



Leaves OF Change



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Research

Linkages between Forest Cover, Community Vitality, and Human Health in Atlanta

PROCTOR CREEK snakes through downtown Atlanta and eventually works its way to the Chattahoochee River. Along the way it passes through both middle and lower income neighborhoods, including some of the most economically depressed areas of the city with high rates of poverty and crime. The waterway is plagued with illegal dumping, pollution, erosion, and high bacteria levels from regular storm-water flooding and sewage overflows. In 2013, Proctor Creek was named one of eleven Urban Waters Federal Partnership Projects, a project that aims to tackle the country's most polluted city waters and reconnect communities with their waterways. The partnership works to improve coordination and focus among federal agencies on problems in the watershed, as well as promote community-led efforts at economic, social, and ecological revitalization.

As a part of the partnership, SRS-4952 is conducting three interconnected studies that will provide valuable information on the links between urban greenspace, ecosystem services, environmental justice, and human health.

Dudley Hartel, the center manager for Urban Forestry South, has been leading a USDA Forest Service effort to use i-Tree tools (www.itreetools.org) to better understand the current state of the urban forest in the watershed and to develop management strategies that can support efforts to restore the creek and revitalize the surrounding neighborhoods. **Eric Kuehler**, a technology transfer specialist with Urban Forestry South, used remote



US Forest Service

Lower watershed portions of Proctor Creek still offer reasonably healthy stream habitat and vistas.

sensing technology and i-Tree Canopy to assess tree and shrub canopy, impervious surface, herbaceous ground cover, bare soil, and water cover. He then used field data collection through i-Tree Eco to describe the urban forest structure and tree canopy volume in order to estimate forest-related ecosystem services such as water quality provisioning, cooling, and carbon sequestration. He also used i-Tree Hydro to examine some of the stormwater runoff and sewage overflow problems in Proctor Creek and propose potential mitigation strategies involving reduced impervious surface and increased forest cover in targeted areas.

While conducting the urban tree canopy survey throughout Proctor Creek and elsewhere in the city of Atlanta, Hartel saw the full range of conditions, challenges, and benefits of the urban forest, as well as the range of social and economic conditions in which the urban forest exists. The forest plots he and his team searched out and surveyed were

found in people’s yards, in parks, at schools, along highways, and beside railroad tracks. They surveyed plots in upper middle-class neighborhoods with old trees and green lawns and depressed neighborhoods with few trees and a great deal of concrete, asphalt, and abandoned buildings. Other areas did not feel like the city at all. “In one plot we were just a few miles from Buckhead [an uptown commercial and residential area in Atlanta] and it was a completely different world than we’d seen in other parts of the city. We were in a wooded area where you could almost believe that you were in a natural rural forest. You couldn’t see the skyline and city noises were buffered. There were mature hardwoods, nice topography, and not a lot of privet and wisteria or other invasive plants,” said Hartel.

The urban forest data and analysis is already providing important information regarding the role of impervious surface in polluting Proctor Creek. Estimates from i-Tree Hydro indicate that an expanded urban tree canopy would mitigate at least some of the problems associated with stormwater runoff in Proctor Creek. Analysis found that pollution could be reduced by 20 percent by disconnecting storm drains from impervious surfaces that lead directly to Proctor Creek. Increasing the urban forest canopy could reduce pollution loading even further.

The next step will be to link what is being learned about the value and extent of ecosystem services in Proctor Creek to a survey of residents throughout the city of Atlanta, not just those in the environs of Proctor Creek, about trees and the urban forest, access to greenspace, and the ability to influence policy decisions made regarding urban forests and the ecosystem services they provide. The survey will contain questions about residents’ attitudes and engagement with Atlanta’s urban forest, including people’s support of tree planting by the city or by private residents and residents’ involvement in community organizations that promote tree preservation and planting.

Cassandra Johnson Gaither,

the SRS-4952 project leader and research social scientist, is working with researchers and students from Morehouse College to complete the survey. “What makes this project innovative is the link between actual measures of local environmental services and people’s participation in the production of those services. We are broadening environmental justice research by empirically looking at people’s perceptions of how they may or may not co-create the urban forest with resource professionals rather than only looking at residents as passive recipients of what others provide,” says Johnson Gaither.

The study includes measures of human engagement and advocacy for Atlanta’s urban forest as a way of gauging environmental justice. The researchers will analyze environmental justice according to three indicators: 1) community proximity to hazardous waste sites and refineries, as well as estimated air pollution exposure; 2) community access to environmental services provided by the urban forest (e.g., cooling, carbon sequestration, and energy savings); and 3) resident’s perceptions of, engagement with, and advocacy for trees in the city.

“This study focuses on residents within the city limits of Atlanta, not the surrounding suburbs,” says Johnson Gaither. “There have been a lot of demographic shifts in recent decades in some of Atlanta’s downtown-proximate communities. Places that twenty years ago were considered ‘inner-city’ have suddenly transformed into hip, urban ‘in-town’ neighborhoods, and with this



A student from Morehouse College discusses the study survey with an Atlanta resident.

change in people come likely changes in how people engage with nearby nature and the amount of energy they expend on keeping it intact. We want to see how this attention to the urban forest may vary across neighborhoods—those that are still lower income and mostly African American, some that are middle/upper income and predominantly African American, and those that are either majority white or mixed and middle/upper income—and importantly, attempt to understand this attention to the urban forest in terms of the broader issues and concerns people have about community integrity.”

