.

**Location:** Landscape and Human Health Laboratory, University of Illinois, Urbana, IL.  
<http://www.lhhl.uiuc.edu/>

**Partners:** Royce Wagner, Inc.

#### **3. Girls and Greenery—Girls With a Home View of Nature Score Higher on Tests of Concentration and Self-Discipline**

**Description:** Flyer (also available in the following forms: one-page graphic and blurb, PowerPoint presentation,

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scientific journal articles, and four-page technical bulletin—all available on CD and also for download from the Web site below).

**Benefit:** In a study conducted in a Chicago public housing development, girls who lived in apartments with greener, more natural views scored better on tests of self-discipline than those living in more barren but otherwise identical housing. Boys showed no link between test scores and the amount of nature near home, most likely because they spend less time playing near home and are then less affected by the environment around it. Self-discipline is an important personal characteristic. The greater a girl's self-discipline, the more likely she is to do well in school, to avoid unhealthy or risky behaviors, and to behave in ways that make life success more likely. Maintaining trees and greenery at home may foster in girls the self-discipline they need to succeed.

**Funded by:** University of Illinois, USDA Hatch; U&CF challenge cost-share program.

**Location:** Landscape and Human Health Laboratory, University of Illinois, Urbana, IL.

<http://www.lhhl.uiuc.edu/>

**Partners:** Royce Wagner, Inc.

#### 4. **Green Relief—Trees Ease Poverty's Burden in Inner City Neighborhoods**

**Description:** Flyer (also available in the following forms: one-page graphic and blurb, PowerPoint presentation, scientific journal articles, and four-page technical bulletin—all available on CD and also for download from the Web site below).

**Benefits:** In a study conducted in a Chicago public housing development, women who lived in apartment buildings with trees and greenery immediately outside reported greater effectiveness and less procrastination in dealing with their major life issues than those living in barren but otherwise identical buildings. In addition, the women in greener surroundings found their problems to be less difficult and of shorter duration. Thus it seems that trees help

poor inner city residents cope better with the demands of living in poverty, feel more hopeful about the future, and manage their most important problems more effectively.

**Funded by:** University of Illinois, USDA Hatch; U&CF challenge cost-share program.

**Location:** Landscape and Human Health Laboratory, University of Illinois, Urbana, IL.

<http://www.lhhl.uiuc.edu/>

**Partners:** Royce Wagner, Inc.

#### 5. **Cooler in the Shade—Aggression and Violence Are Reduced With Nature Nearby**

**Description:** Flyer (also available in the following forms: one-page graphic and blurb, PowerPoint presentation, scientific journal articles, and four-page technical bulletin—all available on CD and also for download from the Web site below).

**Benefit:** In a study conducted in a Chicago public housing development, women who lived in apartment buildings with trees and greenery immediately outside reported committing fewer aggressive and violent acts against their partners in the preceding year than those living in barren but otherwise identical buildings. In addition, the women in greener surroundings reported using a smaller range of aggressive tactics during their lifetime against their partner.

**Funded by:** University of Illinois, USDA Hatch; U&CF challenge cost-share program.

**Location:** Landscape and Human Health Laboratory, University of Illinois, Urbana, IL.

<http://www.lhhl.uiuc.edu/crime.htm>

**Partners:** Royce Wagner, Inc.

#### 6. **Nice To See You—How Trees Build a Neighborhood**

**Description:** Flyer (also available in the following forms: one-page graphic and blurb, PowerPoint presentation, scientific journal articles, and four-page technical bulletin—all available on CD and also for download from the Web site below).

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**Benefits:** Residential common areas with trees and other greenery help to build strong neighborhoods. In a study conducted at a Chicago public housing development, residents of buildings with more trees and grass reported that they knew their neighbors better, socialized with them more often, had stronger feelings of community, and felt safer and better adjusted than did residents of more barren but otherwise identical, buildings.

**Funded by:** University of Illinois, USDA Hatch; U&CF challenge cost-share program.

**Location:** Landscape and Human Health Laboratory, University of Illinois, Urbana, IL.

<http://www.lhhl.uiuc.edu/crime.htm>

**Partners:** Royce Wagner, Inc.



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## Appendix B: Transferring the Technology

### Pacific Southwest Research Station

Center for Urban Forest Research

Davis, CA

530-759-1700

**Technology Transfer Specialist:** Position Vacant

<http://www.fs.fed.us/psw/programs/cufr/>

#### **About the Center:**

The center conducts both research and technology transfer with Pacific Southwest Research Station staff. The center's vision is sustainable communities that are better off today than yesterday. Through technology transfer the center intends for communities to have an increased understanding and appreciation of the urban forest and choose to make an investment in the care and maintenance of community trees to ensure continued health of the urban forest.

#### **Technology Transfer Products (most recent/successful):**

##### **1. Published Reports**

The center publishes research findings in journals, conference proceedings, and periodicals as well as General Technical Reports and dissertations. These reports describe the research methodology, present the findings, and discuss the value of the results to urban forestry.

<http://www.fs.fed.us/psw/programs/cufr/publications.php>

- McPherson, E.G. 2006. [Getting More Than We Pay For](#). City Trees: January/February: 9-12.
- Linsen, L., Karis, B.J., McPherson, E.G., and B. Hamann. 2005. [Tree growth visualization](#). The Journal of WSCG. 13:81-88.
- McPherson, E.G. 2005. [Trees with benefits](#). American Nurseryman. 201(7):34-40.
- McPherson, E.G., James R. Simpson, Paula J. Peper. 2005. [Municipal Forest Benefits and Costs in Five US Cities](#). Journal of Forestry.

- Linsen, L; Karis, B.J.; McPherson, E.G.; Hamann, B. 2005. [Tree Growth Visualization](#). In: Skala, V. (ed) Proceedings of the 13th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision, WSCG 2005, UNION Agency—Science Press, Plzen, Czech Republic. 8 pp.
- Harding, J., E.G. McPherson, S. Mezger, M.L. Flint, S. Dreistadt. 2005. [UC Davis is Testing 14 Elm Varieties](#). CORF News. Fall.
- McPherson, E.G., J. Muchnick. 2005. [Effects of Street Tree Shade on Asphalt Concrete Pavement Performance](#). Journal of Arboriculture. 31(6): 303-310.

##### **2. Newsletters/Updates**

The center produces a quarterly newsletter that discusses current research findings and other timely research products at the center. They are e-mailed to customers as a hyperlink.

<http://www.fs.fed.us/psw/programs/cufr/newsletter.shtml>

- Demystifying Reference Cities—the power behind STRATUM.
- Making research work for you: the story of Greenprint.
- Fire prevention in the wildland-urban interface.
- Replace field surveys with AVIRIS infrared imagery. Can we?
- Air pollution control—the tree factor.
- What are your trees relative performance index?
- STRATUM in Action.

##### **3. Research Summaries**

Research summaries are four-page documents that provide a quick look at a research project, and its findings, in an easy-to-read, comprehensible format.

[http://www.fs.fed.us/psw/programs/cufr/research\\_summaries.php](http://www.fs.fed.us/psw/programs/cufr/research_summaries.php)

- Trees—The Air Pollution Solution.

- The Large Tree Argument—The case for large-stature trees vs. small-stature trees.
- Is All Your Rain Going Down the Drain?
- Where Are All the Cool Parking Lots?
- Where's the Fire?
- Green Plants or Power Plants?
- Save Dollars with Shade.

#### 4. Fact Sheets

One-page fact sheets provide a quick reference to urban forestry research facts. They are designed to be photocopied and distributed.

<http://www.fs.fed.us/psw/programs/cufr/fact.php>

- Tools for Quantifying Climate-related Effects of Trees on Urban Forest Benefits.
- How to Prepare for a Budget Cut.
- Control Stormwater Runoff with Trees.
- Making Parking Lots More Tree Friendly.

#### 5. Presentations

The presentations are PowerPoint talks that center researchers and staff have given at various conferences, workshops, etc.

<http://www.fs.fed.us/psw/programs/cufr/presentations.php>

- **Benchmarking the Health of Your Municipal Forest**  
Speaker: McPherson, E.G.  
International Society of Arboriculture National Conference
- **Urban Forest Research in the Northeast: The Northeast Community Tree Guide and the NYC Municipal Forest Resource Analysis**  
Keynote speaker: Paula J. Peper  
New York ReLeaf Conference
- **How Much Economic Value Does a Park and Recreation System Bring to a City?**  
Speaker: Greg McPherson  
Urban Parks Summit

- **Effects of Tree Cover on Microclimate**

Speaker: Kelaine Vargas

International Society of Arboriculture, Southern Chapter Annual Conference

- **“Selling” Urban Forestry in Your Town**

Speaker: Shelley Gardner

Missouri Community Forestry Council Annual Conference

- **Tree Benefits: Adding Value to California Landscapes**

Speaker: Greg McPherson

California Landscape Contractor's Landscape Industry Show

- **Midwest Community Tree Guide**

Speaker: Jim Geiger

Wisconsin Arborist Association Annual Conference and Trade Show

- **Obtaining an Investment in Community Trees**

Speaker: Jim Geiger

Wisconsin Urban Forestry Conference

#### 6. Models

The center has produced various computer models that can be used by communities, individuals, and private consultants to make informed decisions regarding urban forest management.

- **STRATUM**—An easy-to-use, computer-based program that helps communities assess the benefits of their street trees.  
<http://www.itreetools.org>
- **ecoSmart**—A Web-based program designed to evaluate the economic tradeoffs between different landscape practices on residential parcels.  
<http://www.ecosmart.gov/>
- **Tree Growth Visualization**—This model provides visual representation of the growth of a prototypical tree of certain species. It looks realistic but, more importantly, conforms to real, measured data.  
[http://www.fs.fed.us/psw/programs/cufr/products/cufr\\_532\\_tree\\_growth\\_wscg.pdf](http://www.fs.fed.us/psw/programs/cufr/products/cufr_532_tree_growth_wscg.pdf)

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## 7. Municipal Forest Resources Analyses

These reports provide detailed knowledge on a particular city's tree resource. They include urban forest structure, function, and value along with resource management needs. A summary of annual benefits is provided that includes energy conservation, air quality, stormwater runoff control, and property value increase.

[http://www.fs.fed.us/psw/programs/cufr/research/studies\\_detail.php?ProjID=151](http://www.fs.fed.us/psw/programs/cufr/research/studies_detail.php?ProjID=151)

- City of Charleston, SC, Municipal Forest Resource Analysis.
- City of Glendale, AZ, Municipal Forest Resource Analysis.
- City of Berkeley, CA, Municipal Tree Resource Analysis.
- City of Charlotte, NC, Municipal Forest Resource Analysis.
- City of Boulder, CO, Municipal Tree Resource Analysis.
- City of Minneapolis, MN, Municipal Tree Resource Analysis.
- City of Cheyenne, WY, Municipal Tree Resource Analysis.

## 8. Tree Guides

Tree Guides identify and describe the benefits and costs of planting trees in a specific climate region to assist community officials and tree managers increase public awareness and support for tree programs.

[http://www.fs.fed.us/psw/programs/cufr/tree\\_guides.php](http://www.fs.fed.us/psw/programs/cufr/tree_guides.php)

- Midwest Community Tree Guide: Benefits, Costs, and Strategic Planting.
- Piedmont Community Tree Guide: Benefits, Costs, and Strategic Planting.
- Desert Southwest Community Tree Guide: Benefits, Costs, and Strategic Planting.

- Northern Mountain and Prairie Community Tree Guide: Benefits, Costs, and Strategic Planting.
- Western Washington and Oregon Community Tree Guide: Benefits, Costs, and Strategic Planting.

## 9. News Briefs

News briefs are sent to center customers when things occur at the center that are newsworthy but beyond the scope of the newsletter.

<http://www.fs.fed.us/psw/programs/cufr/briefs.php>

- What is Benefit-Cost Research?
- ecoSmart-Fire is the New Computer Tool to Make Your Home Safe.
- Are You Struggling “Selling” Large Trees to Your Community?
- Can Community Trees be Capital Assets?

## 10. Press Releases

Press releases are designed for the press to alert them of new research. They are also given to customers to use with their local media when research is conducted in their city.

<http://www.fs.fed.us/psw/programs/cufr/press.php>

- Trees in the Piedmont Climate Zone Vastly Improve Quality of Life.
- Trees in Charlotte Pay Huge Dividends.
- Trees Equal Clean Air According to New Research—Arbor Day is perfect time to plant more.
- New Computer Model Makes North Vancouver Trees a Higher Priority.
- Trees in Bismarck are a Wise Investment.
- Fire Hazard Ratings in South Lake Tahoe May Not Protect Homeowners.

## 11. Promotional Items

The center takes advantage of opportunities to get the word out when approached by reporters, national newsletters, National Public Radio (NPR), etc.



- In His Own Words A Conversation With James R. Geiger—Maximizing the Nation’s Benefits from Urban Forests.  
<http://www.fs.fed.us/sustained/special-feature-fall-2006.html>
- Los Arboles? NPR’s Living on Earth: “Los Angeles will soon announce a program to plant one million trees in the city. Living on Earth’s Ingrid Lobet examines the historic roots and green future of tree planting in L.A.” Listen to the discussion with Greg McPherson and others (Air Date: Week of July 14, 2006).  
<http://www.loe.org/shows/segments.htm?programID=06-P13-00028&segmentID=2>

## 12. Training/Workshops

The center is often asked to provide hands-on training of research results so that customers can obtain a better understanding of how to apply the research to their unique situation in their community or consulting practice.

- STRATUM Workshop, March 2005  
Provided a hands-on experience for participants while they explored topics in: street tree management, resource structure and benefit-cost analyses using STRATUM and i-Tree Software Applications.
- Right-of-Way Workshop, May 2006  
The focus of the workshop was to identify the issues, solutions, and research associated with developing standards that integrate gray and green infrastructure in Right-of-Way design as well as the work that will be required to achieve this goal.

## 13. Customer Service

Center staff responds to individual requests from homeowners, reporters, urban forestry professionals, etc. by providing answers to questions and other appropriate information that helps them to do a better job or extend center and other Forest Service research science-based knowledge to their customers. The following are typical examples of requests and questions:

- Requests for STRATUM information.
- Request for ecoSmart information.

- Need for regional specific tree data.
- Arborist related questions that require a referral.
- Requests for publications or presentations.

## 14. LISTSERV e-mailing

Subscription to this electronic mailing list provides customers with an electronic quarterly newsletter, periodic news briefs, and other center correspondence. To become part of the LISTSERV, go to <http://www.treelink.org/ufr/>.

## 15. Web Site

The center’s primary method of outreach and transfer of knowledge is through the Web site. Background on the center and all the center’s products can be found on the site through the following links: What we do, Our research, Our products, Newsletters, News briefs, Press info, STRATUM, Trees in our city, Upcoming speeches, and Past speeches.

<http://www.fs.fed.us/psw/programs/cufr/>

## Northeastern Area (State & Private Forestry)

Midwest Center for Urban and Community Forestry  
St. Paul, MN

Mid-Atlantic Center for Urban and Community Forestry  
La Plume, PA

### Technology Transfer Specialists:

Jill Johnson, Midwest Center Coordinator, 651-649-5253  
Donna Murphy, Mid-Atlantic Center Coordinator, 570-945-8095  
<http://www.na.fs.fed.us/urban/index.shtm>

### About the Centers:

The centers are not directly affiliated with a research station. Each center is a collaboration of staff and partners (State agencies, urban forestry instructors, researchers, practitioners, and nonprofit organizations) within the region. The purpose is to facilitate the exchange of knowledge and innovation that address urban and community forestry issues. This exchange is achieved by working to accomplish the following:

- Increase awareness of and access to existing informational resources.
- Deliver innovative tools and techniques.
- Communicate research findings.
- Encourage development of research projects that address the most pressing issues faced by practitioners.

**Technology Transfer Products (most recent/ successful):**

**1. Center Products**

The centers use input from external advisors (such as State agencies, universities, nonprofit organizations, and practitioners) to identify information needs and potential projects to address those needs. This input is used to help prioritize projects that are completed internally, a collaboration with external partners, or funded by grants to external partners.

- Seasonal Care Calendar—poster and magnet.
- [Landscape Tree Factsheets](#)—CD and book. Purchase the book from [Penn State University Extension](#). Purchase the CD from Henry Gerhold at 814-865-3281 or [hdg@psu.edu](mailto:hdg@psu.edu).
- Streetscape Design—Video and CD. Purchase from [University of Massachusetts Extension](#).
- [Crabapples for Midwestern Landscapes](#)—booklet. Purchase from Iowa State University Extension at 515-294-5247.
- [Planting Trees and Shrubs for Long-term Health](#)—Booklet. Purchase from U of MN Extension.
- [Anti-topping Campaign](#)—Brochure, folder, and ad campaign.
- [A Practitioner's Guide to Stem Girdling Roots](#)—Booklet. Also available for purchase from University of Minnesota Extension at the above Web address or 1-800-876-8636.

- [Preventing Stem Girdling Roots](#)—Video. Purchase from ISA at 1-888-ISA-TREE or on line from the [International Society of Arboriculture](#).
- [Urban Tree Risk Management: A Community Guide to Program Planning and Design](#)—3-ring binder or CD.
- [Trees and Ice Storms: The Development of Ice-storm Resistant Urban Tree Populations](#), 1st and 2nd editions—Booklet.
- [TreeOrd](#)—Software. Purchase from Tree Trust. NOTE: Check with your State U&CF coordinator to see if a copy is available to borrow.
- [Community Tree Planting Guide](#)—3-ring binder. Purchase printed copies from the [Tree Trust](#).
- Midwest Emerald Ash Borer Symposium Compendium—CD.
- [Tree Emergency Manual for Public Officials](#)—Booklet.
- [Tree Emergency Planning Worksheet](#)—Worksheet.
- Storm Preparedness and Response Resource Center—Web site.
- Storm Damage Assessment Protocol—Booklet.
- [Mobile Community Tree Inventory \(MCTI\)](#)—Public domain software.
- An Inventory Manual for Volunteers—Booklet.
- [A Guide: Completing an Inventory of Urban Park Trails](#)—Booklet.
- [A Guide: Developing a Street and Park Tree Management Plan](#)—Booklet.
- [Urban & Community Forestry Appreciation Toolkit](#)—Folder and CD.
- [Trees Pay Us Back](#)—Web site.
- [Chicago Wilderness Invasive Species Roundtable: Woodlands](#)—Booklet.

- [Urban Forestry Lab Exercises for Elementary, Middle, and High School Students](#)—Lab exercises.
- [WISE Gypsy Moth Curriculum](#)—Online education for grades 9-12.  
NOTE: Users must create an account to use the site (free educational account).
- [Northern Trees](#)—Online species selection tool.
- [Planting Trees in Designed and Built Community Landscapes](#)—Booklet. NOTE: one free copy can be ordered from this Web site.
- [Lawnmower Damage Prevention](#)—Poster.
- [Conserving Wooded Areas in Developing Communities](#)—Booklet.
- [Utilizing Municipal Trees: Ideas from Across the Country](#)—Soft-cover book.
- [i-Tree](#)—Public domain software.
- [Storms Over the Urban Forest: Planning, Responding, and Regreening—A Community Guide to Natural Disaster Relief](#)—Soft-cover book.
- Dialogue on Diversity—Booklet.
- [Recipe for Reaching Out](#)—Recipe card.
- [Protect Our Urban Forests](#)—CD and workbook.
- [Urban Watershed Forestry Manual](#).

## 2. **Compilation and Repackaging of Existing Resources**

- [Informational Resources](#) Web site.
- [Trees Pay Us Back](#) Web site.
- Inventory Tools CD.
- Urban Tree Risk Management Resource Center CD.
- Storm Preparedness and Response Resource Center—Web site.

## 3. **Presentations**

- **New Forest Service Tools in Urban Forestry**  
Speaker: Donna Murphy  
PA Urban Forestry Conference, 2006, 2004
- **Urban Forestry Considerations for Landscape Architects**  
Speaker: Donna Murphy  
WV ASLA 2005, 2006
- **Impacts of Invasive Plants (Regional use)**  
Speaker: Donna Murphy  
Five-part, 3-day training module for high school teachers, Keystone College (supporting poster), 2006
- **Urban Tree Risk Assessment PowerPoint**  
Speakers: D. Murphy, M. Galvin, Dr. Martin Mackenzie  
Adapted for the Mid-Atlantic Area.  
Risk Assessment Training workshops in Maryland, Delaware, and Pennsylvania
- **Electronic Tree Risk Calculator (ETRAC)—Overview and Use**  
Speaker: Donna Murphy  
Beta Testing, Delaware Center for Horticulture 2005
- **Fire Performance Tree Selector Tool for Urban Foresters and Firewise Professionals**  
Speaker: Larry Steward  
Prepared by Mid-Atlantic Center for Urban and Community Forestry (MACUCF)  
Mid-Atlantic Compact Firewise Conference 2005
- **In the Palm of Your Hand (Intro to PDAs and use in urban forestry)**  
Speaker: Jill Johnson  
Des Moines Inventory Training, Michigan Great Lakes Trade Exposition, Missouri Community Forestry Conference, Minnesota Workshop on Disaster Preparedness and Response
- **Inventory Tools**  
Speaker: Jill Johnson  
Midwest Chapter ISA Conference, Maine and Vermont Inventory Workshops

- **Resources for a Green Community** (highlighting some of the best informational resources currently available, but largely unknown, by topic)

Speaker: Jill Johnson

New England Chapter ISA Conference, Northeastern Illinois Municipal Foresters Organization, Minnesota Shade Tree Short Course

- **Tools for Storm Preparedness and Response**

Speaker: Jill Johnson

Missouri Storm Preparedness and Response Workshops

- **Storm Mitigation**

Speaker: Jill Johnson

Missouri Storm Preparedness and Response Workshops, Illinois Tree City USA Conference

- **i-Tree Overview**

Speaker: Jill Johnson

Michigan Forestry and Parks Association Conference

- **Risk Calculator**

Speaker: Jill Johnson

Urban Tree Risk Management Workshop, ISA Tree Academy—Community Tree Risk Management

#### 4. Newsletters/Updates

The Mid-Atlantic Center, in partnership with the Morgantown Field Office, produces a quarterly newsletter “Urban Projects” that shares current Forest Service grant projects, State highlights, center work, research and new TT tools, and a calendar of events.

