

THE FOREST THREATNET



Sculptures along Asheville's Urban Trail highlight a landscape from the city's past. Asheville will host the US-IALE 2016 Annual Meeting, April 3-7. Photo by Steve Norman, U.S. Forest Service.



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LANDSCAPE ECOLOGISTS TO GO EAST FOR ANNUAL MEETING

Asheville, North Carolina, is a nationally known destination for arts and entertainment, outdoor recreation, and world-class food and beverages. In recent years, the city has landed on multiple “top ten” lists as a best place to live, play, and retire. With this recognition comes rapid change — a flourishing tourism industry and an influx of new residents leading to increased development and associated economic and ecological pressures in the city and surrounding areas. These shifting dynamics will provide a fitting backdrop when Asheville hosts landscape ecologists examining the theme “Landscape Change” during the [annual meeting](#) of the U.S. Regional Association of the International Association for Landscape Ecology (US-IALE). Organized by the Eastern Threat Center, the meeting will take place April 3-7.

“We’re thrilled to organize the annual

US-IALE meeting, which has not been held in the eastern United States since 2012,” says **Bill Hargrove**, Center research ecologist and co-chair of the meeting’s organizing committee. “With the simple theme of ‘Landscape Change,’ we’ll strive to capture the defining characteristic and the inherent nature of our modern world. We’ll discuss the challenges of many aspects of landscape change, and we expect to discover new opportunities for studying these challenges and collaborations to address them.”

The field of landscape ecology includes a [range of subjects](#) studied at large scales, and the meeting’s program will reflect this variety during 22 [special symposia](#) and 32 sessions of [contributed presentations](#). Half- and full-day [workshops](#) will provide attendees with hands-on training from peer experts, a [poster session](#) will allow for sharing and dialogue in a less formal setting, and [scientific excursions](#) will offer

unique ways to explore issues associated with landscape change in and around Asheville.

The program will also include a workshop and other [activities designed just for students](#) — an essential component of US-IALE membership. “US-IALE recognizes the importance of the next generation and puts them front and center,” says Center research ecologist and meeting co-chair **Kurt Riitters**, who also served as the president of US-IALE from 2012 to 2014. “The US-IALE annual meeting is an ideal opportunity to broaden one’s perspective and make new connections — to deliver on the promise of ecology as an interdisciplinary science,” says Riitters.

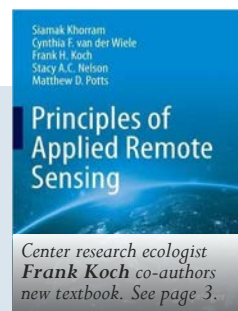
Visit www.usiale.org/asheville2016 to register and follow the latest program updates and meeting announcements.

INSIDE THIS ISSUE

Eastern Threat Center Highlights. Presence and spread of invasive plants. Big data in fire management. Intensive forest management and carbon. International collaboration on monitoring hurricane impacts.

New remote sensing textbook. Publications, products, and events.

Western Threat Center Highlights. New method for rapid disturbance assessment.



Center research ecologist **Frank Koch** co-authors new textbook. See page 3.

EASTERN THREAT CENTER HIGHLIGHTS

A Big-Picture View of the Invasive Plant Problem

Invasive plants increasingly alter the structure and function of our natural environment, and now researchers have determined how far-reaching the problem has become. According to a study conducted by Southern Research Station and university scientists and published in the journal *NeoBiota*, at least one invasive species is present in 39 percent of forested plots sampled nationwide for invasive plants by the Forest Service Forest Inventory and Analysis (FIA) program. Results are provided for all U.S. regions and reveal that a significant portion of the more than 741 million acres of forested land in the United States has been invaded. The researchers created a U.S. map of invasion-intensity (below) to illustrate the extent of the problem and help inform management actions across the landscape. “For this study, our intention was to let people see how large data

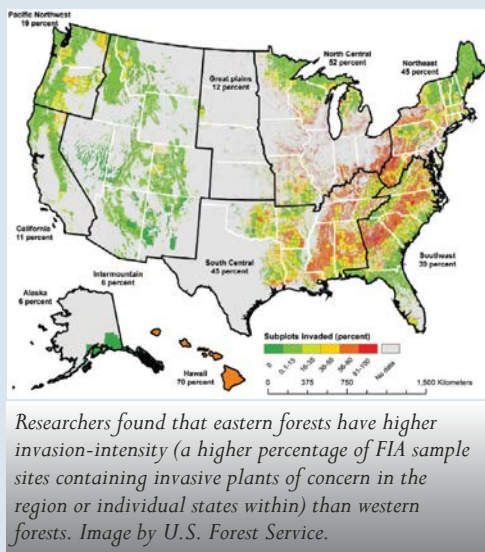
sets can be used to understand macro-scale issues and monitoring forest invasion. This broad-scale study gives us a wider perspective that one can’t get from local studies,” says

Qinfeng

Guo, Center

research ecologist and a co-author of the study.