Another study, co-led by **Wayne Zipperer**, an SRS-4952 research ecologist, and Graham Lockaby of Auburn University, is examining the connections between forest cover, socioeconomic status, and transmission of West Nile virus (WNV) in metropolitan Atlanta. The virus is the most widespread arboviral pathogen (virus transmitted by arthropods such as ticks and mosquitoes) in the United States and is commonly associated with urban environments in the South.

West Nile virus cycles between mosquitoes and birds. Some infected birds can develop high levels of the virus in their bloodstream, and mosquitoes can become infected by biting these infected birds. After about a week, infected mosquitoes can pass the virus to more birds when they bite. Mosquitoes with WNV also bite and infect people and other mammals. Consequently, WNV transmission risk increases in areas with suitable habitat for the development and survival of mosquitoes (specifically *Culex* species) and sufficient habitat for bird species that also make up part of the WNV cycle.

The study is looking at drivers of WNV transmission by examining the links between clusters of WNV infections in metropolitan Atlanta on the one hand, and land cover and environmental characteristics such as water quality indicators of mosquito larvae habitat and forest structure and composition characteristics of bird

Joty Allison

habitat on the other hand. The study is also taking into account data on WNV infection rates and socioeconomic indicators to help explain the spatial variation in WNV transmission risk across Atlanta. Preliminary results show that WNV risk is clustered according to land cover and socioeconomic factors. This research could have broad implications for mitigating transmission risk in Atlanta and other metropolitan areas in the South.

Training and Outreach Activities

Kids in the Woods Workshop Prepares Teachers to Take Their Classes Outdoors

IN JUNE 2015, Annie Hermansen-Báez collaborated with Michael Andreu and Hollie Greer from the University of Florida, Sara Charbonnet and Elizabeth Burt from Westwood Middle School, and Sally Wazny from Gainesville Parks, Recreation and Cultural Affairs to conduct a one-day workshop about outdoor learning. The participants represented eight elementary, middle, and high schools from Alachua County School District in Florida. They engaged in several of the outdoor science techniques used in the Kids in the Woods program at Westwood Middle School and discussed ways to adapt the techniques for use in their own schools. Teachers will follow up to the workshop by implementing a lesson plan that requires the use of outdoor spaces to teach core curriculum concepts.

Taken together these integrative studies will provide a unique look at the direct and indirect connections between healthy ecosystems and communities. While we have long known of the relationship between urban greenspace and factors such as stormwater mitigation, water quality, cooling, and carbon sequestration, these studies expand our notion of ecosystem services by linking urban greenspace to environmental justice and human health.



Hollie Greer

Eric Perez from Oak View Middle School and Frances Lane from Eastside High School learn how to measure the diameter of trees during the workshop.

Kids in the Woods Team Members Present at the 2015 Green Schools National Conference

ANNIE HERMANSEN-BÁEZ and sixth-grade science teachers, Elizabeth Burt and Sara Charbonnet, gave a presentation about the Kids in the Woods Program at the 2015 Green Schools National Conference in Virginia Beach, VA in March. Session participants engaged in several of the techniques used in the Kids in the Woods program and discussed ways to adapt techniques for use in their own schools. They also learned about strategies for forming partnerships between schools and natural resource agencies in their communities that help promote healthy, sustainable school practices.



Ashley Whitehead

Annie Hermansen-Baez, Elizabeth Burt, and Sara Charbonnet at the Green Schools National Conference.

For Proctor Creek that hopefully means a future in which it becomes a source of pride, recreation, and economic sparks for the neighborhoods of Northwest Atlanta.

The Kids in the Woods Program

DUE TO CONCERN about the growing disconnect between children and nature, the U.S. Forest Service (USFS) launched the *More Kids in the Woods Initiative* in 2007. Through a partnership between the Forest Service (SRS-4952), Westwood Middle School, the University of Florida's School of Forest Resources and Conservation, the City of Gainesville Parks, Recreation and Cultural Affairs, and the Alachua County Environmental Protection Department, a Kids in the Woods program was initiated in 2013 at Westwood Middle School in Gainesville, Florida. The program engages sixth-grade students in outdoor science learning activities on the school campus and at the nearby Loblolly Woods Nature Park. Program studies include bird feeding behavior, creek erosion and deposition, and tree identification and benefits. The main objectives of the program are for students to become more aware of and connected to their local environment and exposed to careers in science and natural resources. The program has already engaged over six hundred sixth graders and four science teachers during the first two years and in August will enter its third year.

To learn more about the program at Westwood visit: www.interfacesouth.org/projects/kids-in-the-woods/connecting-kids. For more information, contact Annie Hermansen-Báez, 352-376-3271, ahermansen@fs.fed.us.

In Our Next Issue

We will highlight research conducted in association with community-based projects in three southern states that are a part of the Sustainable Forestry and African American Land Retention Program (a collaborative effort between the U.S. Endowment for Forestry and Communities, the USDA Forest Service, and the Natural Resource Conservation Service). This study will help to improve our understanding of African American land ownership and African American participation in sustainable forestry.

Upcoming Events

Date	Description	Location	Contact
September 26–30, 2015	Water Environment Federation's WEFTEC 2015	Chicago, IL	www.weftec.org/Program/default.aspx?id=64
September 26, 2015	WEFTEC Workshop: Tools to Quantify Environmental Benefits of Trees for Stormwater/Green Infrastructure Projects	Chicago, IL	Eric Kuehler, 706-559-4268, ekuehler@fs.fed.us , www.weftec.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=6442452777&libID=6442452769
November 18–19, 2015	Partners in Community Forestry Conference	Denver, CO	www.arborday.org/programs/pcf/
November 16, 2015	Learn Green 2015: Florida's Green Schools Conference	Boynton Beach, FL	learngreenconference.com