<http://www.na.fs.fed.us/urban/newsltr/archives.shtm>

The Urban projects newsletter is archived by volume, not topic.

The Midwest Center provides updates on State Urban Forestry Coordinator and Volunteer Coordinator conference calls and distributes new resources in periodic mailings to newsletter editors and primary partners in State agencies, universities, nonprofit organizations, and professional organizations.

#### 5. Fact Sheets

Mid-Atlantic Center fact sheets are only for the Appreciation Tool Kit. They were created to provide a quick reference to urban forestry research facts. They are designed to be photocopied and distributed. Midwest Center fact sheets summarize recently completed technology transfer projects and projects currently in progress.

#### 6. Promotional Items

The centers take advantage of opportunities to get the word out when approached by reporters, national newsletters, NPR, etc. The Midwest Center was recently interviewed by a reporter from Buffalo, NY, regarding advice to homeowners after tree damage from heavy snow.

#### 7. Training/Workshops

The centers are often asked to provide hands-on training so that customers can obtain a better understanding of how to apply the research/technology transfer to their unique situation in their community or consulting practice.

- **Urban Tree Risk Assessment Training (2003–2005)**

In conjunction with MWCUCF and Forest Service Health Management program replicated and delivered Urban Tree Risk Training regional training in Maryland, Delaware, and in Pennsylvania. Portions of the training have been replicated six times throughout the Mid-Atlantic reaching more than 400 individuals.

**Partners:** University of Maryland, Maryland Department of Natural Resources (DNR), Forest Service Forest Health Management program, Delaware Department of Agriculture Forest Service, Delaware Center for Horticulture, and Penn State Cooperative Extension.

- **Tree Autopsy Workshops (2003–2004)**

Developed and transferred tree autopsy workshops to fill a need for a level of diagnostic training learned only through years of field experience. The workshops were so well received that New Jersey and Pennsylvania have requested to replicate the workshops in 2003.

**Partners:** Maryland DNR and Ohio DNR, Savage River State Forest, City of Toledo, Ohio, Penn State Cooperative Extension, Awbury arboretum, Philadelphia, and TreeRadar, Inc.

- **Urban Forestry GIS Symposium (2002)**  
Developed an information-sharing forum on how GIS technologies are being used to better manage urban forests in the Mid-Atlantic area.

**Partners:** Delaware Department of Agriculture, Northeast Research Station, New Jersey Forest Service, and Maryland DNR.

- **Media Communications Workshop, Morgantown Field Office (2001)**  
Developed training that focused on effective message preparation and delivery, press writing skills, and interview techniques using video taped interviews to prepare participants to better deliver program messages, build relationships with the media, and avoid common interview mistakes.

## 8. Pilot Workshops

The Midwest Center has helped develop and deliver pilot workshops on priority topics. The intention of the pilot is to provide the partner organization and participants with a model agenda, the necessary resources, and technical skills to deliver additional workshops in the future with limited Forest Service involvement. This strategy worked very well for the Urban Tree Risk Management and Storms workshops, which several different organizations have given annually. In addition, several participants received scholarships with the agreement that they would either implement a technology presented at the workshop or give a presentation to others on one of the workshop topics. This strategy, too, has been very effective.

- **Urban Tree Risk Management Workshop (2003)**  
A 3-day, train-the-trainer workshop hosted in conjunction with the University of Minnesota.
- **Storm Preparedness and Response Workshop (2003–2004)**  
A 1-day workshop hosted in conjunction with the Missouri Department of Conservation.
- **Tree Inventories Workshop (2004–2005)**  
Several 1-day workshops hosted in conjunction with the Indiana Department of Natural Resources (in addition, assisted with workshops in Maine and Vermont).

- **Technology You Can Use (2004)**  
A half-day workshop on using Personal Digital Assistants (PDAs) and Tablet PCs held as a pre-conference workshop as part of the Wisconsin Arborist Association's Annual Conference. A 2-1/2-day workshop on new computer technologies available for urban forest inventories, risk management, and storm preparedness and response. It was held in conjunction with the University of Wisconsin—Stevens Point.
- **Building Effective Partnerships (2004)**  
A 1-day workshop held in conjunction with the National Arbor Day Foundation.

## 9. Customer Service

Center staff responds to individual requests from homeowners, reporters, urban forestry professionals, etc., by providing answers to questions and other appropriate information that helps them to do a better job or extend knowledge to their customers. Inventory software, types of PDAs, and value of trees are the most common kinds of questions.

## 10. Research Summaries

Research summaries are documents that provide a quick look at a research project, and its findings, in an easy-to-read, comprehensible format.

- Trees Pay Us Back—brochure.

## 11. Models

The Mid-Atlantic Center has helped develop various computer models that can be used by communities, individuals, and private consultants to make informed decisions regarding urban forest management.

- Oversaw Phase II ETRAC Development and Beta Testing.
- Worked with research to beta test UFORE handheld collection freeware and provided comments for UFORE City of Scranton.

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## 12. Research-Related Work

- National Arboretum Urban Utility Adapted Nursery and Out-Planting—currently working with the U.S. National Arboretum to field test tree cultivars better adapted to urban and utility environments.  
**Partners:** Maryland DNR Power Plant Research program, DC Urban Forestry Administration, Baltimore Gas & Energy, PEPCO, Maryland DNR, University of Maryland, and Penn State School of Forest Resources.  
**Deliverables:** Statistical Report, Dr. Marla McIntosh.  
**Project Profile:** Donna Murphy. Power Trees Web site: National Arboretum.
- UFORE Analysis of Morgantown, West Virginia—the study revised data collection protocols to reflect the needs of smaller cities.  
**Partners:** WV University, Morgantown WV Shade Tree Commission  
**Products:** Report, Dr. Dave Nowak, 2003.

## Northern Research Station

Urban Natural Resources Institute  
Amherst, MA  
413-545-3755

**Technology Transfer Specialist:** Dave Bloniarz, Coordinator  
<http://www.unri.org/>

### **About the Center:**

The Urban Natural Resources Institute (UNRI) is an initiative of the Forest Service, U.S. Department of Agriculture (USDA), Northern Station, which serves as a point of contact for focused research, development, and information exchange on urban natural resource management. The institute consists of Forest Service scientists who are conducting science-based research on urban natural resource issues throughout the region. The resources of the institute are located in various units of the Northern Research Station and include State, university, municipal, and commercial partners focusing on scientific study of urbanized landscapes. The institute works toward increasing

the coordination, distribution, and accessibility of science-based tools, products, and initiatives within the Northeast.

UNRI works with a variety of clients and stakeholders to assist them with implementing models, tools, and other technology for urban forest stewardship. The institute's scientists serve to promote technology transfer of U&CF scientific knowledge through working relationships and information networks with State, local, and industry partners. The institute serves as a conduit and liaison between Forest Service researchers and its primary partners and cooperators. Using the Internet and state-of-the-art communication tools, the institute provides the principal technology transfer mechanism for urban forest research in the Northeast.

### **Technology Transfer Products (most recent/successful):**

#### **1. Published Reports**

The institute publishes research findings in journals, conference proceedings, and periodicals as well as General Technical Reports and dissertations. These reports describe the research methodology, present the findings, and discuss the value of the results to urban forestry.

<http://www.unri.org/learning/other/publications.shtml>

- Jahnige, P., D. Bloniarz, H.D. Ryan & M. O'Loughlin. 2006. *Community Guide: Urban & Community Forestry Inventories*. Massachusetts Dept. of Conservation & Recreation. pp 22.
- Ryan, H. D., C. Rooney, B. Kane & D. Bloniarz. 2005. *Urban Forestry: Windshield Survey Reliability*. Tree Care Industry 16 (10) 24–29.
- Ryan, H. D., B. Kane & D. Bloniarz. 2005. *DBH vs. Caliper*. UMass Coop. Ext. HORT NOTES. 16 (15) : pp 3. (Also published in MAA NEWS, Winter 2006. pp 13; and NEC-ISA Newsletter, Winter 2006. p 7-8).
- Rooney, C., H. Ryan, D. Bloniarz and B. Kane. 2005. *The Reliability of a Windshield Survey to Locate Hazards in Roadside Trees*. Journal of Arboriculture 31: 89-94. (Also published in Trees on Maine Street, summer 2005. p 1–4.)

- Doherty, K., D. Bloniarz & H. D. Ryan. 2003. *Positively the Pits!* Tree Care Industry 14 (11) 34–42.

## 2. Research Summaries

- **UNRI Timely Topic Briefs**—These briefs highlight the work of UNRI scientists in a variety of topic areas. The latest tools, research findings and upcoming initiatives are outlined in these useful briefs. They are summaries of the important work that is being completed throughout the Northeast, and beyond, by UNRI scientists, collaborators and partners.  
<http://www.unri.org/learning/other/timely.shtml>
- **UNRI Scientists at Work**—The institute’s scientists serve to promote technology transfer of U&CF scientific knowledge through working relationships and information networks with State, local, and industry partners. The work of UNRI scientists is outlined in the “UNRI Scientists at Work” series of profiles provided at the UNRI Web site.  
<http://www.unri.org/learning/other/atwork.shtml>
- **UNRI Scientists Directory**—Working with partners and collaborators at many levels, UNRI scientists are studying urban and community forest resources in an effort to enhance the value of these landscapes to urban residents. A directory of UNRI Scientists is available on line, presenting a one-stop listing of Northern Research Station scientists who are working on Urban Natural Resources Stewardship and Urban Forestry research.  
<http://www.unri.org/resources/partners/>

## 3. Presentations

Throughout the year, UNRI delivers a number of presentations and lectures that discuss the work of UNRI scientists, current research topics, and new tools that are available to urban foresters and arborists. Many of the presentations, which have been archived as PowerPoint files, include talks that institute researchers and staff have given at various conferences, workshops, and so on.

<http://www.unri.org/learning/presentations.shtml>

- **Utilization of Community Volunteers in Urban Forest Inventories**  
Speaker: Dave Bloniarz

Trustees of Reservations Annual Managing Lands & Visitors Conference  
Leominster, MA  
May 2006

- **Urban Tree Risk Management**

Speaker: Dave Bloniarz  
New York State ReLeaf Annual Conference  
Long Island University  
July 2006

- **The i-Tree Software Suite of Inventory & Modeling Tools**

Speaker: Dave Bloniarz  
New York State ReLeaf Annual Conference  
Long Island University  
July 2006

- **Utilization of Community Volunteers in Urban Forest Inventories**

Speaker: Dave Bloniarz  
University of Massachusetts  
May 2006

- **i-Tree: More Than Just a Name**

Keynote Speaker: Dave Bloniarz  
Massachusetts Tree City USA Forum  
Worcester, MA  
April 2006

- **Urbanization and Wildlife: Conflict or Opportunity?**

Speaker: Dave Bloniarz  
University of Massachusetts  
November 2006

- **Personal Digital Assistants: An Overview**

Speaker: Dave Bloniarz  
University of Massachusetts  
May 2006

## 4. e-News

The institute produces a bimonthly newsletter that discusses the latest research findings related to urban forests and natural resource management. They are available on the institute Web site.

<http://www.unri.org/learning/web/mail.shtml>



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## 5. Promotional Items

The institute takes advantage of opportunities to get the word out when approached by reporters, national newsletters, NPR, and so on, and has prepared several items that can be used to promote the institute, including electronic informational postcards that are distributed on a regular basis.

<http://www.unri.org/learning/postcards.shtml>

- UNRI—Announcement Poster.
- Living Memorials Project—Informational Postcard.
- Tree Decay—Informational Postcard.
- UNRI/IUFRO—Informational Postcard.

## 6. Fact Sheets

These one-page fact sheets provide a quick reference to urban forestry research facts. They are designed to be printed, photocopied, or electronically distributed.

<http://www.umass.edu/urbantree/factsheets/index.shtml>

Available Fact Sheets:

[Hazard Mitigation.](#)

[Community Tree Selection.](#)

[Tree Inventory.](#)

[Citizen-based Groups.](#)

[Hazard Evaluation.](#)

[Training Young Trees.](#)

[Buying Quality Trees.](#)

[Tree Ordinance.](#)

[Mulching Trees.](#)

[Staking Trees.](#)

[Evaluation Trunk Cavities.](#)

[Underwire Trees.](#)

[Fertilizing Trees.](#)

[Predicting Limb Breakage.](#)

[Street Tree Cultivars.](#)

[Managing Storm Damaged Trees.](#)

[Root Damage.](#)

[Road Salt.](#)

[Shade Tree Anthracnose.](#)

[Borers.](#)

[Micronutrients.](#)

[Trees and Sidewalks.](#)

[Common Maple Problems.](#)

[Bareroot Tree Planting.](#)

[Wood-decay Fungi.](#)

[Kill a Stump.](#)

[Storm Damage Resources.](#)

[Native Trees.](#)

[Setback Planting.](#)

[Tree Care Standards.](#)

[Citizen Workers.](#)

[Computer Tree Care.](#)

[Maintenance Pruning.](#)

[Girdling Roots.](#)

[Co-dominant Stems.](#)

[Cabling and Bracing.](#)

[Preserving Trees.](#)

## 7. Training/Workshops

The institute is often asked to provide hands-on training of research results so that customers can obtain a better understanding of how to apply the research to their unique situation in their community or consulting practice. For the past year, the focus of the workshops and training has been on the components of the [i-Tree Software Suite](#) of products, developed by the Forest Service and its partners. In addition to the major 2-day i-Tree workshops that were held at Clemson, SC, Golden, CO, and Minneapolis, MN, other trainings have been initiated including Risk Tree Assessment, the Use of PDAs in the Field, Storm Planning and Preparedness, the Use of Community Volunteers, Risk Tree Assessment and Management, and Streetscape Design Alternatives.

<http://www.unri.org/learning/workshops.shtml>

- Storms Over the Urban Forest, Rhode Island Tree Council. Sept 2006.
- Landscape Tree Risk Assessment Workshop, Penn State Univ. July 2006.
- Community Tree Inventories, NYS DEC, Stoney Kill, NY. June 2006.
- Workday on Developing UF Management Plans, CT, New Haven, CT. June 2006.



- i-Tree Academic Workshop Series, University of Massachusetts, Amherst, MA. Oct.–Nov. 2006.

## 8. e-Learning Webcasts

Institute scientists host monthly online educational presentations on timely topics and current research and development initiatives. These Webcasts can be joined from the convenience of your own desk, via the Internet and a telephone. The user logs into the UNRI Webcast Web site on the Internet for the visual component of the presentation and then calls the toll-free telephone number to participate in the audio portion of the call.

<http://www.unri.org/learning/web/webcast.shtml>

- **December 2007**  
Urban Forestry and Human Benefits with Kathleen Wolf, Ph.D., Research Director, University of Washington.
- **November 2007**  
Urban Greening in New York City: A Greener, Greater New York with Fiona Watt, Director of Forestry and Horticulture, New York City Parks and Recreation Department, New York City, NY.
- **October 2007**  
Using UFORE in Hartford, CT: A Practical Approach to Data Collection with Chris Donnelly, Urban Forestry Coordinator, Connecticut DEP, Hartford, CT.
- **September 2007**  
Early Pest Detection in Our Communities: The Role of the Municipal Arborist with Robert Benjamin, Outreach Coordinator, USDA APHIS, Lombard, IL.
- **March 2007**  
State Urban Forest Assessments with David J. Nowak, Eric Greenfield, and Jeffrey Walton, USDA Forest Service, Syracuse, NY.
- **February 2007**  
Urban Tree Canopy (UTC): New Approaches to Assessment, Management and Modeling with Morgan Grove, Ph.D., USDA Forest Service, Burlington, VT, and Jarlath O’Neil-Dunne, Ph.D., University of Vermont, Burlington, VT.

- **January 2007**

Handheld Computer Technology with Robert Sacks, Ph.D., Principal, Bluejay Software Associates, East Longmeadow, MA, and David Bloniarz, Ph.D., USDA Forest Service, Amherst, MA.

## 9. LISTSERV e-mailing

Subscription to this electronic mailing list provides a “daily digest” of postings related to urban natural resources stewardship. This LISTSERV is an electronic mailing list to which customers can post questions or announcements for distribution to the general urban natural resources community.

[listserv@unri.org](mailto:listserv@unri.org)

Membership registration at <http://lists.unri.org/>

Recent postings:

- Monthly abstracts of UNRI Informational Webcasts.
- Calendar of upcoming events of interest, including Web-based instructional workshops and seminars.
- Invitation to participate in [International Union of Forest Research Organizations \(IUFRO\)](#) partnership with UNRI.

## 10. Web-Based Exchange Forum

This Web-based bulletin and discussion board, facilitated by institute staff, promotes the timely exchange of knowledge related to urban natural resource stewardship. Participation in the Exchange Forum provides the opportunity to share interests, questions, research, and thoughts with other urban natural resource practitioners and interested partners.

<http://www.unri.org/boards/>

## 11. Customer Service

Institute staff respond to individual requests from homeowners, reporters, urban forestry professionals, etc., by providing answers to questions and other appropriate information that helps them to do a better job or extend institute research knowledge to their customers.

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Most recent requests:

- Emerald Ash Borer informational requests were responded to via the presentation of an UNRI Informational Webcast.
- Storm Damage informational requests also formed the foundation of an [UNRI Informational Webcast](#).

## 12. Models

The institute has produced various computer models that can be used by communities, individuals, and private consultants to make informed decisions regarding urban forest management.

- a. **[Mobile Community Tree Inventory \(MCTI\)](#)**—This software package includes computerized tools for data collection, archiving, analysis, and reporting of street tree inventory data. The goal of the Mobile Community Tree Inventory (MCTI) system was to design a tree inventory software application that could be distributed to arborists, tree managers, city foresters, and consultants at no cost via the Internet and have it packaged as a standalone program, requiring the purchase of no additional computer software.

**Description:** The MCTI system comprises three components, with each component building on the foundation of the previous level. The three levels include the following:

- Paper tally sheet template.
- Computerized desktop inventory program.
- PDA data collection program.

A firm, organization, or municipality needs to identify the level of MCTI capability they feel is appropriate for their needs and begin working with that MCTI component. Some organizations may have previous inventory experience and feel comfortable starting with the third level of the MCTI process; other organizations may want to start at the first step. MCTI is a component of the i-Tree Software Suite of inventory and assessment tools, developed by the Forest Service and its partners. <http://www.umass.edu/urbantree/mcti/>

### b. **[Storm Damage Assessment Protocol \(SDAP\) for](#)**

**[Urbanized Areas](#)**—This protocol introduces a standard method to assess widespread storm damage in a simple, credible, and efficient manner immediately after a severe storm. This assessment method is adaptable to various community types and sizes and it provides knowledge on the time and funds needed to mitigate storm damage.

**Description:** The SDAP includes a series of components that can be utilized by the user to estimate the total cost of cleanup associated with catastrophic storm or disaster events in a community. The protocol is designed to work using field data collected prior and following an event. The field data can be collected using software that operates on the Pocket PC platform, which is then synchronized to a Windows-based computer for analysis and modeling. A series of fiscal reports are generated, estimating the personnel, equipment and time needed to clean up from the storm. Additionally, a fiscal estimate of the costs is presented via the reporting system. SDAP is also a component of the i-Tree Software Suite of inventory and assessment tools.

<http://www.umass.edu/urbantree/assesindexpage.shtml>

- c. **[Community Tree Risk Assessment Calculator](#)**—The recently introduced manual, collection, and rating calculation has been done via paper and tally sheet. Now, a recently developed PDA and PC software system is available to make the data collection and analysis process more easily implemented by the end user.

**Description:** The data collection system has been automated through the development of a Pocket PC software program and a related desktop component. The BETA version of the software, developed at the Forest Service's Northeast Center for Urban & Community Forestry, is designed for use on a Pocket PC handheld PDA. Using the software, the user can seamlessly collect data in the field and download it to a database on a personal computer.

<http://www.umass.edu/urbantree/hazard/pda.shtml>

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### **Other Technology Transfer Initiatives:**

#### **1. Massachusetts Tree Count Inventory Program**

This initiative involves a cooperative partnership between UNRI, the Massachusetts Department of Conservation and Recreation, the city of Springfield, MA, the city of Worcester, MA, and the Davey Tree Expert Company. This project represents a cooperative venture that includes the implementation of a program that will serve as a national model for States, cities, and towns to follow as they undertake street tree inventories in upcoming years. It will provide a low-cost, affordable option for communities to archive street tree data and develop management plans for the trees found along their public ways.

The cities of Springfield and Worcester, MA, with grant funding from the Massachusetts Department of Conservation and Recreation, are working in cooperation with industry partners, Forest Service, and the DCR Urban and Community Forestry team to provide a Web-based computerized inventory system that will enable 45 Massachusetts cities and towns to use the same recording, archiving, and database system. This solution will enable economy of scale related to training, operation, and data distribution initiatives. From a research standpoint, this system will enable the analysis of data on a large number of urban centers in the State, in a simple, cost-effective manner.  
<http://www.unri.org/matreecount>

#### **2. UNRI-IUFRO Cooperative Technology Transfer Initiative**

This initiative provides UNRI members with an opportunity to learn more about the International Union of Forest Research Organizations (IUFRO) and how membership in this organization's Urban Forestry Working Division can provide an opportunity to network with top Urban Natural Resource researchers around the world.

UNRI and the IUFRO Urban Forestry Working Division share similar vision and goals that will help to achieve objectives by networking activities including the generation, exchange, and dissemination of scientific knowledge; the provision of access to relevant information; and the assistance to scientists and institutions to strengthen their research capacities.

The Urban Forestry Working Division of the International Union of Forest Research Organizations (IUFRO). IUFRO is "the" global network for forest science cooperation. It unites more than 15,000 scientists in almost 700 Member Organizations in more than 110 countries. Scientists cooperate in IUFRO on a voluntary basis. Its mission is to promote the coordination of and the international cooperation in scientific studies embracing the whole field of research related to forests and trees for the well-being of forests and the people that depend on them.