[Read more in CompassLive...](#)



Researchers found that eastern forests have higher invasion-intensity (a higher percentage of FIA sample sites containing invasive plants of concern in the region or individual states within) than western forests. Image by U.S. Forest Service.

Scientists Look to Big Data to Address Local Fire Problems

The case of the Bastrop County Complex illustrates the need for a new way of thinking about the issue of wildfire. In September 2011, a year of severe drought, a summer of record-breaking heat, winds from a tropical storm, and a few sparks combined to create the fire, which burned through 34,000 acres of southeastern Texas. Two lives were lost and nearly 1,700 homes were destroyed, with property damages totaling \$325 million. Four years later, the memory still fresh in the minds of community members, 575 fire scientists and managers from around the world met nearby in San Antonio

during the Association for Fire Ecology’s (AFE) Sixth International Congress, an important knowledge sharing event around the role of fire in land management. Scientists from the Eastern Threat Center and partners from Oak Ridge National Laboratory presented a large body of research during a special session focused on leveraging big data to gain insights toward better solutions for living with fire. “By big data we mean the use of large datasets that previously did not exist or that were too cumbersome to process or disseminate efficiently,” says Center research ecologist **Steve Norman**. “Our session explored how technological developments can help us better address fire management and science questions we’ve long had, but have struggled with, as well as ask important questions we never thought to ask before.” [Read more in CompassLive...](#)



In Bastrop State Park, snags, surviving pines, aggressively resprouting holly, and clumped pine regeneration are seen four years after the Bastrop County Complex fire with developed areas in the background. Photo by Steve Norman, U.S. Forest Service.

WESTERN THREAT CENTER HIGHLIGHTS

Rapid Assessment of Forest Insect, Disease, and Drought Disturbances

A new application using satellite-based disturbance mapping techniques can help users conduct rapid assessments of the source and extent of insect, disease, and drought disturbances on national forests. Researchers from the Western Threat Center have developed a method to isolate these disturbances by filtering out land areas disturbed by management, weather events, and wildfire. When the disturbance maps are combined with National Forest vegetation data, users can estimate the stand type affected; information about species affected, along with expert knowledge, can highlight the nature of the disturbance. Once the satellite-based disturbance data are obtained for a study area or national forest, users can perform the assessment in less than a week. Although this rapid assessment is based on coarse-scale disturbance maps, the method provides a powerful tool for forest planners and silviculturists who must plan for survey teams, including numbers and locations of common stand exams, and the resulting disturbance dataset provides a useful perspective on the progression of forest health changes over several years.

Contact remote sensing analyst **Charlie Schrader** (cschrader@fs.fed.us) for more information, and visit www.fs.fed.us/wwetac.

EASTERN THREAT CENTER HIGHLIGHTS

What Drives the Spread of Invasive Plants?

Scientists often measure the number of invasive plant species to assess invasions, but species richness is just one factor that contributes to the spread of invasive plants. To gain insight into the drivers of invasion, university and Forest Service researchers used Forest Inventory and Analysis data to map and compare invasions in eastern and western forests. They modeled richness and prevalence of invasive species and considered habitat quality and invasion vulnerability as well as the number of propagules (reproductive plant material) produced by invasive plants, known as propagule pressure. Study results, [recently published in *Diversity and Distributions*](#), reveal that eastern forests are more heavily invaded with varying impacts throughout the region and suggest that propagule pressure and habitat invasibility are key drivers whose contributions to large-scale invasions may differ depending on the stage of invasion. Center research ecologist **Qinfeng Guo** and North Carolina State University cooperating scientist **Kevin Potter** are among the study's co-authors.

[Read more in *CompassLive...*](#)

How Does Intensive Forest Management Affect Global Carbon Storage?