Ongoing urbanization of society has led to the increasing importance of urban green spaces as contributors to the quality of the urban environment and urban life across the globe. Forest and tree resources have a wide range of socio-cultural, economic, and environmental values. To optimize these values in a sustainable way, within the framework of a range of urban pressures and problems, integrated approaches and research for the planning design, selection, establishment, and management of urban forests and trees are asked for.

<http://www.unri.org/iufro>

### **Southern Research Station**

Urban Forestry South (Component of Centers for Urban and Interface Forestry)

**Athens, GA**

706-559-4236

**Co-Directors:** Dr. J. Michael Bowker, SRS-4952, and Ed Macie, U&CF Region 8

**Center Coordinator:** Dudley Hartel, 706-559-4236

**Technology Transfer Specialist:** Eric Keuhler, 706-559-4268  
<http://www.urbanforestrysouth.org/>

#### **About the Center:**

The center is a collaboration of personnel and funding from the Southern Research Station (Asheville, NC), Region 8 State & Private Forestry (Atlanta, GA) and the southern National Forests. The mission is to provide technical support to the State (forestry agency) U&CF coordinators, the State U&CF

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councils, advocacy groups (e.g., TreesAtlanta), communities, and others on topics related to urban & community forestry.

**Technology Transfer Products (most recent/successful):**

**1. Repackaging Information**

The number one job of the Southern Center (SCUFR&I) is repackaging of science-based knowledge in a form or format that provides their customers with something useful. The [Web site](#), a collaboration with Southern Regional Extension Forestry and the Warnell School of Forest and Natural Resources, is their best example of this service. The site is a state-of-the-art Content Management System built on open source software (Plone/Zope) that allows for the cataloging of information by any registered user with oversight by the site administration. This system provides a convenient and powerful interface for SCUFR&I and their collaborators to assemble and maintain current and relevant research knowledge related to U&CF. The site is also the repository of the Urban Forestry Index (UFind), which is the national repository of technology transfer products produced by the national U&CF Program.

The site provides resources in the following categories:

- a. [Urban & Community Forestry FAQs](#).
- b. [Document Library](#).
- c. [Images](#).
- d. [Tree Ordinances](#).
- e. [Web Links](#).
- f. [Classroom Activities](#).
- g. [Presentations](#).
- h. [Collections](#). Some examples include:
  - Air quality: Pavement: Impacts and Alternatives, SIPs, Trees and Urban Forests, The Role of Urban Forests in Sequestering Carbon, and Trees & Chlorine.
  - Human Health: [Urban Forest Edition of The Natural Inquirer](#).

- Inventory and Management: [i-Tree: Integrated Software](#), The [UFSe Guide to STRATUM](#), UFHM (FIA, FHM), and [UFORE and Urban Forests](#).
- Production: Finding the “Right Tree,” Ginkgo Trees, and Oxydendrum arboreum / Sourwood Tree.
- Social Impacts: Finding the “Right Tree,” Trees, Business and Parking, and Urban Forestry & Youth (Education).
- Tree Health: Allelopathy in Trees (Collected Works), Drought and Trees, Sudden Oak Death (Collected Works), and Turf Wars!
- Watershed: Alternative Stormwater Control, Pavement: Impacts and Alternatives, and Using Trees to Protect and Restore Urban Watersheds.
- Economics: The UFSe Guide to STRATUM and Trees, Business and Parking.
- History of Urban Forestry: Promoting an Urban Forestry Program in a Small Community.
- Tree Physiology: Fall Leaf Color, Live Oak, Tree Stump Removal, and Ornamental Pears.
- Benefits: Greenways: A Collection of Resources, Landscape Aesthetics: A Handbook for Scenery Management (SMS), and The Role of Urban Forests in Sequestering Carbon.
- Ecosystems: The Basics of Ecological Restoration and Renovation and Using Trees to Protect and Restore Urban Watersheds.
- Interface: Wildland-Urban Interface in Region 8.
- Maintaining Urban Forests: Trees and Utilities Collection (Appleton NUCFAC 2004) and Right Tree, Right Place, Right Now!
- Planning and Management: Finding the “Right Tree,” Greenways: A Collection of Resources, Promoting a Urban Forestry Program in a Small Community, Trees and Storms: Assessment Discussion (2005), Trees and Storms: Damage Assessment, Trees and Storms: Disaster Preparedness, Trees and Storms:

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Ice Storms, Trees and Storms: News Releases & Articles, Trees and Storms: Planning, Trees and Storms: Research & Studies, Trees and Storms: Resources, Trees and Storms: Response & Treatment, Trees and Storms: Safety, Trees, Developers, and Development, and Urban Forestry Manual.

- Regulation: Alternative Stormwater Control.
- Technology: Finding the “Right Tree.”
- Urban Planning: Alternative Stormwater Control, Trees, Developers, and Development, and Wildland-Urban Interface in Region 8.

i. [Computer Applications & Data.](#)

## 2. Case Studies—i-Tree

i-Tree is a state-of-the-art, peer-reviewed software suite from the Forest Service that provides U&CF analysis and benefits assessment tools. To better understand the Forest Service role in promoting the use of these tools, the Southern Center for Urban Forestry Research & Information has partnered with urban foresters of the Georgia Forestry Commission to test the data collection protocol and reporting with two small communities near Athens.

### a. Newborn, GA

- 100 percent inventory of street trees.
- Volunteer and State forestry agency participation.
- STRATUM study.
- Modification of i-Tree to facilitate transfer of tree inventory data to MCTI and other proprietary inventory programs (ACCESS).
- Presentation to City Council, local Tree Board, and the State agency.

### b. Social Circle, GA

- Random sample of street trees.
- Volunteer and State forestry agency participation.
- STRATUM study.

- Presentation to City Council, local Tree Board, and the State agency.

### c. Presentations of Results

- Georgia Urban Forest Council Annual Meeting exhibit (November 2006).
- Region 8 U&CF Coordinators Winter meeting 3-hour workshop (January 2007).

## 3. Tree Assessments—Gulf Coast

The Southern Center for Urban Forestry Research & Information recently coordinated the Gulf Coast Tree Assessment Project in Louisiana and Mississippi. More than 35 Certified Arborists volunteered to work in the area affected by Hurricane Katrina and helped complete assessments in Orleans, Jefferson, and St. Tammany parishes in Louisiana and Harrison and Hancock counties in Mississippi during the past 6 months.

During the project, thousands of trees on public and private property were evaluated that represent a risk to the public (e.g., on and along street rights-of-ways and in parks). The objective of the assessment was to make recommendations that would help communities reduce or eliminate that risk. Reducing or eliminating risk is accomplished by either pruning damaged limbs or, when necessary, removing the tree.

### a. Partnerships

- Government agencies ( Forest Service and State forestry commissions).
- Professional organizations (ISA and SMA).
- Green industry (The Davey Tree Expert Company).
- Local communities.
- Local volunteers.

### b. Coordination of Partner Components

- Volunteer arborists.
- Data collection.
- Reimbursement.
- Onsite scheduling.
- Community liaison.

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#### 4. Urban Forestry Manual—A Manual for Urban Forestry in the South

<http://www.urbanforestrysouth.org/Resources/Collections/Collection.2005-06-02.0039>

The Urban Forestry Manual is being developed by the Forest Service, Southern Region, the Southern Research Station, and the Southern Group of State Foresters as an educational tool for State forestry agency employees and others who work with communities on urban forestry issues. The manual can be used for self-guided learning, finding specific information on a topic, and developing workshops and presentations. When completed, the manual will include 16 units (chapters). Currently, the following 11 units are available:

- a. Benefits (general/multiple).
- b. Construction.
- c. Identification.
- d. Maintenance Specifications.
- e. Planting.
- f. Policy.
- g. Site Evaluation/Selection.
- h. Soil Health.
- i. State Forestry Agency (role of).
- j. Urban Forest Management.
- k. Wildlife (mammals).

#### 5. Brochures—Benefits of Trees

<http://www.urbanforestrysouth.org/cannedSearch?id=HotTopic.2004-06-24.5628>

The September 2003 update of the benefits brochure uses the ‘booklet’ format for printing a master copy that can be used to copy and print booklets (folded and stapled) in the 8.5x11 format. The ‘1 Up’ format prints one page per sheet when booklets are not required. A PowerPoint is also provided.

#### 6. Technology Bulletins

These are periodic news bulletins produced for center customers.

- [How to Protect Tree Roots While Replacing Sidewalks and Curbs.](#)
- [The Search for Salt-tolerant Trees.](#)
- [Trees for Children: Helping Inner-City Children Get a Better Start in Life.](#)
- Do Trees Strengthen Urban Communities, Reduce Domestic Violence?
- Tree Growth in the Urban Forest.
- [Chinese Privet Control Project.](#)

#### In Progress:

- i-Tree Implementation.
- Bare Root Planting in the South.

#### 7. Presentations

The presentations are typically PowerPoint talks that center researchers and staff have given at various conferences, workshops, etc.

<http://www.urbanforestrysouth.org/Resources/PowerPoints>

##### a. 2007 iTunes, iPod, iMac and now i-Tree

Speaker: Eric Kuehler  
Oklahoma Urban & Community Forestry Council  
Annual Conference  
February 15–16, 2007  
Oklahoma City, OK

##### b. 2007 i-Tree: What Is It and How Do You Use It?

Speaker: Eric Kuehler  
Virginia Tree Inventory Workshop  
Charlottesville, VA  
February 13, 2007  
<http://www.urbanforestrysouth.org/Resources/PowerPoints/i-tree-what-is-it-and-how-do-you-use-it/view>

##### c. 2007 Rapid Tree Damage Assessment and FEMA Experiences Following Hurricane Katrina in Mississippi and Louisiana Coastal Communities

Poster Presenters: Dudley R. Hartel and Eric Kuehler  
Southern Research Station All Scientist Meeting  
Lake Lanier Islands, GA  
January 30, 2007



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- d. 2007 i-Tree—STRATUM Street Tree Inventory—  
Newborn, Georgia**  
Poster Presenters: Eric Kuehler and Dudley R. Hartel  
Southern Research Station All Scientist Meeting  
Lake Lanier Islands, GA  
January 30, 2007
- e. 2007 i-Tree: What Is It and How Do You Use It?**  
Speaker: Eric Kuehler  
Southern Group of State Foresters U&CF Winter  
Meeting  
Louisville, KY  
January 18, 2007
- f. Gulf Coast Tree Assessment**  
Speaker: Dudley Hartel  
ISA's 82nd Annual Conference and Trade Show in  
Minneapolis, MN, 2006.  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/gulf-coast-tree-assessment-2006-  
presentation-to-isa/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/gulf-coast-tree-assessment-2006-presentation-to-isa/view)
- g. 2006 Gulf Coast Tree Assessment: A Partnership  
Responding to Community Needs**  
Speaker: Dudley Hartel  
Washington Office review of Region 8 Cooperative  
Forestry  
Region 8 CF/S&PF (Atlanta)  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/gulf-coast-tree-assessment-a-partnership-  
responding-to-community-needs/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/gulf-coast-tree-assessment-a-partnership-responding-to-community-needs/view)
- h. 2006 How Do We Educate Them**  
Speaker: Eric Kuehler  
Technology Transfer and Extension in Natural  
Resources at Hot Springs, AR  
Southern Regional Extension Forester, Athens GA.  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/many-hands-make-for-light-work-after-  
a-natural-disaster-gulf-coast-tree-assessment-project-  
1/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/many-hands-make-for-light-work-after-a-natural-disaster-gulf-coast-tree-assessment-project-1/view)
- i. 2006 Many Hands Make for Light Work After a  
Natural Disaster**  
Speaker: Eric Kuehler  
2006 Annual Conference  
Society of Municipal Arborists in Asheville, NC  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/many-hands-make-for-light-work-after-  
a-natural-disaster-gulf-coast-tree-assessment-project-  
1/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/many-hands-make-for-light-work-after-a-natural-disaster-gulf-coast-tree-assessment-project-1/view)
- j. 2005 Southern Center for Urban Forestry Research  
& Information**  
Speaker: Dudley Hartel  
Review of S&PF Programs  
Region 8 State & Private Forestry (Atlanta)  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/PowerPoint.2005-04-20.4048/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/PowerPoint.2005-04-20.4048/view)
- k. 2005 Greening Urban & Community Forestry in  
the Southern Region: The Role of Partnerships**  
Speaker: Dudley Hartel  
Driving changes in forestry: 2005 National Convention  
(Fort Worth, TX)  
Society of American Foresters  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/PowerPoint.2005-10-20.1436/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/PowerPoint.2005-10-20.1436/view)
- l. 2004 Urban Natural Resources as Capital Assets**  
Speaker: Dudley Hartel  
National U&CF Conference (San Antonio)  
American Forests  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/urban-natural-resources-as-capital-assets/  
view](http://www.urbanforestrysouth.org/Resources/PowerPoints/urban-natural-resources-as-capital-assets/view)
- m. 2004 History and Current Status of Urban Forestry  
Research**  
Speaker: Dudley Hartel  
U&CF Research Workshop in Auburn, AL  
Alabama Cooperative Extension System  
[http://www.urbanforestrysouth.org/Resources/  
PowerPoints/history-and-current-status-of-u-cf-  
research/view](http://www.urbanforestrysouth.org/Resources/PowerPoints/history-and-current-status-of-u-cf-research/view)

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#### **n. 2003 Resources, Research and Tools**

Speaker: Dudley Hartel

2003 Annual Conference in Columbus, GA

Georgia Urban Forest Council

<http://www.urbanforestrysouth.org/Resources/PowerPoints/resources-research-and-tools/view>

#### **8. Press Releases**

Press releases are designed for dissemination through the regional press to alert them and the general public of new research and technology. They are also given to customers to use with their local media when research is conducted in their city.

- Communities Developing Tree Ordinances to Promote Mature Tree Canopies (June 2004; Southwide).

[http://www.urbanforestrysouth.org/Resources/Press\\_Release/PressRelease.2004-06-01.0126/view](http://www.urbanforestrysouth.org/Resources/Press_Release/PressRelease.2004-06-01.0126/view)

#### **9. Other Training/Workshops**

The center is often asked to provide hands-on training of research results so that customers can obtain a better understanding of how to apply the research to their unique situation in their community or consulting practice.

- Kentucky Division of Forestry.
- Mississippi Urban Forest Council.
- Region 8 U&CF Coordinators (Winter & Summer meetings).
- Professional arborists & urban foresters (International Tree Failure Database).

#### **10. Customer Service**

Center staff assists U&CF Coordinators, U&CF Councils, and SRS Social Scientists and responds to requests from homeowners, reporters, urban forestry professionals, etc., by providing answers to questions and other appropriate information that helps them to do a better job or extend center research knowledge to their customers.

##### **a. U&CF Coordinators**

- Storm assessment.

- Immediate post-storm assessment of regional/State needs.
- Short-term detailed inventories of storm damage.
- Protocol for public risk assessment following natural disasters.

##### **b. Environmental Services**

- Investigating urban carbon market opportunities.

##### **c. Training**

- Ad hoc (topic, venue, & audience on request).
- Winter meeting of the U&CF coordinators.
- Summer meeting of the Southern Group of State Foresters meeting.

##### **d. Specialized Internet Content**

- Website provides the ability to “collect” a variety of research and resources into a package for easy location by targeted end users.

##### **e. U&CF Councils**

- **Event Database:** Designed and funded the development of a database of events, presentation topics and presenters to facilitate meeting/workshop/conference planning by U&CF councils.
- **Web Presence:** An Internet-based system for the Southern Cooperative Councils records, events, and marketing.

##### **f. SRS Social Scientists:**

- **Attitudes and perceptions:** Support for the design, development, and implementation of survey tools for Hispanic study.
- **Economics:** Property value studies, open space/greenway studies, carbon markets.

##### **g. Manuscript (Peer) Reviews**

- Urban Ecology (2006).



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## h. Community

- City of Atlanta—Canopy Goals.
- Casualty claims for Katrina-affected region.
- Katrina communities/FEMA Coordination & Data Support.

## Southern Research Station

InterfaceSouth (Component of Centers for Urban and Interface Forestry)

Gainesville, FL

352-376-3271

**Team Leader:** Ed Macie, U&CF Region 8

**Center Manager / Technology Exchange Coordinator:**

L. Annie Hermansen-Baez

<http://www.interfacesouth.org/>

<http://www.interfacesouth.usda.gov>

### **About the Center:**

The center is primarily funded by the Southern Research Station with some funding from S&PF. The center is now part of the SRS RWU 4952 titled “*Integrating Human and Natural Systems in Urban and Urbanizing Environments.*” The unit is a combination of the former unit 4950 headed by Ken Cordell and the Gainesville unit SRS-4951. The acting project leader rotates between Wayne Zipperer, Mike Bowker, Cassandra Johnson, and Ed Macie until a permanent project leader is selected. The mission of the center is to develop and communicate guidelines, models, and tools needed by natural resource managers, policymakers, planners, and citizens to reduce risks to ecosystems and human communities in urban and urbanizing landscapes. The center’s technology transfer program focuses on (1) disseminating new and existing information, (2) serving as a clearinghouse of WUI information, (3) building partnerships and collaborative efforts and approaches, and (4) facilitating and creating linkages.

The Southern Wildland-Urban Interface Council (SWUIC), a chartered council of the Southern Group of State Foresters, is

the advisory council for the WUI Center. SWUIC helps guide the technology transfer activities of the WUI Center and assists in identifying research needs. This guidance helps ensure that the research and technology transfer products of the WUI Center meet the needs of their stakeholders.

### **Technology Transfer Products (most recent/successful):**

#### 1. **Decision Support Systems**

These decision support systems are tools to help make homes Firewise.

- [Wildfire Risk Assessment for Southern Homeowners](#)  
This risk assessment enables homeowners to determine their particular risk to fire, as well as the critical factors that increase their risk and suggestions for how they can reduce them.
- [Flammability Key](#)  
This flammability key can be used to determine whether a species is appropriate for a firewise plant list.

#### 2. **Fact Sheets and Brochures**

##### a. [Fire in the Interface Fact Sheets](#)

These fact sheets and brochures provide knowledge about wildland-urban interface (WUI) topics in a concise, easy-to-read format.

- [Preparing a Firewise Plant List for WUI Residents.](#)
- [Selecting and Maintaining Firewise Plants for Landscaping.](#)
- [Reducing Wildfire Risk While Achieving Other Landscaping Goals.](#)
- [Understanding Fire Behavior.](#)
- [Considering Fire in Florida’s Ecosystems.](#)

##### b. [InterfaceSouth Brochure.](#)

#### 3. **Photo Gallery**

This photo gallery contains pictures that depict a variety of interface issues to browse and download.

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#### 4. Presentations

The enhanced media section includes Flash and PowerPoint presentations.

- **Firewise Retrofit Home**

This interactive module demonstrates the process of retrofitting a Florida home and surrounding yard to make it Firewise.

- **Wildland-Urban Interface Presentations**

PowerPoint presentations on a variety of interface topics can be found here.

#### 5. Publications

These publications provide knowledge on the center's research and technology transfer activities, including technical reports, journal articles, proceedings, theses/technical papers, and abstracts.

- **Communication Tools for the Wildland-Urban Interface**

Paper in the 2003 National Urban Forest Conference Proceedings.

- **Creating a Wildfire Risk Assessment Guide for Homeowners in the Southern United States**

U.S. Master's Technical Report.

- **Down by the Riverside: Urban Riparian Ecology**

Journal Article in *Frontiers in Ecology*.

- **Fire in the Wildland-Urban Interface in the USA South**

Paper from Forestry Serving Urbanized Societies Conference, IUFRO World Series.

- **Flammability of Native Understory Species in Pine Flatwood and Hardwood Hammock Ecosystems and Implications for the Wildland-Urban Interface**

*International Journal of Wildland Fire*.

- **Fuel Reduction Options for Landowners at the Wildland-Urban Interface**

Master's Technical Report.

- **Forests at the Wildland-Urban Interface: Conservation and Management.**

Book from CRC Press.

- **Human Influences on Forest Ecosystems: the Southern Wildland-Urban Interface Assessment**

Forest Service General Technical Report.

- **Policy in the Wildland-Urban Interface**

Paper in the 2003 APA National Planning Conference Proceedings.

- **Species Composition and Structure of Regenerated and Remnant Forest Patches within an Urban Landscape**

Journal Article in *Urban Ecosystems*.

- **The Moving Edge: Perspectives on the Southern Wildland-Urban Interface**

Forest Service General Technical Report.

- **The Wildland-Urban Interface: An Introduction**

Paper in the 2003 APA National Planning Conference Proceedings.

#### 6. Research Project Summaries

The center and partners are involved in research projects addressing a variety of interface issues. Project descriptions and related publications can be downloaded.

- **Flammability of Natural Vegetation and Home Landscapes**

This study comprises three research projects that were designed to address the issues of wildfire hazard in the wildland-urban interface and investigate different facets of natural vegetation and home landscape flammability. They provide knowledge to help guide firewise planning and to improve fire behavior modeling for urban settings.

- **Fuel Reduction Options for Landowners at the Wildland-Urban Interface**

This study includes two parts: (1) a review of fuel reduction options available to small landowners and (2) a comparison of the effectiveness, longevity, and costs of three fuel reduction treatments in the South.

- **Postfire Assessment of Interface Landscapes**  
This study examined how building materials and the arrangement and composition of landscape plants influence structural vulnerability during wildfires.
- **Wildfire Risk Assessment Guide for Homeowners in the Southern United States**  
This assessment and accompanying guidelines were designed to provide knowledge about fire risk focused on individual properties throughout the South, as a complement to guidelines available for whole communities.
- **Analysis of Urbanization Effects on Forest Vegetation**  
This research project will help to develop an integrated approach to monitoring changes from urbanization to ecological and social systems in the Florida Panhandle.
- **Cultural Dimensions of Landscape Change in the Florida Panhandle**  
This research examines the cultural dimension of landscape change in Franklin and Gulf Counties, FL.
- **Gainesville Urban Forest Effects Project**  
The primary objective of this project is to monitor how the urban forest changes over time in a small urban city in the South.

## 7. Training, Outreach, and Conferences

The center and partners develop training and outreach programs for use by natural resource agencies across the South. The center also helps sponsor and organize conferences. Some examples include:

- **Changing Roles: Wildland-Urban Interface Professional Development Program**  
This program provides State and Federal natural resource agencies with a set of flexible resources to conduct their own training programs, aimed toward building skills and tools to successfully tackle WUI issues.
- **Wood to Energy Outreach Program**  
The goal of this biomass outreach program is to encourage the use of woody biomass for bioenergy

production in communities at the wildland-urban interface in the 13 Southern States and Puerto Rico.

- **Emerging Issues Along Urban-Rural Interfaces**  
This conference will bring together researchers, practitioners, and policymakers to share current research results and to identify knowledge gaps regarding the interaction between urbanization, land use change, and natural resources.

## 8. SWUINET LISTSERV

The Southern Wildland Urban Interface Network (SWUINET) LISTSERV is a mailing list through which the InterfaceSouth Updates and other interface-related information is sent to SWUINET members.

LISTSERV sign-up address: <http://interfacedsouth.org/swuinet/listserve.html>.

## 9. InterfaceSouth Updates

The InterfaceSouth Update is an electronic, periodic bulletin about critical wildland-urban interface issues. It is sent electronically through the SWUINET LISTSERV. Click here to be added to the list!

Some examples include the following:

- Vol. 4 No. 9—Fire in the Interface.
- Vol. 4 No. 8—Ecosystem and Human Health.
- Vol. 4 No. 7—Air Quality.
- Vol. 4 No. 6—Technology Transfer and Extension.
- Vol. 4 No. 5—Technology.
- Vol. 4 No. 4—Water Quality.
- Vol. 4 No. 3—Planning.
- Vol. 4 No. 2—Recreation in the Interface.
- Vol. 4 No. 1—Biomass.

## 10. Customer Service

Center staff respond to individual requests from homeowners, reporters, wildland-urban interface professionals, and others by providing answers to questions and sending information as needed to help them to do a better job working and living in the interface.

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Examples of requests include the following:

- South Carolina Forestry Commission requested 150 copies each of the Fire in the Interface fact sheets for use in an upcoming Firewise exhibit. The Virginia Department of Forestry recently requested 500 copies of each of these fact sheets for use in upcoming events with homeowners.
- The Weather Channel recently requested information about and graphic illustrations of defensible space around homes in the wildland-urban interface.

## Southern Research Station

USDA National Agroforestry Center  
Lincoln, NE  
402-437-5178

**Technology Transfer Specialist:** Richard Straight, Lead Agroforester  
<http://www.unl.edu/nac/>

### **About the Center:**

The USDA National Agroforestry Center (NAC) had its origins in the 1990 Farm Bill. It began as a Forest Service Research and State & Private Forestry effort in 1992 and expanded into a partnership with the Natural Resources Conservation Service (NRCS) in 1995. It is administered by the Forest Service, Southern Research Station. NAC offices are located in Lincoln, NE, and Huntsville, AL. NAC accelerates the application of agroforestry through a national network of partners. Together with partners, the center conducts research, develops technologies and tools, coordinates demonstrations and training, and provides useful information to natural resource professionals.

### **Technology Transfer Products (most recent/successful):**

#### **1. Software**

The center has produced software that can be used by communities, individuals, and private consultants to make informed decisions regarding urban forest management.

#### **a. Visual Simulation Kit**

The visual simulation kit consists of three distinct and complementary pieces. The first is CanVis, an entry-level image editing software program that enables resource professionals to create photorealistic simulations with minimal computer skills. These simulations can be used to depict proposed conservation practices or urban forestry projects to assist in the planning and decisionmaking process. The software runs on a Windows-based computer and requires a Pentium 166 MHz or faster processor with 32 MB of RAM or higher.

The software enables users to edit a scanned photograph or an image from a digital camera. CanVis contains tutorial videos that show how to use each editing tool along with a collection of object libraries that contain images of plants, agricultural features, people, wildlife, and park elements that can be quickly added to the base image.

The second component is the Visual Simulation Guide; a multimedia CD reference manual on how to use image-editing software to create visual simulations for natural resource planning. The guide provides instruction on how to plan a simulation project, acquire images, and accurately locate and size imported objects.

The third component is a series of self-paced tutorial modules that guides the user through hands-on activities for developing skills necessary to create effective visual presentations.

#### **2. Published Reports**

The center publishes research findings in journals, conference proceedings, and periodicals as well as general technical reports and dissertations. These reports describe the research methodology, present the findings and discuss the value of the results to urban forestry.

- a. Bentrup, G. and G. Wells. 2005. *Picture this*. Journal of Soil and Water Conservation 60:144A-149A.
- b Francis, C.A., M.L. Schneider, P. Skelton, M. Schoeneberger, and G. Bentrup. 2005. *Methods for designing future food systems in peri-urban areas*. Proc. Visualizing Food and Farm Meetings. Portland, OR.

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11 June 2005, Agriculture, Food and Human Values Society.

c. Francis, Charles; Bentrup, Gary; Schoeneberger, Michele; DeKalb, Mike. 2003. *Integration of woody buffers at three levels of spatial scale in the urban/rural interface in Lincoln—Lancaster County, Nebraska*. In: Proceedings—AFTA 2003 The 8th North American Agroforestry Conference; 2003 June 23-25; Corvallis, OR: 116-127.

d. Bentrup, G., M.M. Schoeneberger, S. Josiah, and C. Francis. 2001. *Ecobelts: reconnecting agriculture and communities—case studies*. In: Steward W.C. and A. Lisec (eds). Proc. of the Ecospheres Conference. 10-12 June 2001. University of Nebraska, Lincoln, NE. pp. 1-13.

### 3. Newsletter

The center produces a periodic newsletter, *Inside Agroforestry*, which discusses the latest research findings related to urban forests and natural resource management. They are available on the center Web site. <http://www.unl.edu/nac/insideagroforestry.htm>

- a. Summer 2005: Water Quality.
- b. Winter/Spring 2004: Wildlife.
- c. Summer 2001: Green Infrastructure.
- d. Fall 2000/Winter 2001: Carbon.
- e. Spring 2000: Status of Our Nation's Water.

### 4. Brochures/Fact Sheets/Displays

a. The center's popular series of **Working Trees** brochures serves as a great introduction to agroforestry. These color publications each illustrate various agroforestry practices that landowners can apply to help meet their production and conservation objectives.

<http://www.unl.edu/nac/workingtrees.htm>

- Working Trees for Communities.
- Working Trees for Treating Waste.
- Working Trees for Water Quality.
- Working Trees for Wildlife.
- Working Trees for Carbon Cycle Balance.

### b. Other brochures:

- Topeka—Urban/Rural Watershed Solutions.
- Topeka—Sustainable Development: Moving Toward a Greener Community.
- Kansas City Region—Green Infrastructure: Designing With Nature.
- Edible Woody Landscapes for People and Wildlife—Josiah, Scott J. and Lackey, Jeanine / University of Nebraska-Lincoln.

c. The center also creates **floor displays** (8 by 10 feet) that correspond to the Working Trees brochures. The displays can be reserved free for any event; the user provides return shipping costs.

### 5. Technical Notes

The center's technical note series provides agroforestry knowledge in a useful "how to" format. "Agroforestry Notes" are numbered and sorted by agroforestry practice. <http://www.unl.edu/nac/agroforestrynotes.htm>

- a. Guide To a Successful Demonstration Project.
- b. Photo-Realistic Visual Simulation: An Agroforestry Planning Tool.
- c. Wastewater Management Using Hybrid Poplars.

### 6. Management Tools

Periodically the center develops a tool to assist agencies or individuals with a particular problem or provide specific education.

a. **Conservation Planning Atlas:** The Conservation Planning Atlas (Midwest Version) is an online compilation of maps produced by various government and nongovernmental agencies. The purpose of the atlas is to provide a general overview of issues that may affect conservation planning. The atlas consists of both national- and regional-scale maps. Each map includes a description and references or Internet links for additional information. The goal of the atlas is to encourage a regional-scale perspective in all areas of conservation planning efforts. The atlas can provide

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guidance for prioritizing projects and creating policy change.

<http://www.unl.edu/nac/atlas/index.htm>

## **7. Promotional Items**

The center takes advantage of opportunities to get the word out when approached by reporters, national newsletters, NPR, etc.

## **8. Training/Workshops**

The center is often asked to provide hands-on training so that customers can obtain a better understanding of how to apply the research to their unique situation in their community or consulting practice.

<http://www.unl.edu/nac/training.htm>

- a. Green Infrastructure Course, March 12–16, 2007.
- b. Creating Believable Simulations (1-day workshop), Alcorn State University and Mississippi Forestry Commission, Alcorn, Mississippi, May 16–17, 2006.
- c. Communicate Your Ideas Visually: Creating Photo-Realistic Simulations for Conservation Planning, Soil & Water Conservation Society Annual Conference, Keystone, Colorado, July 23, 2006.

## **9. Customer Service**

Center staff respond to individual requests from homeowners, reporters, urban forestry professionals, etc., by providing answers to questions, contact information of local resource professional who may be able to provide more detailed or onsite assistance and other appropriate information that helps them to do a better job or extend center research knowledge to their customers.

- a. Indiana Soil & Water Conservation Districts, 2006 annual meeting.
- b. Soil & Water Conservation Society, Michigan Chapter, 2006.
- c. City of Lincoln, NE, Watershed Management Division of the Public Utilities Department, 2006.
- d. Susan Rothman, Bronx, NY—citizen preparing a presentation for an upcoming Food Security meeting in New York State.

## **10. Blog**

The center provides a Web site that contains online short news items, comments, and often hyperlinks to more information.

<http://www.unl.edu/nac/blog.htm>



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## Appendix C: Key National Technology Transfer Products

### Air Photo Interpretation Tool

[http://www.fs.fed.us/ne/syracuse/Tools/downloads/Aer\\_phot\\_interp.zip](http://www.fs.fed.us/ne/syracuse/Tools/downloads/Aer_phot_interp.zip)

**Description:** A Geographic Information System (GIS) tool to speed up the photo interpretation of digital images (e.g., DOQs, scanned aerial photos). The tool creates a dialog box containing user-defined categories that moves the view from one photo interpretation point to the next. Points can be arranged randomly or on a regular grid. This tool is an extension file for [ArcView 3.2](#).

**Benefits:** Ability to quickly assess urban cover characteristics over large or small areas with a statistical accuracy assessment.

**Funded by:** Forest Service, U.S. Department of Agriculture (USDA).

**Location:** Northern Research Station.

### Air Pollution Removal Calculator

<http://www.fs.fed.us/ne/syracuse/Tools/downloads/Air%20Pollution.zip>

<http://www.fs.fed.us/ne/syracuse/Tools/pollution/PollutionProgram.php>

**Description:** This program estimates pollution removal and value for urban trees based on basic user inputs about the study area (e.g., a park). This program uses local data analyzed for various cities by the Urban Forest Effects (UFORE) model.

**Benefits:** Ability to quickly assess urban cover characteristics over large or small areas with a statistical accuracy assessment.

**Funded by:** Forest Service, Trust for Public Lands.

**Location:** Northern Research Station.

**Partners:** Forest Service, Trust for Public Lands.

### Appreciation Tool Kit for Urban and Community Forestry

<http://www.na.fs.fed.us/urban/inforesources/ucftoolkit/ucftoolkit.shtm>

**Description:** The tool kit was developed to promote Urban and Community Forestry (U&CF) as a crucial component of livability in communities and targets decisionmakers as champions for message delivery. The “Bring Life to Your Community Plant Trees” logo, developed with U&CF challenge cost-share program funding recommended by the National Urban and Community Forestry Advisory Council (NUCFAC), is used throughout the kit.

**Benefits:** This kit makes it easy for users to educate community leaders about all the ways community trees contribute to quality of life and a city/town’s social, economic and environmental well-being. These outreach materials show that trees are a critical component of urban infrastructure and that they require financial commitment for care.

**Funded by:** Forest Service, U&CF challenge cost-share program.

**Location:** Forest Service, Northeastern Area State and Private Forestry (S&PF).

**Partners:** Forest Service, Northeastern Area State and Private Forestry, District of Columbia Urban Forestry Administration, Delaware Department of Agriculture, New Jersey Forest Service, Maryland Department of Natural Resources Forest Service, West Virginia Division of Forestry, Pennsylvania Department of Conservation and Natural Resources, and Ohio Department of Natural Resources.

### Biogenic VOC Emission Estimated Rates for Common U.S. Tree and Shrub Genera

<http://www.fs.fed.us/ne/syracuse/vocrates.pdf>

**Description:** Volatile Organic Compound (VOCs) emissions contribute to ozone and carbon monoxide formation. Tree species differ in the amount of VOCs emitted per gram of leaf mass. This document lists the estimated amount of isoprene and monoterpene emission (the two dominant VOC chemicals emitted by trees) for numerous genera. Emission rates are in micrograms of C/g of leaf dry weight/hr (standardized to 1,000  $\mu\text{mol m}^{-2} \text{s}^{-1}$  of photosynthetically active radiation and 30 °C). Some emission rates on list were not measured; rather they are median values of botanical relatives.



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**Benefits:** Understanding the differences in VOC emission rates among species to aid in proper species selection to improve air quality.

**Funded by:** Forest Service.

**Location:** Northern Research Station.

### **CanVis: Image Editing for Resource Planning**

<http://www.unl.edu/nac/simulation/products.htm#canvis>

**Description:** The CanVis image editing software is an entry-level program that enables resource professionals to create photorealistic simulations that can demonstrate to decision-makers what a potential project will look like. It runs on a Windows-based computer and requires a Pentium 166 MHz or faster processor with 32 MB of RAM or higher.

**Benefits:** Photorealistic simulations provide a powerful planning tool to communicate ideas visually, leading to better decision-making. Simulations can improve adoption and support for natural resource management. Although image-editing software has been available for some time, the CanVis software, Visual Simulation Guide, and Self-pace Tutorials fill an important niche.

**Funded by:** U.S. Environmental Protection Agency (EPA), Mid-America Regional Council, Forest Service Research and Development (R&D)/S&PF, USDA Natural Resources Conservation Service (NRCS).

**Location:** USDA National Agroforestry Center, Lincoln, NE.

**Partners:** Mid-America Regional Council, USDA NRCS.

### **Cooperating Across Boundaries: Partnerships To Conserve Open Space in Rural America**

<http://www.fs.fed.us/projects/four-threats/documents/cooperatingacrossboundaries.pdf>

**Description:** S&PF and R&D have released this new publication, which highlights the importance of open space, explores how growth trends in rural America are changing the Nation's forests, and offers practical ideas for balancing growth and conservation.

**Benefits:** Developed as part of the Forest Service's emphasis on the "Four Threats," the publication focuses on the benefits

of partnerships and working across jurisdictional boundaries to conserve open space in rural America. It also kicks off the development of a national strategy and implementation plan to identify ways for the Forest Service to help conserve open spaces.

**Funded by:** S&PF and R&D, Forest Service.

**Location:** Washington Office, Washington, DC.

**Partners:** Numerous public and private organizations.

### **Effect of Urban Trees on Air Quality**

<http://www.fs.fed.us/ne/syracuse/TREE%20Air%20Qual.pdf>

**Description:** A short document summarizing the research on the effects of urban trees on air quality.

**Benefit:** A relatively simple summary of an important and complicated subject.

**Funded by:** Forest Service.

**Location:** Northern Research Station.

### **Electronic Mailing Lists (LISTSERV)**

[ufresearch@list.treelink.org](mailto:ufresearch@list.treelink.org)

[LISTSERV@unri.org](mailto:LISTSERV@unri.org)

<http://www.interfacesouth.org/swuinet/listserv.html>

**Description:** An electronic mailing list, a type of Internet forum, is a special usage of e-mail that allows for widespread distribution of knowledge to many Internet users. One type of electronic mailing list is an announcement list, which is used primarily as a one-way conduit of information and can be "posted to" only by selected people. A more common type of electronic mailing list is a discussion list, in which any subscriber may post.

**Benefit:** On either type of list, announcement or discussion, the subscriber receives a lot of information at no cost. The added benefit of the discussion list is that the subscriber can use the mailing list to send messages/questions to all the other subscribers, who may answer in similar fashion. Thus, actual discussion and information exchanges can happen. Mailing lists of this type are usually topic oriented.

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**Funded by:** Forest Service.

**Location:** TreeLink.

**Partners:** Forest Service, TreeLink.

Other active LISTSERVs:

- Alliance for Community Trees: [act@list.treelink.org](mailto:act@list.treelink.org).
- California Department of Forestry and Fire Protection: [urbanforest@yahoogroups.com](mailto:urbanforest@yahoogroups.com).
- International Society of Arboriculture (ISA): [isa@isa-arbor.com](mailto:isa@isa-arbor.com).
- Trees: [trees@list.treelink.org](mailto:trees@list.treelink.org).
- Society of Municipal Arborists: [sma@urban-forestry.com](mailto:sma@urban-forestry.com).
- National Association of State Foresters: [nasf@stateforesters.org](mailto:nasf@stateforesters.org).

### Flammability Key

[http://www.interfacesouth.org/products/flammability\\_key.html](http://www.interfacesouth.org/products/flammability_key.html)

**Description:** This flammability key can be used to determine whether a species is appropriate for a firewise plant list.

**Benefits:** The preparation of outreach materials on firewise plants may present a challenge to natural resource professionals because information is not widely available, particularly for local circumstances. This step-by-step method assists natural resource professionals, such as extension agents, urban foresters, landscape architects, nursery personnel, and others, with the development of local firewise plant lists that can assist local homeowners with firewise landscaping.

**Funded by:** National Fire Plan and Southern Research Station.

**Location:** InterfaceSouth Web site, Fact sheet.

**Partners:** University of Florida, Southern Group of State Foresters.

Additional resource: [http://www.interfacesouth.org/products/fact\\_sheets/Preparing\\_Firewise\\_Plant\\_List.pdf](http://www.interfacesouth.org/products/fact_sheets/Preparing_Firewise_Plant_List.pdf)

### Green Infrastructure Resources Web Site

<http://www.greeninfrastructure.net/>

**Description:** This Web site is a collection of the latest knowledge on Green Infrastructure. It provides solutions to users to

ensure environmental protection and a higher quality of life for communities as well as regulatory predictability for landowners and investors.

**Benefits:** Just as all forms of built infrastructure are promoted for the wide range of public and private benefits they provide, this Web site promotes Green Infrastructure systems for the wide range of essential ecological and social functions, values, and benefits that accrue to people and nature.

**Funded by:** Forest Service.

**Location:** The Conservation Fund, Arlington, VA.

**Partners:** Forest Service, The Conservation Fund.

### Guideline Specifications for Nursery Tree Quality

<http://www.urbantree.org/specs.asp>

**Description:** A [committee](#) composed of municipal arborists, urban foresters, nurserymen, U.C. Cooperative Extension horticultural advisors, landscape architects, nonprofit tree groups, horticultural consultants, etc., developed the specifications to ensure high-quality landscape trees. After more than a year of work, they succeeded in drafting a document entitled [Specification Guidelines for Container-grown Trees](#) for California.

**Benefits:** The intent of the Guidelines is to help landscape professionals develop their own comprehensive and detailed specifications to ensure that they obtain high-quality container-grown nursery trees. The document is also intended to help nursery professionals in their efforts to improve the quality of trees grown in California. These specifications can be modified for specific simulations.

**Funded by:** California Department of Forestry and Fire Protection, Forest Service, SafeTree.

**Location:** Urban Tree Foundation, Visalia, CA.

**Partners:** Urban Tree Foundation, California Department of Forestry and Fire Protection, California ReLeaf, Western Chapter ISA.

### Guidelines for Developing and Evaluating Tree Ordinances

<http://phytosphere.com/treeord/index.htm>

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**Description:** This Web site provides a variety of tools and resources for citizens and local governments interested in developing, revising, or evaluating local tree ordinances.

**Benefits:** Rather than using a “model ordinance” approach, the site describes how tree ordinance development can be integrated with an overall community tree management program. The site includes annotated examples of effective tree ordinance provisions used throughout the country. It also provides detailed descriptions of practical methods used to monitor community tree resources, tree management activities, and community attitudes.

**Funded by:** Forest Service, ISA, and ESRI, Inc.

**Location:** Phytosphere, Vacaville, CA.

**Partners:** Forest Service, ISA, and ESRI, Inc., Phytosphere Research, American Forests, Society of Municipal Arborists, International City Management Association, National Association of State Foresters, Alliance for Community Trees, California ReLeaf, American Planning Association.

### Individual Tree Carbon Calculator

<http://www.fs.fed.us/ne/syracuse/Tools/downloads/Individual%20Tree%20Carbon%20Estimator.xls>

**Description:** Spreadsheet programs to estimate the carbon storage and sequestration rates for a sugar maple and a white pine. These EXCEL spreadsheets provide a rough approximation of tree carbon storage and sequestration rates based on user inputs of tree growth rates. Urban tree diameter growth rates are typically between 0.1 and 0.4 inches per year.

**Benefits:** These programs are designed to provide quick and easy estimates of individual tree carbon.

**Funded by:** Forest Service.

**Location:** Northern Research Station.

### i-Tree

<http://www.itreetools.org/>

**Description:** i-Tree is a state-of-the-art, peer-reviewed software suite, developed by Forest Service researchers and partners, that provides U&CF analysis and benefits assessment tools. In

addition to the Street Tree Resource management and Analysis Tool for Urban forest Managers (STRATUM) and Urban Forest Effects model (UFORE) applications, i-Tree brings together other complimentary urban forestry utilities: Tree Inventory PDA—Personal Digital Assistants Utility, Sample Inventory Generator, MCTI—Mobile Community Tree Inventory, and Storm Damage Assessment Protocol. Some of these tools were designed to facilitate and support inventory data collection and management needed for UFORE and STRATUM projects. Other utilities provide analyses that go beyond the reporting features of STRATUM and UFORE.

**Benefits:** The current release of the i-Tree suite has been in development for more than 10 years as individual components. For the first time, complete support of the software is available to the user through Davey Tree Expert Company staff—Web site, e-mail, regular mail, or phone.

**Funded by:** Forest Service, The Davey Tree Expert Company.

**Location:** The Davey Tree Expert Company, Stow, OH.

**Partners:** Forest Service, The Davey Tree Expert Company, National Arbor Day Foundation, and Society of Municipal Arborists.

### Lessons Learned in the Inner City

[http://www.na.fs.fed.us/urban/hottopics/05\\_UF\\_Inner\\_City\\_Forum\\_Aug5.pdf](http://www.na.fs.fed.us/urban/hottopics/05_UF_Inner_City_Forum_Aug5.pdf)

**Description:** This publication shares the voices, experience, and expertise of individuals striving to engage community residents, catalyze a stewardship ethic, and build local capacity in some of the most challenging urban environments in America.

**Benefits:** Readers will use this knowledge to spark ideas, replicate success, avoid failure, and speed their own efforts in improving environmental equity, public health, economic development, and quality of life in distressed communities nationwide.

**Funded by:** Forest Service.

**Location:** Forest Service Northern Area.

**Partners:** Forest Service and numerous nonprofit tree organizations.

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### **Natural Inquirer: Urban Forest Edition (vol. 6, no. 1)**

<http://www.urbanforestrysouth.org/Resources/Collections/Collection.2005-04-22.3503/view>

**Description:** The Natural Inquirer is a journal of scientific research written for middle school teachers and students. This volume highlights Forest Service research related to urban forestry.

**Benefits:** This urban forest edition includes research related to ultraviolet radiation, street trees, parking lot shade, residential property value, stormwater runoff, and park visitation. Children (elementary through high school) will obtain a better understanding of the role trees play in their lives.

**Funded by:** Washington Office R&D and S&PF U&CF.

**Location:** Washington Office.

**Partners:** Washington Office Research, Forest Service Researchers, and Research Stations.

### **OASIS NYC**

<http://oasisnyc.gc.cuny.edu>

**Description:** The New York City Open Accessible Space Information System Cooperative (OASIS) is a one-stop, interactive mapping and data analysis application that is available via the Internet to enhance the stewardship of open space for the benefit of New York City residents.

**Benefits:** OASIS enables New York City community residents to: create maps of open space by ZIP code, borough, tax block and lot, and/or neighborhood; identify key open space resources within or near a user-defined area; locate these resources by name, type, and other attributes in addition to geographic-based searches; identify other natural resources and landmarks near or adjacent to open spaces in the city; calculate statistics based on open space patterns by ZIP code, borough, tax block and lot, and/or neighborhood; undertake “what if” scenarios, such as, what would my neighborhood look like if these vacant lots remained community gardens, or how would new bike lanes or bus routes improve my access to a park in the Bronx; and use other mapping and data analysis tools.

**Funded by:** Forest Service, NRCS.

**Location:** New York, NY.

**Partners:** Partnership of more than 30 Federal, State, and local agencies, private companies, academic institutions, and nonprofit organizations, including Forest Service, EPA, U.S. Geological Society (USGS), New York Dept. of Environmental Conservation, New York City Dept. of Environmental Planning, New York Restoration Project, and Trees New York.

### **OUTCOMES Model**

<http://www.fs.fed.us/ne/syracuse/Projects/OUTCOMES.zip>

**Description:** Trees modify air temperature, solar and thermal radiation exchanges, wind, and humidity of the air, and all of these influence human comfort. A computer program has been developed to predict human comfort and evaluate the impact of trees on comfort. The program, OUTCOMES (OUTdoor COMfort Expert System), is a Windows® program that was written with the goal of providing an easy to use interface and ample on-screen help. OUTCOMES shows the shade pattern of a tree and calculates a human comfort index considering the full range of weather variables, the density of a tree that shades a person, and other features of the surrounding neighborhood.

**Benefits:** Trees influence solar radiation, wind speed, air temperature, and humidity. The program permits predictions of the combined tree influences on the weather variables for human comfort.

**Funded by:** Forest Service.

**Location:** Northern Research Station.

**Partners:** The SUNY College of Environmental Science and Forestry assisted in programming OUTCOMES.

### **Recycling Municipal Trees—A Guide for Marketing Sawlogs From Street Tree Removals in Municipalities**

[http://www.fs.fed.us/na/morgantown/frm/cesa/rmt/rmt\\_index.html](http://www.fs.fed.us/na/morgantown/frm/cesa/rmt/rmt_index.html)

**Description:** The purpose of this guide is to increase the awareness of officials of municipalities regarding an alternative strategy for using their street tree removals; a “recycling” strategy, which can potentially turn a cost-burden scenario into an income-generating opportunity. The strategy involves

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merchandising sawmill-size logs from street tree removals to sawmills or other companies that have unique uses for street tree logs.

**Benefits:** Recycling municipal trees by converting street tree removals to valuable sawlogs could potentially generate income as well as reduce the amount of time and labor costs involved in processing this material into firewood.

**Funded by:** Forest Service, NA.

**Location:** Forest Service, Morgantown, WV.

**Partners:** Forest Service, S&PF, New Jersey Forest Service, West Virginia University, School of Journalism.

**Similar Resource:** Utilizing Municipal Trees: Ideas from across the country. By Stephen Bratkovich, 2001. <http://www.na.fs.fed.us/spfo/pubs/misc/umt/index.htm>.

## SEED

<http://publicecology.org/seed/>

**Description:** SEED is an open-source content management system and Web site development tool for use by civic and conservation organizations.

**Benefits:** It is designed specifically for building the capacity of local organizations and their networks (at local to global scales) to more effectively communicate amongst themselves and their target audiences to more effectively achieve their conservation goals.

**Funded by:** Forest Service.

**Location:** Public Ecology, Lynchburg, VA.

**Partners:** Forest Service, Public Ecology, and Virginia Tech.

## SelecTree

<http://selecttree.cagr.calpoly.edu/>

**Description:** The guide lists 1,481 trees with up to 49 attributes and more than 6,278 photos for 1,056 trees available from tree detail records. Search by tree attribute or by name.

**Benefits:** Provides users with a comprehensive list of tree species and their attributes to guide them to the proper species for their location/site.

**Funded by:** California Department of Forestry and Fire Protection, Forest Service.

**Location:** Urban Forest Ecosystems Institute, Cal Poly State University, CA.

**Partners:** California Department of Forestry and Fire Protection, Forest Service, PG&E, Caltrans, SafeTree, and Sempra Energy.

## State Urban Forest Reports

**Description:** As part of the urban forest Resource Planning Act (RPA) assessment, State reports are being developed that detail tree and impervious cover and population characteristics for every community, county, and county subdivision. Each community is being graded on its cover characteristic and tree stocking levels; and areas of highest priority for tree plantings are suggested. Urban forest benefits at the State level are also detailed.

**Benefits:** Reports provide detailed cover and stocking information to aid in regional, State, and local urban forest planning and management decisions.

**Funded by:** Forest Service RPA program, U&CF Program, and the Northeastern Area.

**Location:** In progress, State reports will be released as the cover data becomes available from the USGS.

**Partners:** USGS, RPA, Washington Office U&CF, and NA.

## STRATUM

[http://www.itreetools.org/street\\_trees/introduction\\_step1.shtm](http://www.itreetools.org/street_trees/introduction_step1.shtm)

**Description:** STRATUM, a Street Tree Resource management and Analysis Tool for Urban forest Managers, uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO<sub>2</sub> reduction, stormwater control, and property value increase. STRATUM is included in the i-Tree suite of tools.

**Benefits:** The tool is an easy-to-use, computer-based program that enables 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 inventory or an existing inventory of street trees, this software enables managers to evaluate current benefits, costs, and management needs.

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**Funded by:** Forest Service and The Davey Tree Expert Company.

**Location:** The Davey Tree Expert Company.

**Partners:** Forest Service, The Davey Tree Expert Company, National Arbor Day Foundation, and Society of Municipal Arborists.

### **TreeLink**

<http://www.treelink.org/>

**Description:** The TreeLink Web site was created to provide information, research, and networking for people working in U&CF. For the researcher, the arborist, the community group leader, the volunteer—the purpose of the site is to inform, educate, and inspire.

**Benefits:** TreeLink serves as a knowledge repository and networking center for urban forestry professionals while providing outreach to land agencies, academics, green industry, and the general public.

**Funded by:** Forest Service.

**Location:** TreeLink, Salt Lake City, UT.

**Partners:** Forest Service, Bartlett Tree Experts, and The Kenerson Group.

### **TREEORD**

[http://www.mnstac.org/RFC/treeord\\_software.htm](http://www.mnstac.org/RFC/treeord_software.htm)

**Description:** TREEORD is software for tree ordinance development.

**Benefits:** TREEORD enables cities to develop a tree ordinance that reflects the unique assets of their community. It contains a database of more than 1,800 clauses from more than 200 ordinances from throughout the United States. Cities tap into this information as they respond to the interview format of the software. The software is designed to be easy to use and covers many difficult issues related to setting up a Tree Board, handling planning and zoning conflicts, inventorying trees, managing responsibilities for tree maintenance, etc. It includes guidance on bringing together a constituency to develop and review the ordinance.

**Funded by:** Forest Service.

**Location:** Minnesota Tree Trust.

**Partners:** Forest Service and Minnesota Shade Tree Advisory Committee.

### **Treesearch**

<http://treesearch.fs.fed.us/>

**Description:** Treesearch is an online system for locating and delivering publications by Research and Development scientists in the Forest Service. Publications in the collection include research monographs published by the agency as well as papers written by Forest Service scientists but published by other organizations in their journals, conference proceedings, or books. Research results behind these publications have been peer reviewed to ensure the best quality science.

**Benefits:** Before Treesearch, each of the regional Stations handled distribution of their publications differently. Now all new books, chapters, and articles beginning with January 2004 are available to the public in a standard format. Older publications will be added as rapidly as possible. At the start of 2004 the collection contained more than 7,000 publications, making it the largest freely available collection of online forestry research in the world.

**Funded by:** Forest Service.

**Location:** Forest Service, Washington, DC.

### **Trees in Our City PowerPoints**

<http://www.fs.fed.us/psw/programs/cufr/TreesInOurCity/>

**Description:** These PowerPoints are a product of research that was conducted to identify barriers and obstacles that prevent the effective delivery of urban forestry technology and information. They are short 10-minute PowerPoints designed to be shown to local elected officials. They are being customized for the 19 climate regions using local data generated by the Center for Urban Forest Research.

**Benefits:** The results of the center's research, along with Everett Rogers' pioneering work on the art of persuasion, guided the development of these products. They allow supporters of urban



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forests to better communicate the messages to their community leaders and take urban forestry to the next level.

**Funded by:** Forest Service.

**Location:** Center for Urban Forest Research, Davis, CA.

**Partners:** Forest Service, California Urban Forest Council, Crocker/Flanagan Marketing, Inc., and Hal Voege Consulting.

### **Trees—The Air Pollution Solution (Research Summary)**

[http://www.fs.fed.us/psw/programs/cufr/products/cufr\\_658\\_Air%20Research%20Summary\\_3-06.pdf](http://www.fs.fed.us/psw/programs/cufr/products/cufr_658_Air%20Research%20Summary_3-06.pdf)

**Description:** Research summaries are four-page documents that provide a quick look at a research project, and its findings, in an easy-to-read, comprehensible format. This particular summary discusses the role trees play in cleaning the air and making communities healthier places to live. Other summaries from the Center for Urban Forest Research can be found at [http://www.fs.fed.us/psw/programs/cufr/research\\_summaries.php](http://www.fs.fed.us/psw/programs/cufr/research_summaries.php).

- The Large Tree Argument—The case for large-stature trees vs. small-stature trees.
- Is all your rain going down the drain?
- Where are all the cool parking lots?
- Where's the fire?
- Green plants or power plants?
- Save dollars with shade.

**Benefits:** The publication provides knowledge on how trees clean the air and offers ways readers can expand the role of trees as pollution control devices.

**Funded by:** Forest Service.

**Location:** Center for Urban Forest Research, Davis, CA.

**Partners:** Forest Service, California Department of Forestry, Sacramento Air Quality Management District, and Sacramento Tree Foundation.

### **U&CF TT Web Sites**

<http://www.fs.fed.us/psw/programs/cufr/>  
<http://www.na.fs.fed.us/urban/index.shtm>

<http://www.unri.org/>

<http://www.urbanforestrysouth.org/>

<http://www.interfacesouth.org/>

<http://www.interfacesouth.usda.gov>

<http://www.unl.edu/nac/>

**Description:** Seven Web sites are specifically designed and operated as technology transfer Web sites. Each has a slightly different focus, but all provide a user-friendly, accessible, and relevant Internet site that helps their customers easily find the information and services they need. The primary audiences also differ somewhat, although it is generally agreed to target State foresters, State urban forestry coordinators, staff of nonprofit tree groups, and U&CF professionals, including researchers, State extension foresters, university service and outreach representatives, municipal arborists and urban foresters, and other urban foresters and arborists (consulting and commercial). Secondary audiences usually include staff and elected officials of local governments and their volunteers serving on tree boards or other advisory committees that deal with U&CF issues.

**Benefits:** The customers of these Web sites have instant access to a multitude of products and services on any one of the six sites. The sites are user friendly, products are of a low resolution to facilitate downloading, and customers can expect to find something new on a regular basis.

**Funded by:** Forest Service and various State and local agencies.

**Location:** Forest Service, Technology Transfer facilities.

**Partners:** Forest Service Northern, Southern, and Pacific Southwest Research Stations, Northeast Area S&PF, and TreeLink.

### **Urban Forest Effects Model**

<http://www.fs.fed.us/ne/syracuse/Tools/UFORE.htm>

[www.itreetools.org](http://www.itreetools.org)

[www.ufore.org](http://www.ufore.org)

**Description:** The Urban Forest Effects (UFORE) model (included in the i-Tree suite of tools) is designed to use standardized field data from randomly located plots and local hourly air pollution and meteorological data to quantify urban forest structure and numerous urban forest effects for cities across the world. The model currently quantifies the following:

- Urban forest structure by land use type (e.g., species composition, tree density, tree health, leaf area, leaf and tree biomass, species diversity).
- Hourly amount of pollution removed by the urban forest, and its 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 VOC 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.
- Potential impact of Gypsy moth and Asian longhorned beetle infestation.

**Benefits:** Ability to analyze urban forest structure and ecosystem services and values for any size area (individual tree, neighborhood, city, to statewide areas) in an easy and statistically valid way.

New tools in development for UFORE include the following:

- UFORE Hydro—estimates effects of tree and impervious cover changes on hourly stream flow and water quality.
- UFORE Population Projector—quantifies future tree cover, number of trees, diameter distribution, and tree benefits over a 100-year period based on user-defined mortality rates. Estimates the number of trees needing to be established annually to meet a user-specified tree cover goal in a sustainable fashion.
- UFORE Functional Species Selector—selects the most appropriate trees for an area given the user-specified desired functions desired for the trees.
- UFORE Mapper—A GIS-based program designed to display forest benefits, find the most appropriate locations

to plant trees, and map future changes to urban forest benefits.

**Funded by:** Forest Service, Northeastern Area, U&CF Program, The Davey Tree Expert Company, and SUNY College of Environmental Science and Forestry.

**Location:** Northern Research Station, The Davey Tree Expert Company.

**Partners:** Forest Service Northeastern Area, U&CF Program, The Davey Tree Expert Company, SUNY College of Environmental Science and Forestry, National Arbor Day Foundation, and Society of Municipal Arborists.

### Urban Forestry Carbon Sequestration

<http://www.dnr.state.wi.us/org/aw/air/registry/quantexamples/example10.html>

**Description:** The Urban Forestry Carbon Sequestration tool calculates direct carbon sequestration from tree growth. The tool displays total carbon sequestered (aggregated over all the years since the first tree was planted, available in the “Total Storage” field), and individual year carbon sequestered (this is the “Annual Increase” field). The individual year amount employs varying growth rates and survival rates for any population of up to six different categories of trees.

**Benefits:** With the workbook provided with the tool, all users have to do is enter the number and type of trees planted by year. From the sequestration page within the Excel tool, the user can then determine the amount of carbon sequestered over the years.

**Funded by:** Forest Service.

**Location:** Wisconsin Department of Natural Resources.

**Partners:** Wisconsin Department of Natural Resources, Forest Service.

### Urban Forestry Images

<http://www.designcenter.umn.edu/nucfac/>

**Description:** The Metropolitan Design Center Image Bank is one of the largest free online image collections on the Internet. Approximately 26,000 photos are available for free. This collection is one of the first to systematically catalog a large collection of land use and urban design images.



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**Benefits:** The Urban Forestry Images add to that resource and create online slide shows linked to downloadable images in the [Image Bank](#) to provide easy access for professionals and civic groups interested in locating images that can demonstrate the value of urban forestry and to connect to other collections of urban forestry related images and information.

**Funded by:** Forest Service, U&CF challenge cost-share program.

**Location:** University of Minnesota, Minneapolis, MN.

**Partners:** University of Minnesota, Metropolitan Design Center.

### Urban Forestry Index (UFind)

<http://www.urbanforestryindex.net/>

<http://www.UrbanForestrySouth.org> is the national repository of this database and provided the mechanism for TreeLink (and anyone) to search the Web site remotely. The Southern Center also downloads and pre-processes the citations from the University of Minnesota Forestry Library.

**Description:** The Urban Forestry Index (UFind) is a database of current and historic urban forestry and arboriculture publications and other media that can be searched by topic, author, title, description, or keyword.

**Benefits:** The Urban Forestry Index provides one comprehensive place to search (searchable database) for informational resources that have been produced by a wide variety of organizations—in all types of formats. The goal is to increase awareness of urban forestry publications and other media, increase access to these materials, and prevent duplication of products that have already been developed. The database makes use of existing indices, when available, and existing Internet technology. The database can also support many users.

**Funded by:** Forest Service—Washington Office and Urban Forestry Centers.

**Location:** Coordinator is based at the Forest Service, St. Paul Field Office (MN).

**Partners:** Forest Service, University of Minnesota Forestry Library, and TreeLink.

### Urban Natural Resources Institute (UNRI)

<http://www.unri.org/>

**Description:** Web site designed to facilitate scientific interactions and receive and address questions from the general public.

**Benefit:** Increased collaboration and ability to address questions.

**Funded by:** Forest Service Northern Research Station.

**Location:** Northern Research Station.

### Urban Tree Cover and Air Quality Planning

<http://www.treescleanair.org>

**Description:** This Web site is dedicated to building the case for urban tree canopy cover inclusion in State Implementation Plans (SIPs). On this Web site are documents critical to (1) understanding the link between trees and air quality and (2) navigating the State air quality improvement planning process.

**Benefit:** The creation and preservation of tree canopy is an innovative strategy being proposed to improve urban air quality and thus help to meet Clean Air Act standards. This project provides a resource center for materials concerning the rationale and process of incorporating urban tree planting into SIPs. It also aims to foster the dialogue between policymakers, air quality regulators, foresters, individuals, and organizations interested in air quality improvement and community forestry.

**Funded by:** Forest Service.

**Location:** Northern Research Station.

**Partners:** Forest Service, National Tree Trust, Center for Chesapeake Communities, and The Davey Tree Expert Company.

**Additional resource:** Strategic Tree Planting as an EPA Encouraged Pollutant Reduction Strategy. <http://www.fs.fed.us/ne/syracuse/Emerging%20Measures%20Summary.pdf>.

### Visual Simulation Kit

<http://www.unl.edu/nac/simulation/index.htm>

**Description:** The visual simulation kit consists of three distinct and complementary pieces. The first is [CanVis](#), an entry-level, image-editing software program that enables resource professionals to create photorealistic simulations with minimal

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computer skills. These simulations can be used to depict proposed conservation practices or urban forestry projects to assist in the planning and decisionmaking process. It runs on a Windows-based computer and requires a Pentium 166 MHz or faster processor with 32 MB of RAM or higher. The second component is the [Visual Simulation Guide](#); a multimedia CD reference manual on how to use image-editing software to create visual simulations for natural resource planning. The guide provides instruction on how to plan a simulation project, acquire images, and accurately locate and size imported objects. The third component is a series of [self-paced tutorial](#) modules that guides the user through hands-on activities for developing skills necessary to create effective visuals.

**Benefits:** The software enables users to edit a scanned photograph or an image from a digital camera. CanVis includes tutorial videos, which show how to use each editing tool, and a collection of [object libraries](#), which contain images of plants, agricultural features, people, wildlife, and park elements that can be quickly added to the base image.

**Funded by:** EPA, Mid-America Regional Council, Forest Service R&D/S&PF, USDA NRCS.

**Location:** USDA National Agroforestry Center.

**Partners:** Mid-America Regional Council, USDA NRCS.



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## Appendix D: Key Regional Technology Transfer Products

### Northeastern Area

<http://na.fs.fed.us/urban/inforesources/index.shtm>

#### Baltimore Ecosystem Study

<http://beslter.org/index.html>

**Description:** The Baltimore Ecosystem Study (BES) aims to understand metropolitan Baltimore as an ecological system. The program brings together researchers from the biological, physical, and social sciences to collect new data and synthesize existing knowledge on how both the ecological and engineered systems of Baltimore work.

**Benefits:** As one of only two Long-Term Ecological Research sites located in an urban environment, the Baltimore Ecosystem Study has a special opportunity to both contribute to and examine ecological management and decisionmaking practices at a range of scales. The general public, students and teachers, and various policymakers and environmental managers all have a stake in the outcome of such an endeavor. Although all ecology educators would assert that understanding the environment has utility, here is the opportunity to test this relationship in a bold and long-term fashion.

**Funded by:** National Science Foundation, Forest Service, U.S. Department of Agriculture (USDA).

**Location:** Baltimore, MD.

**Partners:** National Science Foundation, Long-Term Ecological Research Network, Forest Service, U.S. Geological Survey, Parks and People of Baltimore, and Natural Resources Conservation Service.

#### Conservation Planning Atlas (Midwest Version)

<http://www.unl.edu/nac/atlas/index.htm>

**Description:** The Conservation Planning Atlas (Midwest Version) is compilation of maps produced by various government and nongovernmental agencies. The purpose of the atlas is to provide a general overview of issues that may affect conservation

planning. The atlas consists of both national- and regional-scale maps. Each map includes a description and references or Internet links for additional information.

**Benefits:** The goal of the atlas is to encourage a regional-scale perspective in all areas of conservation planning efforts. The atlas can provide guidance for prioritizing projects and creating policy change.

**Funded by:** Forest Service Rocky Mountain Research Station, and The University of Missouri Center for Agroforestry, Agricultural Research Service—Dale Bumpers Small Farms Research Center at Booneville, AR, and U.S. Environmental Protection Agency (EPA).

**Location:** National Agroforestry Center, Lincoln, NE.

**Partners:** Forest Service Rocky Mountain Research Station, and The University of Missouri Center for Agroforestry, Agricultural Research Service—Dale Bumpers Small Farms Research Center at Booneville, AR, and EPA.

#### Landscape Change Integrated Program

<http://ncrs.fs.fed.us/4153/deltaIMS/>

**Description:** The Landscape Change Integrated Program combines the efforts of scientists to develop a better understanding of land use and land cover change and to develop knowledge and tools to help people make informed choices about how they use natural resources.

**Benefits:** The program answers the following questions: How is the landscape changing, what drives landscape change, what are the consequences of landscape change, and what can be done about it?

**Funded by:** Forest Service.

**Location:** Northern Research Station.

#### Living Memorials Project

<http://www.livingmemorialsproject.org/landmark.htm>

<http://www.livingmemorialsproject.org>

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**Description:** Because of the overwhelming desire to honor and memorialize the tragic losses that occurred on September 11, 2001 (9-11), the United States Congress asked the Forest Service to create the Living Memorials Project (LMP). This initiative invokes the resonating power of trees to bring people together and create lasting, living memorials to the victims of terrorism, their families, communities, and the Nation. Living memorials are spaces created, used, or re-appropriated by people as they employ the landscape to memorialize individuals, places, and events. Ranging from single tree plantings, to the creation of new parks, to the rededication of existing forests, hundreds of groups across the country created a vast network of sites that continues to grow. Land-markings: 12 Journeys through 9/11 Living Memorials is a multimedia exhibition that compresses 4 years of research data and analysis on more than 700 living memorials into 12 digitally authored journeys. Social science researchers, urban ecologists, designers, and architects collaborated to collect, analyze, and present this dispersed collective response to the tragedy of September 11, 2001.

**Benefits:** Researchers created a national registry that serves as an online inventory of hundreds of community-based, living memorial sites. Memorials created from 2001 to 2004 are displayed on a national map, which will continue to be updated as new site locations are identified, registered, and uploaded to the site. Findings from the first years of research, as well as a “tool-box” of resources and designs, are available. This interpretation presents memorials not only as mechanisms by which events and individuals are marked but also as interpretations of the function and spatial location of these remembrances, treating them as emergent forms that outline how people interact with public landscapes.

**Funded by:** Forest Service.

**Location:** Northeastern Area.

**Partners:** Forest Service, NA S&PF, NRS, Urban Resources Initiative, Urban-Interface, OASIS, Parsons The New School, Tishman Environment and Design Center, and Meristem, Inc.

### **Northern Trees—Online Selection**

<http://orb.at.ufl.edu/TREES/index.html>

**Description:** This Web site helps guide users through the process of tree selection and provides a list of possible trees in the Northeast United States, hardiness zones 2–7 ([Click here if you live in zones 8–11](#)). It is also designed to provide extensive cultural and maintenance information and many photographs.

**Benefits:** The Tree Selector Web site enables users to develop a list of trees based on their soil, site, and plant attributes.

**Funded by:** Forest Service.

**Location:** University of Florida.

**Partners:** Forest Service, University of Florida, and Rutgers Cooperative Extension.

### **Trees Pay Us Back**

<http://www.na.fs.fed.us/urban/treespayusback/index.shtm>

**Description:** This Web site lists various important products that supplement the i-Tree program, and help with communicating the benefits of trees including: Minneapolis Municipal Tree Resource Analysis, Assessing Urban Forests Effects and Values, Midwest Tree Guide, Trees in Our City ppt, Human Dimensions of Urban Greening, Conveying the Power of Trees, and Planting the Seeds of Success.

**Benefits:** All the products summarize the values that result from planting and caring for trees in urban environments. They also encourage communities to use the i-Tree results as a guide in strategic planting.

**Funded by:** Forest Service, Northeastern Area.

**Location:** Northeastern Area.

### **Tree Emergency Plan Worksheet**

[http://www.na.fs.fed.us/urban/ucfdisasters/tree\\_emerg\\_plan/TreeEmerPlanWkSheetJune2006.pdf](http://www.na.fs.fed.us/urban/ucfdisasters/tree_emerg_plan/TreeEmerPlanWkSheetJune2006.pdf)

**Description:** This worksheet outlines the important features that need to be decided and assembled to best prepare for a storm. The worksheet is available as a Word or pdf file so users can write or type in responses.

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**Benefits:** Communities that complete the form will be well prepared to effectively respond to and recover from a storm, minimizing damage and costs.

**Funded by:** Forest Service, Northeastern Area.

**Location:** Northeastern Area.

**Partners:** Katie Himanga (Urban Forestry Consultant) and Jim Hermann (Minneapolis Park and Recreation Board).

### **Urban and Community Forestry Appreciation Tool Kit**

<http://www.na.fs.fed.us/urban/inforesources/ucftoolkit/ucftoolkit.shtm>

**Description:** The tool kit was developed to promote U&CF as a crucial component of livability in communities and targets decisionmakers as champions for message delivery.

**Benefits:** Promotes continued investment in community trees by enlisting support for tree care and planting programs. Kit products include: Top 10 Reasons We Need Trees Flyer, sample letter to the editor, sample action alert, fact sheets on benefits of trees, press articles, and PowerPoint presentation.

**Funded by:** U&CF challenge cost-share program.

**Location:** Newtown Square, PA.

**Partners:** Forest Service, Northeastern Area State and Private Forestry, Ohio DNR, New Jersey DEP Community Forestry program, Maryland DNR Forest Service, Pennsylvania DCNR Rural Section Program, Delaware DOA Forest Service, District of Columbia Urban Forestry Administration, and West Virginia DOF Urban Forestry program.

### **Urban Projects Newsletter**

[http://www.na.fs.fed.us/urban/hottopics/Urban\\_Projects\\_Spring\\_2006.pdf](http://www.na.fs.fed.us/urban/hottopics/Urban_Projects_Spring_2006.pdf)

**Description:** Periodic newsletter produced by the Morgantown field office. The newsletter highlights a particular project and a partner, provides news from the Forest Service and Mid-Atlantic States, presents research findings and new technology transfer products, and lists new calendar items.

**Benefits:** Keeps Mid-Atlantic customers fully apprised of current news, products, and events in U&CF.

**Funded by:** Forest Service, Northeastern Area.

**Location:** Mid-Atlantic Center for Urban and Community Forestry.

**Archived newsletters:** <http://www.na.fs.fed.us/urban/newsltr/archives.shtm>.

### **Urban Watershed Forestry Manual**

[http://www.cwp.org/Resource\\_Library/Special\\_Resource\\_Management/forestry.htm](http://www.cwp.org/Resource_Library/Special_Resource_Management/forestry.htm)

**Description:** This three-part manual series is designed to protect and restore urban watersheds and is particularly focused on using trees for stormwater treatment and planting trees in the urban landscape. The three parts of the manual series are as follows:

[Part 1: Methods for Increasing Forest Cover in a Watershed.](#)

[Part 2: Conserving and Planting Trees at Development Sites.](#)

[Part 3: Urban Tree Planting Guide.](#)

**Benefits:** The manual introduces the emerging topic of urban watershed forestry and presents new methods for systematically measuring watershed forest cover and techniques for maintaining or increasing this cover. It presents specific ways to enable developers, engineers, or landscape architects to incorporate more trees into a development site. The manual also introduces conceptual designs for stormwater treatment practices that use trees as part of the design, and it provides detailed guidance on urban tree planting that is applicable at both the development site and the watershed scale.

**Funded by:** Forest Service.

**Location:** Center for Watershed Protection, Ellicott City, MD.

**Partners:** Forest Service, Center for Watershed Protection.

### **Southern Area**

<http://www.urbanforestrysouth.org/>

<http://www.interfacesouth.org/>

### **Changing Roles: Wildland-Urban Interface Professional Development Program**

[http://www.interfacesouth.org/products/training/changing\\_roles.html](http://www.interfacesouth.org/products/training/changing_roles.html)

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**Description:** This program provides State and Federal natural resource agencies with a set of flexible resources to conduct their own training programs, aimed toward building skills and tools to successfully tackle WUI issues.

**Benefits:** These professional development modules were designed to assist agencies at the forefront of the rapid transition of the southern landscape. The South has the greatest private land ownership and the fastest population growth of any other region of the Nation. This professional development program will help agency staff better understand the wildland-urban interface issues within a local policy framework and communicate the management of forests and other natural areas with the best available science.

**Funded by:** Southern Group of State Foresters, Southern Research Station, U.S. Fish & Wildlife.

**Location:** InterfaceSouth Web site.

**Partners:** University of Florida, Southern Group of State Foresters, and U.S. Fish & Wildlife.

**Cooperators:** Virginia Tech, Auburn University, Southern Regional Extension Forestry, and North Carolina State University.

### **Gulf Coast Tree Assessments—Hurricane Katrina**

**Description:** The Southern Center for Urban Forestry Research & Information (SCUFR&I) recently coordinated the Gulf Coast Tree Assessment Project (GCTA) in Louisiana and Mississippi. More than 35 Certified Arborists volunteered to work in the area affected by Hurricane Katrina and helped complete assessments in Orleans, Jefferson, and St. Tammany parishes in Louisiana and Harrison and Hancock counties in Mississippi during the past 6 months.

The volunteers, all experienced arborists or urban foresters, were trained in a rapid tree assessment procedure based on current arboricultural practices, which includes the following:

- A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd Edition, 1994, Nelda Matheny and James R. Clark, International Society of Arboriculture.
- Urban Tree Risk Management: A Community Guide to Program Design and Implementation, NA-TP-03-03, 2003, Richard J. Hauer and Gary R. Johnson, Forest Service.

During the project, thousands of trees on public and private property were evaluated that represent a risk to the public (e.g., on and along street rights-of-ways and in parks). The objective of the assessment was to make recommendations that would help communities reduce or eliminate that risk. Reducing or eliminating risk is accomplished by either pruning damaged limbs or, when necessary, removing the tree.

Tree assessments that resulted in a recommendation for tree removal included: cracked trunks, broken structural roots, root plate lifted and/or leaning trees, and standing dead trees.

#### **Benefits:**

- Direct assistance to local communities affected by the disaster.
- Timely risk assessments by professionals along public Rights-of-Way.
- Demonstrate role of professional management to communities.
- Maps & data to facilitate local community discussions with FEMA.
- Opportunity of engage FEMA as professionals.
- National “springboard” for better coordination with FEMA and the Army Corps of Engineers for disaster planning and recovery.

**Funded by:** Many sources of funding were tapped that included Region 8 S&PF, Southern Research Station, Northeastern Area S&PF (St. Paul), State forestry agencies, professional organizations, local communities, and local nonprofits.

**Partners:** The project was a partnership of professional organizations, industry, local communities, and State and Federal agencies that have an interest in urban forestry. The Society of Municipal Arborists and the International Society of Arboriculture asked arborists experienced in storm mitigation and recovery to assist Gulf Coast communities in the evaluation of trees that remained following their initial storm cleanup.

- Mississippi Forestry Commission.
- Louisiana Department of Agriculture & Forestry.

- Mississippi State Cooperative Extension Service.
- International Society of Arboriculture.
- Society of Municipal Arborists.
- Volunteer arborists & urban foresters.
- The Davey Tree Expert Company.
- Land Trust for the Mississippi Coastal Plain.
- City of Biloxi, MS.
- City of Ocean Springs, MS.
- City of New Orleans (City Park).
- Community of Lake Vista.
- City of Kenner, LA.
- Jefferson Parish, LA.
- St. Tammany Parish, LA.
- City of Mandeville, LA.
- City of Covington, LA.
- Hancock County, MS.
- Local volunteers.

### **i-Tree Case Studies**

**Description:** i-Tree is a state-of-the-art, peer-reviewed software suite from the Forest Service that provides U&CF analysis and benefits assessment tools. The Southern Center for Urban Forestry Research & Information is committed to supporting the use of this suite of tools in the Southern Region.

To better understand their role in promoting the use of these tools, the Southern Research Station partnered with urban foresters of the Georgia Forestry Commission to test the data collection protocol and reporting with two small communities near Athens. In addition to presentations to each of the community's Tree Boards, the results of these test inventories will be displayed at the 2006 Annual Conference of the Georgia Urban Forest Council and staff will use the knowledge and experience already gained to train Region U&CF Coordinators at their winter training meeting.

**Benefits:** By the center developing these case studies, local communities benefit by obtaining a street tree valuation, State agency staff get a hands-on introduction to i-Tree, and State

U&CF Coordinators have a specific example of i-Tree (STRATUM) implementation. In addition, center staff benefit from the direct experience.

**Funded by:** Region 8, S&PF, Southern Research Station.

**Partners:** Georgia Forestry Commission; City of Newborn, GA; City of Social Circle, GA; and Georgia Urban Forest Council.

### **U&CF Web Site**

[www.UrbanForestrySouth.org](http://www.UrbanForestrySouth.org)

**Description:** The objective of the Urban Forestry South (UFSe) is to provide a user-friendly, accessible, and relevant (useful and up-to-date) Internet site that will help customers easily find information and services they need.

The primary audience for UFSe is described as the "professional" urban forestry community. That is, those individuals who work, on a day-to-day basis, with the creation, protection, and management of urban and community forests. This audience includes State U&CF coordinators, other State forestry agency staff, researchers, State extension foresters, university service and outreach representatives, county and regional extension agents involved locally with urban forestry issues, municipal arborists and urban foresters, other urban foresters and arborists (consulting and commercial), and staff of nongovernmental organizations (i.e., urban forest councils, land trusts, and others).

A secondary audience includes staff and elected officials of local governments and their volunteers serving on tree boards or other advisory committees that deal with U&CF issues.

UFSe is designed as a user-supported site. This designation means that UFSe users who "register" and "log in" to the site will be encouraged to submit information (content) for inclusion.

UFSe is a primary communication tool among the Forest Service, State U&CF Coordinators, and State Urban Forest Councils in this region.

### **Key components:**

- Support for State U&CF coordinators and Urban Forest Councils.



- Searchable Tree Ordinance database (December 2006).
- Support for State U&CF Coordinator CARS reporting: Tree Ordinances (December 2006): <http://www.urbanforestrysouth.org/Resources/Ordinances>. Management Plans (2007). Professional Management (2007). Organizations (Implemented): <http://www.urbanforestrysouth.org/Contacts/Organization>.
- Support for post-secondary urban forestry education.

**Benefits:**

- State-of-the-Art Content Management System (CMS).
- Provides a flexible framework for knowledge dissemination.
- Enables any user to submit information for inclusion onto the Web site.
- Directly supports State U&CF programs.

**Funded by:** Region 8, S&PF, Southern Research Station, Southern Group of State Foresters, Southern Region Extension, Warnell School of Forestry & Natural Resources.

**Partners:** Warnell School of Forestry & Natural Resources, Southern Region Extension, Southern Group of State Foresters.

**Pacific Southwest Area**

<http://www.fs.fed.us/psw/programs/cufr/>

**Municipal Forest Resources Analyses**

[http://www.fs.fed.us/psw/programs/cufr/research/studies\\_detail.php?ProjID=151](http://www.fs.fed.us/psw/programs/cufr/research/studies_detail.php?ProjID=151)

**Description:** These reports provide detailed knowledge on a particular city’s tree resource. They include urban forest structure, function, and value, along with resource management needs. A summary of annual benefits is provided that includes energy conservation, air quality, stormwater runoff control, and property value increase.

**Benefits:** Each of the cities represented in this research will be better able to justify funding, evaluate program cost-efficiency and alternative management structures, understand the relationship of trees to local quality of life issues, and develop alternative funding sources.

**Funded by:** Forest Service, participating municipality.

**Partners:** Forest Service, University of California Department of Land, Air and Water Resources, and cities of Charleston, SC; Glendale, AZ; Fort Collins, CO; Berkeley, CA; Charlotte, NC; Boulder, CO; Minneapolis, MN; Cheyenne, WY; Santa Monica, CA; Albuquerque, NM; and Bismarck, ND.

**Tree Guides**

[http://www.fs.fed.us/psw/programs/cufr/tree\\_guides.php](http://www.fs.fed.us/psw/programs/cufr/tree_guides.php)

**Description:** Tree Guides identify and describe the benefits and costs of planting trees in a specific climate region to assist community officials and tree managers increase public awareness and support for tree programs.

**Benefits:** The guides can be used by any of the cities within the particular climate zone covered by the guide. Each guide answers a number of questions about the environmental and aesthetic benefits community trees provide:

- What is their potential to improve environmental quality, conserve energy, and add value to communities?
- Where should residential and public trees be placed to maximize their cost-effectiveness?
- Which tree species will minimize conflicts with powerlines, sidewalks, and buildings?

**Funded by:** Forest Service, reference city municipality.

**Partners:** Forest Service, University of California Department of Land, Air and Water Resources, and cities of Modesto, CA; Glendale, AZ; Fort Collins, CO; Longview, WA; Claremont, CA; Santa Monica, CA; Charlotte, NC; and Minneapolis, MN.

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## Appendix E: National Technology Transfer Team

The Urban and Community Forestry (U&CF) National Technology Transfer Team of 23 members is composed of urban forestry professionals, technology transfer specialists, research scientists, university professionals, not-for-profit organizations, and other external partners. The team's ongoing role is to periodically review the technology transfer activities of the Forest Service, U.S. Department of Agriculture (USDA), U&CF Program, establish new directions and goals as needed, and provide project leadership in accomplishing the various team objectives.

The team currently serves at the pleasure of the director of U&CF and is administered by the National Technology Transfer Team Leader (Jim Geiger, Acting). An annual face-to-face meeting is held in conjunction with periodic conference calls and special subgroup meetings as needed.

The team's 5-year objectives, 2006–10, as established at the last annual meeting, are as follows:

- **Increase our partnerships beyond the U&CF community (Customers):** Collaboratively use U&CF technology to include green infrastructure in sustainable community planning.  
Champion, Bill Hubbard
- **Improve delivery of U&CF products and information (Delivery):** Use market research to develop and disseminate user-friendly U&CF material.  
Champion, Jill Johnson
- **Implement feedback process to determine success of technology transfer (Feedback):** Ensure that right messages and products reach intended audiences.  
Champion, Donna Murphy
- **Introduce marketing to the U&CF community (Marketing):** Promote the use of market research and marketing strategies to improve delivery of U&CF products and science-based knowledge for targeted audiences.  
Champion, Jim Geiger

The members for 2007 are as follows:

**Eric Berg**, Community Forester, Nebraska Forest Service, Lincoln, NE, [eberg2@unlnotes.unl.edu](mailto:eberg2@unlnotes.unl.edu)

**Dave Bloniarz**, Coordinator, Forest Service, Northern Research Station, Urban Natural Resources Institute, Amherst, MA, [dbloniarz@fs.fed.us](mailto:dbloniarz@fs.fed.us)

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**Ed Dickerhoof**, Economist, Forest Service, Resource Valuation and Use Research Staff, Washington, DC, [edickerhoof@fs.fed.us](mailto:edickerhoof@fs.fed.us)

**Margie Ewing**, State & Private Forestry Specialist, Forest Service, Region 1 and 4, Missoula, MT, [mewing@fs.fed.us](mailto:mewing@fs.fed.us)

**James Geiger**, Acting National Technology Transfer Team Leader, U&CF, Forest Service, Davis, CA, [jgeiger@fs.fed.us](mailto:jgeiger@fs.fed.us)

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**Annie Hermansen-Baez**, Center Manager, Forest Service, Southern Research Station, InterfaceSouth, Gainesville, FL, [ahermansen@fs.fed.us](mailto:ahermansen@fs.fed.us)

**Bill Hubbard**, Extension Forester, Cooperative Extension Service—Southern Region, The University of Georgia, Athens, GA, [hubbard@smokey.forestry.uga.edu](mailto:hubbard@smokey.forestry.uga.edu)

**Jill Johnson**, Center Coordinator, Forest Service, Northern Area, Midwest Center for Urban & Community Forestry, St. Paul, MN, [jilljohnson@fs.fed.us](mailto:jilljohnson@fs.fed.us)

**Bill Kruidenier**, Coordinator of External Relations, Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana, IL, [kruideni@uiuc.edu](mailto:kruideni@uiuc.edu)

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**Barbara McDonald**, Social Scientist, Forest Service,  
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**Donna Murphy**, Center Coordinator, Forest Service, Northern  
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**Rick Olson**, Urban Forest Coordinator, Mississippi Forestry  
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**Pepper Provenzano**, Director, TreeLink, Salt Lake City, UT,  
[pepper@treelink.org](mailto:pepper@treelink.org)

**Richard Straight**, Lead Agroforester, Forest Service, National  
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**Alice Ewen Walker**, Executive Director, Alliance for Com-  
munity Trees, Washington, DC, [alice@actrees.org](mailto:alice@actrees.org)

**Lynn Westphal**, Lead Scientist, Forest Service, Northern  
Research Station, Evanston, IL, [lwestphal@fs.fed.us](mailto:lwestphal@fs.fed.us)

**Joe Wilson**, Executive Director, Keep Greater Milwaukee  
Beautiful/Greening Milwaukee, Milwaukee, WI,  
[joewilson@greeningmilwaukee.org](mailto:joewilson@greeningmilwaukee.org)  
(Current Chair of NUCFAC)

**Kathy Wolf**, Research Social Scientist, College of Forest  
Resources, University of Washington, Seattle, WA,  
[kwolf@u.washington.edu](mailto:kwolf@u.washington.edu)

Northeastern Area U&CF State Coordinator, (position open)

**Ex officio members:**

**Peggy Harwood**, U&CF, Forest Service, Washington Office

**Susan Mockenhaupt**, U&CF, Forest Service, Washington  
Office

**Steve Marshall**, Acting Director, U&CF, Forest Service,  
Washington Office

**Phillip Rodbell**, U&CF, Forest Service, NA

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## Appendix F: National Urban and Community Forestry Advisory Council

### NUCFAC: Making Your Voice Count for the Health of Urban Environments

The National Urban and Community Forestry Advisory Council (NUCFAC) was established to advise the Secretary of Agriculture on the national Urban and Community Forestry (U&CF) Program. The purpose of the council is to develop a comprehensive national U&CF action plan, evaluate the implementation of that plan, and develop criteria for and submit recommendations for funding the U&CF challenge cost-share program. More than 160 projects have been completed in the 15 years since NUCFAC was authorized.

The U&CF challenge cost-share program directly supports national level projects that intentionally translate and apply science to local situations. The U&CF challenge cost-share program is also an unusual grant source in that investigators are expected to do technology transfer as part of their research outcomes. This strategy has encouraged a direct link between knowledge building and fact sharing.

### Members

**Brenda M. Allen** serves as one of two members representing academic institutions with an expertise in U&CF activities. She is an assistant professor, School of Forestry and Wildlife Sciences, Auburn University. She is also an extension specialist—Urban Forestry, Alabama Cooperative Extension System. [allenbm@auburn.edu](mailto:allenbm@auburn.edu)

**Catalino Blanche** is the member representing U.S. Department of Agriculture (USDA) Extension Service. He serves as the national program leader, Natural Resources and Environment, USDA CSREES. [cblanche@csrees.usda.gov](mailto:cblanche@csrees.usda.gov)

**Juan Carlos Cervantes** serves as the member representing professional renewable natural resource or arboricultural societies. He is the former director of science and research for the International Society of Arboriculture (ISA). [juanc.cervantes@gmail.com](mailto:juanc.cervantes@gmail.com)

**James E. Hubbard** serves as the member representing the Forest Service, USDA. He is the deputy chief, State and Private Forestry. He is located in the Forest Service's headquarters in Washington, DC. [jehubbard@fs.fed.us](mailto:jehubbard@fs.fed.us)

**J. James Kielbaso** serves as the member who is not an officer or employee of any government body living in a city with a population of less than 50,000 and who has experience and has been active in U&CF. He has served on the Meridian Township Environmental Commission for 11 years. He also taught and was involved in extension work at Michigan State University for 36 years. [kielbas3@msu.edu](mailto:kielbas3@msu.edu)

**Melanie R. Kirk** serves as one of two members representing academic institutions with an expertise in U&CF activities. She is the urban and community forestry extension program specialist with the Texas Cooperative Extension. [mrkirk@tamu.edu](mailto:mrkirk@tamu.edu)

**Dan Lambe** serves as one of two members representing national nonprofit forestry and conservation citizen organizations. Dan is vice president of programs at the National Arbor Day Foundation. [dlambe@arborday.org](mailto:dlambe@arborday.org)

**W. Neil Letson** serves as the member representing State government. He is the State urban forestry coordinator for Alabama. [neil.letson@forestry.alabama.gov](mailto:neil.letson@forestry.alabama.gov)

**Carl Nordstrom** serves as the member representing forest products, nursery, or related industries. Carl is executive director of the New Jersey Nursery and Landscape Association. [NJNLA1@aol.com](mailto:NJNLA1@aol.com)

**Suzanne Probart** serves as the member representing urban forestry, landscape, and design consultants. Suzanne owns Southwest Interiorscape, Ltd., and is executive director of Tree New Mexico. [tnm@treenm.com](mailto:tnm@treenm.com)

**Stephen Shurtz** serves as the member representing city/town government. He is landscape and forestry manager for the city of Baton Rouge, Louisiana. [sshurtz@brgov.com](mailto:sshurtz@brgov.com)

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**Steve Sinclair** is the member representing State forestry agencies or equivalent State agencies. He is the State forester of the Vermont Department of Forests, Parks, and Recreation. He is also the chair of the National Association of State Foresters' Urban and Community Forestry Committee. [steve.sinclair@state.vt.us](mailto:steve.sinclair@state.vt.us)

**Alice Ewen Walker** serves as one of two members representing national nonprofit forestry and conservation citizen organizations. She is executive director for the Alliance for Community Trees. [alice@actrees.org](mailto:alice@actrees.org)

**Bobbi Wallace** serves as the member representing county government. She is a native of Washington State and serves the citizens living in the city of Kirkland as the manager for surface and wastewater. [bwallace@ci.kirkland.wa.us](mailto:bwallace@ci.kirkland.wa.us)

**Joe Wilson** is the member who is not an officer or employee of any government body living in a city with a population of more than 50,000 and who has experience and has been active in U&CF. Joe is the current chair of the Council. He is executive director of Keep Greater Milwaukee Beautiful/Greening Milwaukee. [joewilson@greeningmilwaukee.org](mailto:joewilson@greeningmilwaukee.org)

**Laurence (Larry) Wiseman** serves as one of two members representing national nonprofit forestry and conservation citizen organizations. Larry is president of the American Forest Foundation. [lwiseman@forestfoundation.org](mailto:lwiseman@forestfoundation.org)

## **NUCFAC and the U&CF Challenge Cost-Share Projects**

More than 160 projects have been completed in the 11 years since NUCFAC began. The following list includes all active projects and the most recently completed projects by project category:

### **1. Advancing the Emerging Field of Green Infrastructure and Sustainable Urban Ecosystem Development**

- Compounding the Impact: Train-the Trainer Urban Forestry Education.

- Urban Forest Management and Public Works: Improving Communications and Building Capacity.

### **2. Communicating the Value of Urban Forestry**

- The Forest in Our Backyard.
- Online Urban Forestry Images.
- Talking Trees: Integrating Urban Forestry Into Local Government's Sustainability and Emissions Reduction Initiatives.
- The Return of American Elms to America's Main Street: A National Teachable Moment for the Value of Urban Trees.
- Big Trees = Big Values.
- CTMI: Community Tree Management Institute.
- Urban Trees and Municipal Value: Communicating What a Park System Is Worth to a City.

### **3. Grassroots Funding Initiative**

- Leadership From the Grassroots Up.

### **4. Nationwide Database for Lidar Satellite Imaging of Urban Forest Canopy**

- Development and Implementation of a Prototype for Nationwide Urban Forest Canopy Database: A Prototype for the Southeastern United States.

### **5. Replication and Transfer of Model Urban Forestry Programs**

- Five Regional Urban Trees—Clean Air Conferences.
- Develop and Present a Three-Day Workshop for Sharing the Greenprint Model.

### **6. U&CF for and With Minority and Underserved Populations**

- Guidebook on How To Start and Run a Youth Tree Care Program.
- Los Bosques en Nuestras Ciudades (The Forests in Our Cities).

- Honoring Mother Earth: Engaging Native Americans in Community Restoration.
- Trees and Positive Youth Development: Research on Effect of Urban Forestry Work Experiences on Inner City, Underserved Adolescents.
- Strengthening and Diversifying the Community Forestry Movement: An Innovative Technical Assistance and Capacity-Building Model for Minority and Underserved Communities.
- National Assessment of Minority and Underserved Populations' Experiences in Urban and Community Forestry.
- Southeast Asian Initiative for Urban and Community Forestry.

#### **7. U&CF Projects That Promote Livable Communities**

- Development of a Green Infrastructure Technology That Links Trees and Engineered Soil To Minimize Runoff From Pavement.
- Plants for a Livable Delaware.
- Cost Effective Sidewalk Planting Site Re-Habilitation.

#### **8. Urban Forest Resource Management**

- "Trees are Good for Green Cities" Model.

### **Recently Completed U&CF Challenge Cost-Share Projects**

#### **1. Costs and Benefits of Urban Forest Projects**

- Study of the Effect of Vegetation on Micro-Climates and Residential Energy Use in Ann Arbor, Michigan.
- The Forest Where We Live.

#### **2. Creative and Innovative Projects**

- Conveying the Power of Trees: A National Outreach Effort.
- Computer Animated Stormwater Runoff Model.

#### **3. Economic Impact of Urban Forests on a Business or Community**

- The Economic Impact of Urban Trees in Commercial Districts: A Greater New York/New Jersey Area Study.
- The Influence of Trees on the Appraised Value of Urban Land.

#### **4. Education, Communication, and Outreach Projects**

- Electronic Media Tutorial Programs To Improve Urban Tree Establishment and Maintenance.
- Trees2K.
- Tree City USA Bulletins.

#### **5. Guidebook for Assisting Communities To Develop a Sustainable Urban and Community Forestry Program**

- Sustainable U&CF Program Guidebook.

#### **6. Internet Clearinghouse of Urban Forestry**

- The TreeLink Project.

#### **7. Model Municipal and Volunteer Programs**

- A Model for Urban Forest Sustainability.
- Teen's Forestry Organization for Russell Community Enhancement: T-FORCE.

#### **8. National Assessment of Current Urban and Community Forestry Programs**

- National Assessment of Current Urban and Community Forestry Programs.

#### **9. National Urban and Community Forestry Research Assessment**

- National Urban and Community Forestry Research and Technology Transfer Assessment.

#### **10. Public's Knowledge of Urban Forest Benefits and Values**

- Public Knowledge of Urban Forest Benefits and Values in Commercial and Retail Environments.

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**11. Research and Technology Development**

- The Influence of Urban Soil Condition and Modifications on Transplanted Tree Performance.
- Urban Forest Tree Growth and Global Climate Change: Sugar Maple as an Indicator Species.

**12. U&CF Projects That Promote Livable Communities**

- Livable Communities and Urban Forestry: You Can't Have One Without the Other.
- Re-Designing Neighborhood Parks and Town Squares.
- Watershed Analysis and Issue Characterization for Urban Forestry Education and Outreach.

**13. Urban Forestry Educational Material for City or State Government**

- The Green Infrastructure Guide: Planning for a Healthy Urban and Community Forest Ecosystem.
- Greening the Garden State: Trees New Jersey Community Forestry Materials.

**14. Urban Forestry Informal Education Programs in the United States**

- Common Knowledge: Turning Local Gems Into National Treasures.

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## Appendix G: Sustainable Urban Forests Coalition

The Sustainable Urban Forests Coalition (SUFC) is a national coalition to advance a unified urban forest agenda for our Nation's communities. The coalition views urban forests as the aggregate of all vegetation and green spaces within communities that provide benefits vital to enriching the quality of life.

In a time of both increasing demand for urban forest benefits and tightened budgets, coalition members seek to work together to enhance the impact of urban forest organizations on communities nationwide. They have prepared concise, science-based products that are intended to inform national policy and budget leadership. SUFC also encourages or develops products that are suited for the leadership and members of a coalition of organizations with interest in urban greening.

Individually, each coalition member organization is strong and serves their constituencies well. However, a unified national coalition will strengthen relationships, take better advantage of synergies between like-minded organizations, and raise the national profile of urban forests, their benefits, and the people who help keep urban forests healthy.

More than 100 local and State organizations signed on in support of SUFC's FY 2007 funding recommendations for Federal investments in urban forests, a reflection of the broad nationwide support for U&CF.

### Members

#### **Alliance for Community Trees**

*Alice Ewen Walker*

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#### **American Forests**

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#### **American Nursery & Landscape Association**

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[jjhinrichs@rcn.com](mailto:jjhinrichs@rcn.com)**Convener Host: *International Society of Arboriculture***

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## Appendix H: Select List of Partners

This list of partners represents not only many of the traditional partners but also new alliances that are just being made or need to be made to create more sustainable urban forests for the future. Some partners have produced very attractive secondary and tertiary products that conscientiously report the science and address concerns and issues specific to very influential audiences.

Even though these partners are not directly generating the science or knowledge, they are instrumental in placing it before the people who can act on it. Most of them help connect the research to the language and issues that are important to local leadership. Many invite scientists to their regional and national meetings, enabling direct sharing and interaction. This networking often results in further partnering, and even future research collaborations.

**Alliance for Community Trees (ACT)**, Alice Ewen Walker, [alice@actrees.org](mailto:alice@actrees.org)  
<http://www.actrees.org/site/>, Beltsville, MD, 301–220–2251

ACT's mission is to support grassroots, citizen-based nonprofit organizations dedicated to urban and community tree planting, care, conservation, and education.

**American City and County**, Lindsay Isaacs, Managing Editor, [lisaacs@prismb2b.com](mailto:lisaacs@prismb2b.com)  
<http://www.americancityandcounty.com/>

*American City and County* has been the voice of State and local governments since 1909. The magazine serves a powerful audience of city, county, and State officials who are charged with developing and implementing government policy, programs, and projects. The magazine maintains its leadership position by providing these readers with news, government trends, policy alternatives, and operational solutions.

**American Forests**, Deborah Gangloff, [gangloff@amfor.org](mailto:gangloff@amfor.org)  
<http://www.americanforests.org/>, Washington, DC, 202–737–1944

American Forests is a world leader in planting trees for environmental restoration, a pioneer in the science and practice of urban forestry, and a primary communicator of the benefits of trees and forests. As part of their efforts to improve urban forests they developed CITYgreen software. It is a powerful GIS application for land use planning and policymaking. The software conducts complex statistical analyses of ecosystem services and creates easy-to-understand maps and reports. CITYgreen calculates dollar benefits based on specific site conditions. The development of the software was funded in part by the Forest Service, U.S. Department of Agriculture.

**American Nursery & Landscape Association (ANLA)**, Robert Dolibois, Executive Vice President,  
<http://www.anla.org/staff/index.htm>, Washington, DC, 202–789–2900

The ANLA, organized in 1876, is the national trade association of the nursery and landscape industry. ANLA provides education, research, public relations, and representation services to members. This support enables them to operate more effectively and to provide the public with quality plants, landscape design and installations, and related products and services.

**American Planning Association**, Peter Hawley, [phawley@planning.org](mailto:phawley@planning.org)  
<http://www.planning.org/>, Washington, DC, 202–872–0611

The American Planning Association is a nonprofit public interest and research organization representing 39,000 practicing planners, officials, and citizens involved with urban and rural planning issues. APA's objective is to encourage planning that will meet the needs of people and society more effectively.

*Zoning Practice* is a periodic newsletter that can help local communities with planning issues by providing guidance in writing and administering smart development codes. *Zoning Practice* also provides access to ordinances, reports, and other information featured in APA articles. Obtain a subscription at <http://www.planning.org/zoningpractice/index.htm>.

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**American Public Works Association**, Lisa Pogue,  
[lpogue@apwa.net](mailto:lpogue@apwa.net)  
<http://www.apwa.net/>, Washington, DC, 202-408-9541

The American Public Works Association is an international educational and professional association of public agencies, private sector companies, and individuals dedicated to providing high-quality public works goods and services.

**American Society of Landscape Architects**, Nancy Somerville, [nsomerville@asla.org](mailto:nsomerville@asla.org)  
<http://www.asla.org/>, Washington, DC, 888-999-ASLA

ASLA promotes the landscape architecture profession to more than 16,000 members and advances the practice through advocacy, education, communication, and fellowship.

**Center for Public Environment Oversight (CPEO)**, Lenny Siegel, Director, [lsiegel@cpeo.org](mailto:lsiegel@cpeo.org)  
<http://www.cpeo.org/>, Mountain View, CA, 650-961-8918

In cooperation with the Urban Habitat Program and the United Church of Christ Commission on Racial Justice, the CPEO has sponsored the formation of the National Brownfields Environmental Justice/Community Caucus to develop common solutions to common problems and establish a dialogue not only with government policymakers but also with private-sector Brownfields interests. CPEO will support the caucus with a range of activities, including the already functioning Brownfields Internet Forum, Citizen's Report on Brownfields newsletter.

**Center for Watershed Protection**, Hye Yeong Kwon, Executive Director, [hyk@cwpp.org](mailto:hyk@cwpp.org)  
<http://www.cwpp.org/>, Ellicott City, MD, 410-461-8323

The Center for Watershed Protection provides local governments, activists, and watershed organizations around the country with the technical tools for protecting some of the Nation's most precious natural resources: our streams, lakes and rivers. The center has developed and disseminated a multidisciplinary strategy to watershed protection that encompasses watershed planning, watershed restoration, stormwater management, watershed research, better site design, education and outreach, and watershed training.

**Center of Excellence for Sustainable Development**, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, [sustainable.development@hq.doe.gov](mailto:sustainable.development@hq.doe.gov)  
<http://www.smartcommunities.ncat.org>, Golden, CO, 800-357-7732

The center helps communities design and implement innovative strategies that enhance the local economy as well as the local environment and quality of life. Its Web site contains a "tool kit" of sustainable information including manuals, workbooks, bibliographies, data bases, case studies, and model codes and ordinances.

**Congress for New Urbanism (CNU)**, John O. Norquist, President and CEO, [jnorquist@cnu.org](mailto:jnorquist@cnu.org)  
<http://www.cnu.org>, Chicago, IL, 312-551-7300

CNU is a Chicago-based nonprofit organization that was founded in 1993. The Congress works with architects, developers, planners, and others involved in the creation of cities and towns, teaching them how to implement the principles of the New Urbanism. These principles include coherent regional planning, walkable neighborhoods, and attractive, accommodating civic spaces. CNU has more than 2,000 members throughout the United States and around the world and sponsors annual conferences, known as Congresses, for the sharing and discussion of best practices in New Urbanism.

**Firewise Communities**, [custserv@nfpa.org](mailto:custserv@nfpa.org)  
<http://www.firewise.org/index.php>, Quincy, MA, 617-770-3000

The Firewise Communities program (a program of the National Fire Protection Association), envisions wildfires occurring without disastrous loss of life, property, and resources. The program provides wildfire/urban interface resources to help protect people, property, and natural resources from wildland fire. The program is part of the National Wildland-Urban Interface Fire Program, which is directed and sponsored by the Wildland-Urban Interface Working Team of the National Wildfire Coordinating Group, a consortium of wildland fire organizations and Federal agencies responsible for wildland fire management in the United States.

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**GreenPower Conferences**, [info@greenpowerconferences.com](mailto:info@greenpowerconferences.com)  
<http://www.greenpowerconferences.com/index.html>,  
+44-870-758-7808

Accelerating the transition to a sustainable, low-carbon society requires good communication and collaboration among governments, banks, investors, power producers, and consultants. GreenPower provides targeted business-to-business events that facilitate networking, sales, and innovation. Their events feature the most-up-to-date industry thinking and high-quality information from prominent speakers in their fields.

**Green Roofs for Healthy Cities**, Steven Peck, Founder and President, [speck@greenroofs.org](mailto:speck@greenroofs.org)  
<http://www.greenroofs.org/>, Toronto, Ontario,  
416-971-4494

Green Roofs for Healthy Cities' mission is to increase the awareness of the economic, social, and environmental benefits of green roof infrastructure across North America and rapidly advance the development of the market for green roof products and services. Although the current market does not value many of the tangible public and private benefits of green roofs to their full potential, Green Roofs for Healthy Communities is striving to facilitate changes that will bring green roof technologies to the forefront of high-performance green building design, implementation, and maintenance.

**Institute of Ecosystem Studies**, Gene E. Likens, Director,  
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<http://www.ecostudies.org/>, Millbrook, NY, 845-677-5343

The Institute of Ecosystem Studies combines research and education in fulfillment of its scientific mission. Central to the institute's mission is the creation, dissemination, and application of knowledge about ecological systems. A society with a basic understanding of ecological systems and an appreciation of their role in the quality of human life is essential if natural areas are to be sustained.

**International City/County Management Association (ICMA)**, Alison Miller, [amiller@icma.org](mailto:amiller@icma.org)  
<http://www.icma.org/>, Washington, DC, 202-289-4262

The mission of the ICMA is to create excellence in local governance by developing and fostering professional local government management worldwide. ICMA provides technical and management assistance, training, and information resources to its members and the local government community.

**International Society of Arboriculture**, Jim Skiera,  
[jskiera@isa-arbor.com](mailto:jskiera@isa-arbor.com)  
<http://www.isa-arbor.com/>, Champagne, IL, 888-ISA-TREE

ISA, aligned on many fronts with other green organizations, is working hard to foster a better understanding of trees and tree care through research and the education of professionals as well as global efforts to inform tree care consumers.

**International Union of Forest Research Organizations**, Dr. Michael Kleine, [kleine@iufro.org](mailto:kleine@iufro.org)  
<http://www.iufro.org/>, Vienna, Austria, +43-1-877-01-51-0

The International Union of Forest Research Organizations is a nonprofit, nongovernmental international network of forest scientists. Its mission is to promote the coordination of and international cooperation in scientific studies embracing the whole field of research related to forests and trees for the well-being of forests and the people who depend on them.

**Jim Self Center on the Future**, Dr. H. Gregory Hawkins,  
[greg@strom.clemson.edu](mailto:greg@strom.clemson.edu)  
<http://selfcenter.clemson.edu/index.php>, Clemson, SC,  
864-656-0217

The Jim Self Center on the Future provides public policy research and targeted programs to address and serve current and emerging needs in South Carolina, the Southeast, and the Nation.

**Local Government Commission**, Judy Corbett,  
[jcorbett@lgc.org](mailto:jcorbett@lgc.org)  
<http://www.lgc.org/index.html>, Sacramento, CA, 916-448-1198

The Local Government Commission is a nonprofit, nonpartisan, membership organization that provides inspiration, technical assistance, and networking to local elected officials and other dedicated community leaders who are working to create healthy, walkable, and resource-efficient communities.

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**Local Government Environmental Assistance Network**, managed and operated by ICMA, [lgean@icma.org](mailto:lgean@icma.org)  
<http://www.lgean.org/index.cfm>, Washington, DC,  
877-865-4326

The Local Government Environmental Assistance Network is a “first-stop shop” providing environmental management, planning, funding, and regulatory information for local government elected and appointed officials, managers, and staff.

**Local Initiatives Support Corporation (LISC)**, [info@lisc.org](mailto:info@lisc.org)  
<http://www.lisc.org/>, New York, NY, 212-455-9800

LISC helps resident-led, community-based development organizations transform distressed communities and neighborhoods into healthy ones—good places to live, do business, work, and raise families. By providing capital, technical expertise, training and information, LISC supports the development of local leadership and the creation of affordable housing, commercial, industrial, and community facilities, businesses and jobs. LISC helps neighbors build communities.

**National Association of Conservation Districts (NACD)**, Krysta Harden, Chief Executive Officer,  
[krysta-harden@nacdnet.org](mailto:krysta-harden@nacdnet.org)  
<http://www.nacdnet.org/>, Washington, DC, 202-547-NACD

The National Association of Conservation Districts (NACD) unites districts into one voice and helps them accomplish collectively what they could not accomplish alone. On behalf of districts, NACD develops national conservation policies, influences lawmakers, and builds partnerships with other agencies and organizations. NACD also provides services to its districts to help them share ideas to better serve their local communities. The motto of NACD—“Conservation—Development—Self-Government” conveys the belief that conservation begins with the actions of individuals. Whether joining NACD as a member, implementing conservation practices in communities or becoming a volunteer, participation and commitment to the conservation cause will ensure the future health of the Nation’s natural resources.

**National Association of Local Government Environmental Professionals**, Paul Conner, Executive Director,  
[paul.connor@spiegelmc.com](mailto:paul.connor@spiegelmc.com)  
<http://www.nalgep.org>, Washington, DC, 202-638-6254

The National Association of Local Government Environmental Professionals is a not-for-profit organization that represents local government personnel responsible for ensuring environmental compliance and developing and implementing environmental policies and programs. Its membership includes more than 140 local government entities located throughout the United States, ranging in size from the largest cities to much smaller local communities. It also recognizes that local government environmental professionals are often confronted with tight budgets, complicated requirements, and problems that are perhaps first-time problems for a particular local entity that may have been encountered and dealt with by other localities.

**National Association of State Foresters (NASF)**,  
[nasf@stateforesters.org](mailto:nasf@stateforesters.org)  
<http://www.stateforesters.org/>, Washington, DC, 202-624-5415

Through public-private partnerships, NASF seeks to discuss, develop, sponsor, and promote programs and activities that will advance the practice of sustainable forestry, the conservation and protection of forest lands and associated resources, and the establishment and protection of forests in the urban environment.

**National Brownfield Association**, Robert Colangelo, Chief Executive Officer, [robertc@brownfieldassociation.org](mailto:robertc@brownfieldassociation.org)  
<http://www.brownfieldassociation.org/>, Chicago, IL,  
773-714-0407

The National Brownfield Association is a nonprofit, educational organization dedicated to stimulating the responsible redevelopment of brownfields. It is the premier association for government, businesses, and individuals involved in the redevelopment of brownfields. The association is the only group that represents the wide array of brownfield stakeholders—property owners, developers, investors, service professionals, and government representatives. Programs are designed to meet the needs of professionals, whether they are individual or corporate members.



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**National Center of Excellence on SMART Innovations for Urban Climates and Energy**, Jay S. Golden,

[jay.golden@asu.edu](mailto:jay.golden@asu.edu)

<http://www.asusmart.com/>, Tempe, AZ, 408–965–4951

Rapid urbanization is quickly transitioning areas of native vegetation to regions of man-made materials, altering urban climate and requiring increased consumption of energy. It is at this nexus that the National Center of Excellence on SMART Innovations serves to develop use-inspired fundamental and applied research solutions for an urbanizing planet.

**National Science Foundation**, Dr. Arden L. Bement, Jr.,  
Director, [info@nsf.gov](mailto:info@nsf.gov)

<http://www.nsf.gov/>, Arlington, VA, 703–292–8000

The National Science Foundation (NSF) is an independent Federal agency created by Congress in 1950 “to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense...”. With an annual budget of about \$5.5 billion, the Foundation is the funding source for approximately 20 percent of all federally supported basic research conducted by America’s colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of Federal backing.

**National Urban and Community Forestry Advisory Council**, Nancy Stremple,

[nstremple@fs.fed.us](mailto:nstremple@fs.fed.us)

<http://www.treelink.org/nucfac>, Washington, DC,  
202–205–1054

The National Urban and Community Forestry Advisory Council was established to advise the Secretary of Agriculture on the national U&CF Program. The purpose of the council is to develop a comprehensive national U&CF action plan, evaluate the implementation of that plan, and to develop criteria for and submit recommendations for funding the U&CF challenge cost-share program.

**Natural Resources Conservation Service**, Arlen Lancaster,  
Chief, [arlen.lancaster@wdc.usda.gov](mailto:arlen.lancaster@wdc.usda.gov)

<http://www.nrcs.usda.gov>, Washington, DC, 202–720–7246

The Natural Resources Conservation Service (NRCS) provides products and services that enable people to be good stewards of the Nation’s soil, water, and related natural resources on non-Federal lands. With the help of NRCS, people are better able to conserve, maintain, or improve their natural resources. As a result of technical and financial assistance, land managers and communities take a comprehensive approach to the use and protection of natural resources in rural, suburban, urban, and developing areas. The Agency promotes the following strategies: a **cooperative conservation** to seek and promote cooperative efforts to achieve conservation goals; a **watershed approach** to provide information and assistance to encourage and enable locally led, watershed-scale conservation; and a **market-based approach** to facilitate the growth of market-based opportunities that encourage the private sector to invest in conservation on private lands.

**Partnership Network**, Julia Steets,

[jsteets@globalpublicpolicy.net](mailto:jsteets@globalpublicpolicy.net)

<http://www.partnershipnetwork.org/>, Berlin, Germany,  
+49–30–275959750

The Partnership Network’s goal is to facilitate (1) the exchange among researchers from different disciplines, (2) the communication of research results to partnership practitioners and policymakers, and (3) the input of partnership practitioners and policymakers into emerging research agendas. The network also recognizes that corporations, governments, international organizations, and civil society are increasingly working in partnerships to address development challenges such as poverty, corruption, and environmental degradation. As partnerships become more common in practice, researchers are focusing their attention on this approach to development.

**Pew Center on Global Climate Change**, Hon. Eileen  
Claussen, President

<http://www.pewclimate.org>, Arlington, VA, 703–516–4146

The Pew Center on Global Climate Change brings together business leaders, policymakers, scientists, and other experts to bring a new approach to a complex and often controversial issue. Our approach is based on sound science, straight talk, and a belief that we can work together to protect the climate while sustaining economic growth.

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**Preserve America**, [Paacommunities@achp.gov](mailto:Paacommunities@achp.gov) or [Paawards@achp.gov](mailto:Paawards@achp.gov)  
<http://www.preserveamerica.gov/index.html>, Washington, DC,  
202-606-8503

Preserve America is a White House initiative that encourages and supports community efforts to preserve and enjoy the Nation's priceless cultural and natural heritage. The goals of the initiative include a greater shared knowledge about the Nation's past, strengthened regional identities and local pride, increased local participation in preserving the country's cultural and natural heritage assets, and support for the economic vitality of our communities. The program will not fund bricks-and-mortar projects but rather will complement the Save America's Treasures grant program by helping local communities develop sustainable resource management strategies and sound business practices for the continued preservation and use of heritage assets. The President's 2007 budget requests \$10 million for these grants.

**Project Learning Tree**, Kathy McGlauffin,  
[kmcglauffin@plt.org](mailto:kmcglauffin@plt.org)  
<http://plt.org/cms/urbanforestry/>, Washington, DC,  
202-463-2462

The American Forest Foundation recently completed a project that resulted in a new Web resource on urban forestry that lists, organizes, and provides a bibliography of materials relevant to teachers in urban and community areas. Training was provided to 50 State Coordinators who are in the process of training 2,500 volunteer facilitators who will educate teachers about how to use the new Web site.

**Smart Communities Network**, Jeff Birkby, [jeffb@ncat.org](mailto:jeffb@ncat.org)  
<http://www.smartcommunities.ncat.org/landuse/urbanfor.shtml>,  
Butte, MT, 406-494-4572

Managed by the National Center for Appropriate Technology (NACT) for the U.S. Department of Energy, the Smart Communities Network Web site is NCAT's longest running, Internet-based information program. The Web site contains hundreds of community success stories, model codes, breaking news on community sustainability, a national conference calendar, and a compendium of links to sustainable community information.

**Smart Growth Network**, [info@smartgrowth.org](mailto:info@smartgrowth.org)  
<http://www.smartgrowth.org/>, Washington, DC, 202-962-3623

In 1996, the U.S. Environmental Protection Agency (EPA) joined with several nonprofit and government organizations to form the Smart Growth Network—a forum. The network was formed in response to increasing community concerns about the need for new ways to grow that boost the economy, protect the environment, and enhance community vitality.

**Society of American Foresters, U&CF Working Group**  
[safweb@safnet.org](mailto:safweb@safnet.org)  
<http://www.safnet.org/workinggroups/b2.cfm>, Bethesda, MD,  
301-897-8720

The Society of American Foresters U&CF Working Group provides technical information, support, and recommendations concerning urban forest ecosystem management. The group's intent is to increase awareness and understanding of U&CF. It promotes all aspects of urban forestry and shares information with local units of government regarding current issues, programs, policy, and regulatory laws concerning urban forest ecosystem management.

**Society of Municipal Arborists**, Jerri LaHaie,  
[urbanforestry@prodigy.net](mailto:urbanforestry@prodigy.net)  
<http://www.urban-forestry.com/>, Watkinsville, GA,  
706-769-7412

A professional affiliate of the International Society of Arboriculture, the SMA strives to create networking and educational opportunities for its municipal membership that promote the sound, professional management of a vital and invaluable resource. They also sponsor the Municipal Forester Institute and the Urban Forestry Program Accreditation.

**Southern Region Extension Forestry**, Bill Hubbard,  
[whubbard@uga.edu](mailto:whubbard@uga.edu)  
<http://sref.info/>, Athens, GA, 706-542-7813

The goal of the Southern Regional Extension Forestry Office is to identify, prescribe, and implement a mix of education and technical services that increase the efficiency of forestry and urban forestry programs in the 13 Southern States.

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**Sustainable Community Network**, Susan Boyd,  
[concern@concern.org](mailto:concern@concern.org) or [info@sustainable.org](mailto:info@sustainable.org)  
<http://www.sustainable.org/>, Washington, DC

Sustainable Communities Network Web site connects citizens with the resources they need to implement innovative processes and programs to restore the economic, environmental, and social health and vitality of their communities. It addresses a wide range of issues related to community sustainability, including creating communities, living sustainably, and governing communities. In addition it gives case studies, resources, links to relevant Web sites, events calendar, and suggested reading.

**Sustainable Urban Forests Coalition**, Jennifer Judd Hinrichs,  
[jjhinrichs@rcn.com](mailto:jjhinrichs@rcn.com)  
<http://www.urbanforestcoalition.com/>, Silver Spring MD,  
301-219-6249

The Sustainable Urban Forests Coalition (SUFC) is a national coalition to advance a unified urban forest agenda for our Nation's communities. The Coalition views urban forests as the aggregate of all vegetation and green spaces within communities that provide benefits vital to enriching the quality of life.

**The Arbor Day Foundation**, John Rosenow,  
[jrosenow@arborday.org](mailto:jrosenow@arborday.org)  
<http://www.arborday.org/>, Lincoln, NE, 888-448-7337

Through mass-media communications, by providing low-cost trees for planting, and by producing high-quality, easy-to-use educational materials, National Arbor Day Foundation works to make tree planting and care something in which nearly everyone can be involved.

**The Grant Institute**, Kristine Chermakyan,  
[KChermakyan@thegrantinstitute.com](mailto:KChermakyan@thegrantinstitute.com)  
<http://www.thegrantinstitute.com>, Los Angeles, CA,  
888-824-4424

The Grant Institute offers expert workshops for nonprofit professionals, academic researchers, program planners, and public sector administration employees. The institute is the leader of grant writing education with respect to professional preparation and multidisciplinary focus.

**The Grantsmanship Center**, [info@tgci.com](mailto:info@tgci.com)  
<http://www.tgci.com/>, Los Angeles, CA, 213-482-9860

The Grantsmanship Center offers grantsmanship training and low-cost publications to nonprofit organizations and government agencies. It conducts some 200 workshops annually in grantsmanship, enterprise development, and fundraising. Center alumni receive continuing support and benefit from technical assistance and other forms of support delivered through the Internet. The Center's Winning Grant Proposals Online collects the best of funded Federal grant proposals annually and makes them available on CD-ROM. The proposal-writing guide, Program Planning and Proposal Writing (PP&PW), is the most widely read publication in nonprofit history, with more than a million copies in print.

**The Trust for Public Land**, [info@tpl.org](mailto:info@tpl.org),  
<http://www.tpl.org>, San Francisco, CA, 800-714-LAND

The Trust is a national, nonprofit, land conservation organization that conserves land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come.

**The U.S. Conference of Mayors**, Judy Sheahan,  
[jsheahan@usmayors.org](mailto:jsheahan@usmayors.org)  
<http://usmayors.org/>, Washington, DC, 202-293-7330

The U.S. Conference of Mayors is the official nonpartisan organization of cities with populations of 30,000 or more. Today, mayors of 1,139 cities in the United States are represented in the conference. The primary roles of the Conference of Mayors are to promote the development of effective national urban/suburban policy, strengthen Federal-city relationships, ensure that Federal policy meets urban needs, provide mayors with leadership and management tools, and create a forum in which mayors can share ideas and information.

**Toolbox for the Great Outdoors**  
<http://www.tools4outdoors.us/index.jsp>

The purpose of the Toolbox for the Great Outdoors is to help harness the power of new recreation tools to connect 21st-century Americans to public lands and to enhance the way great experiences for visitors are delivered. The initial version of the

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Toolbox combined work done in several Partners Outdoors sessions and by partnerships forged at those sessions with a concerted effort to assemble information about programs available to supplement traditional appropriations to provide high-quality recreation experiences on public lands.

**Tree Care Industry Association**, Cynthia Mills, President and CEO, [Mills@TreeCareIndustry.org](mailto:Mills@TreeCareIndustry.org)  
<http://www.treecareindustry.org>, Manchester, NH,  
603-314-5380

Established in 1938 as the National Arborist Association, today's TCIA is a trade association of more than 2,000 commercial tree care firms and affiliated companies. TCIA develops safety and education programs, standards of tree care practice, and management information for arboriculture firms around the world. Through TCIA's Accreditation program, consumers can be assured of hiring a professional, ethical tree care company that has been inspected by TCIA for proper business practices, professional employees, quality service, and customer satisfaction.

**TreeLink**, Pepper Provenzano, Director, [pepper@treelink.org](mailto:pepper@treelink.org)  
<http://www.treelink.org/>, Salt Lake City, UT, 801-359-1933

TreeLink provides knowledge and communication that inspires people to cultivate sustainable urban forests worldwide.

TreeLink achieves this goal by providing the best Web site technology to grow the movement and discipline of U&CF to the widest audience. It provides access to traditional resources and outreach to more than 70 countries. Internet technology allows TreeLink to share its archived knowledge with every small town and large city in this country.

**Treesearch**, [treesearch@fs.fed.us](mailto:treesearch@fs.fed.us)  
<http://www.treesearch.fs.fed.us>, Washington, DC,  
202-205-8333

Treesearch is an online system for locating and delivering publications by Research and Development scientists in the Forest Service. Publications in the collection include research monographs published by the agency as well as papers written by our scientists but published by other organizations in their journals, conference proceedings, or books. Research results behind these publications have been peer reviewed to ensure the best quality science. Treesearch resolved to make available all

new books, chapters, and articles beginning January 2004 and to add older publications as rapidly as possible. At the start of 2004, the collection contained more than 7,000 publications, making it the largest freely available collection of online forestry research in the world.

**United States Climate Action Partnership (USCAP)**,  
[info@us-cap.org](mailto:info@us-cap.org)  
<http://www.us-cap.org/index.asp>, Washington, DC,  
202-354-6442

The USCAP is a group of businesses and leading environmental organizations that have come together to call on the Federal Government to quickly enact strong national legislation to require significant reductions of greenhouse gas emissions. USCAP has issued a landmark set of principles and recommendations to underscore the urgent need for a policy framework on climate change.

**Urban Forest Ecosystems Institute**, Dr. Richard Thompson,  
Director, [ufe@polymail.calpoly.edu](mailto:ufe@polymail.calpoly.edu)  
<http://www.ufe.org/>, San Luis Obispo, CA, 805-756-5171

The Urban Forest Ecosystems Institute is based in the College of Agriculture at California Polytechnic State University, San Luis Obispo, California. The institute was developed to address the increasing need for improved management of the urban forests in California through applied research, extension and technology transfer, and community service and outreach programs, all designed to assist landowners and public agencies in improving the management of urban forests. The institute is designed to work in cooperation with other universities, government agencies, and private consulting firms.

**Urban Land Institute**, [customerservice@uli.org](mailto:customerservice@uli.org)  
<http://www.uli.org//AM/Template.cfm?Section=Home>,  
Washington, DC, 202-624-7000

Founded in 1936, the institute now has more than 30,000 members worldwide representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. As the preeminent, multidisciplinary real estate forum, Urban Land Institute facilitates the open exchange of ideas, information and experience among local, national and international industry leaders and policymakers

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dedicated to creating better places. The mission of the Urban Land Institute is to provide responsible leadership in the use of land to enhance the total environment. The institute is a trusted idea place where leaders come to grow professionally and personally through sharing, mentoring, and problem solving. Members commit to the best in land use policy and practice.

**U.S. Composting Council**, Dr. Stuart Buckner,  
[admin@compostingcouncil.org](mailto:admin@compostingcouncil.org)  
<http://www.compostingcouncil.org>, Holbrook, NY,  
631-737-4931

The USCC is dedicated to the development, expansion, and promotion of the composting industry based on science, principles of sustainability, and economic viability. The council also directs the Composting Council Research and Education Foundation a 501.c.3 charitable foundation, which administers public and private research and education grant activities. The USCC is the only national organics recycling organization committed to the advancement of the composting industry.

**U.S. Department of Energy, Office of Science**  
<http://www.science.doe.gov>, Washington, DC, 800-DIAL-DOE

The Office of Science manages fundamental research programs in basic energy sciences, biological and environmental sciences, and computational science. In addition, the Office of Science is the Federal Government's largest single funder of materials and chemical sciences; it supports unique and vital parts of U.S. research in climate change, geophysics, genomics, life sciences, and science education.

#### **U.S. Environmental Protection Agency**

- **Community-Based Environmental Protection**, Office of Policy, Economics and Innovation—Gerald Filbin,  
[filbin.gerald@epa.gov](mailto:filbin.gerald@epa.gov)  
<http://www.epa.gov/ecocommunity/>, Washington, DC,  
202-566-2182

Community-Based Environmental Protection (CBEP) integrates environmental management with human needs, considers long-term ecosystem health and highlights the positive correlations between economic prosperity and environmental well-being.

- **Green Communities Program**, [r3green@epamail.epa.gov](mailto:r3green@epamail.epa.gov)  
[www.epa.gov/greenkit](http://www.epa.gov/greenkit), Philadelphia, PA, 215-814-2739

This EPA Region III program is designed to help communities access the tools and knowledge that will help them become more sustainable, green communities. Its online Green Communities Assistance Kit is a step-by-step guide for planning and implementing sustainable actions.

- **Heat Island Reduction Initiative**, Eva Wong,  
[wong.eva@epamail.epa.gov](mailto:wong.eva@epamail.epa.gov)  
<http://www.epa.gov/heatisland/>, Washington, DC,  
202-343-9343

EPA's Heat Island Reduction Initiative supports research to better understand the impacts that heat island reduction strategies have on urban meteorology, air quality, energy demand, and human health. The program translates this research into outreach materials, tools, and guidance that provide communities with knowledge to develop programs, policies, codes, and ordinances to implement heat island reduction strategies.

- **Smart Growth**, [smartgrowth@epa.gov](mailto:smartgrowth@epa.gov)  
<http://www.epa.gov/smartgrowth/>, Washington, DC,  
202-566-2878

EPA helps States and communities realize the economic, community, and environmental benefits of smart growth by (1) providing information, model programs, and analytical tools to inform communities about growth and development; (2) working to remove Federal barriers that may hinder smarter community growth; and (3) creating new resources and incentives for States and communities pursuing smart growth.

- **Source Water Protection**  
<http://cfpub.epa.gov/safewater/sourcewater/>,  
Washington, DC, 202-564-3750

The drinking water from local drinking water utilities or individual wells comes from ground water, streams, rivers, springs or lakes in a watershed. Although most water requires some treatment before use, protecting this source water is an important part of providing safe drinking water

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to the public. Protecting drinking water sources usually requires the combined efforts of many partners such as public water systems, communities, resource managers, and the public.

**U.S. Green Building Council**, S. Richard Fedrizzi, President and CEO, [info@usgbc.org](mailto:info@usgbc.org) for general USGBC inquiries, [leedinfo@usgbc.org](mailto:leedinfo@usgbc.org) for LEED inquiries <http://www.usgbc.org/>, Washington, DC, 202-828-7422

The U.S. Green Building Council's core purpose is to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life. The Council's LEED (Leadership in Energy and Environmental Design) Green Building Rating System® is a voluntary, consensus-based national standard for developing

high-performance, sustainable buildings. USGBC's members, representing every sector of the building industry, developed and continue to refine LEED.

**Utility Arborists Association**, Derek Vannice, [dvannice@isa-arbor.com](mailto:dvannice@isa-arbor.com) <http://www.utilityarborist.org/index.html>, Champaign, IL, 217-355-9411, ext. 234

The Utility Arborist Association (UAA) is the premier organization for individuals who desire to provide professional utility arboricultural services. Through the International Society of Arboriculture, the UAA is made up of people serving people, to enhance the quality of utility arboriculture. The association's mission is to provide UAA members with opportunities to improve their skills and knowledge, and enhance public awareness.