A growing world population demands more wood and fiber, much of which is harvested from intensively managed forests. In these forests, tree growth as well as post-harvest land cover changes can be easy to see, but an invisible part of the management process has captured the attention of scientists and university collaborators with the Eastern Threat Center.

Trees are harvested from a forest plantation. Photo from U.S. Forest Service Forest Operations Research Archive, Bugwood.org.



Following a study published in [Forest Ecology and Management](#), researchers concluded that high forest productivity in managed forests often comes at the expense of carbon storage in

soils. After reviewing current global datasets and comparing characteristics of managed and unmanaged stands, “We discovered that carbon is allocated differently between plant parts in managed forests, with relatively greater aboveground productivity and lower belowground carbon storage,” says **Asko Noormets**, a North Carolina State University scientist working with the Eastern Threat Center and the study’s lead author. “The greater frequency of harvests and physical disturbance of soils in managed forests results in higher soil respiration and carbon loss.”

[Read more in *CompassLive...*](#)

International Scientist and *ForWarn* Researchers Meet Over a Common Challenge

Miguel Ortega Huerta, a scientist with the Universidad Nacional Autónoma de México, is seeking to understand vegetation damage following Hurricane Jova, a powerful storm that struck Mexico’s western coast in October 2011. These impacts can be difficult to discern from remote sensing in the tropical dry forests that surround his field station in Chamela (in the state of Jalisco). He recently visited the Eastern Threat Center in Asheville, North Carolina, to present passive remote sensing methods and results from his work during a consultation with *ForWarn* researchers **Bill Hargrove** and **Steve Norman**. “Hurricane impacts differ in many ways from smaller disturbances like tornadoes, ice storms, or fire. Like Dr. Ortega Huerta, the *ForWarn* team has struggled to understand similarly complex landscape-to-regional responses that follow powerful storms that have struck the United States,” says Norman. He explains, “Along with damaging winds, hurricanes bring rain that can alleviate drought. At the edges, they can bring dry winds that can whip up wildfires. These changes are particularly hard to detect in satellite-based images of both tropical dry and temperate forests because the hurricane season is usually at the end of the growing season when decline in vegetation growth is normal.”



Hurricane Jova approaches western Mexico on October 10, 2011. Photo courtesy of Wikimedia Commons.

After his Asheville visit, Ortega Huerta presented his work and engaged in additional discussion with *ForWarn* partners at Oak Ridge National Laboratory. Expertise and insights exchanged among researchers facing common challenges could ultimately help land managers better understand hurricane impacts and develop more effective monitoring and management plans.

New Book Introduces Students to Fundamentals of Remote Sensing

Students have a new resource for understanding technology that monitors land, water, sky, and space from aircraft and satellites. Center research ecologist **Frank Koch** is a co-author of *Principles of Applied Remote Sensing*, one of the first textbooks to cover many aspects of remote sensing for both graduate and undergraduate students, including data acquisition, tools, applications, international laws and policy, and future trends. According to the publisher, “Remote sensing is an exciting, dynamic technology that is transforming the Earth sciences... as well as the practices of agriculture, disaster response, engineering, natural resources, providing evidence in legal cases and documented humanitarian crises, and many other fields. Increasingly, understanding of these techniques will be central to a number of disciplines, particularly as the technology advances.” Visit the [Springer website](#) to learn more.

Center News, Publications, Products, and Events

- An [article and activities](#) in the [Freshwater](#) edition of the *Natural Inquirer* science journal helps middle school students understand findings from a national assessment of drinking water watersheds, a study conducted by Center research ecologist **Kurt Riitters** and partners from the U.S. Environmental Protection Agency.
- In honor of the birthday of Dr. Martin Luther King, Jr., Center staff participated in USDA's National Day of Service on January 21. **Lars Pomara, Sarah Workman, Bjorn Brooks, and Stephanie Worley Firley** volunteered with the non-profit Asheville Greenworks to remove trash and recyclable items along Hominy Creek Road in Asheville, North Carolina (right).
- The Eastern Threat Center-hosted USDA Southeast Regional Climate Hub (SERCH) delivers science-based information, tools, and technology to farmers, ranchers, and forest land managers. Visit the [SERCH website](#) to learn more and to sign up for the SERCH & FIND newsletter.
- Visit the [First Friday All Climate Change Talks \(FFACCTs\) webpage](#) for archived resources and upcoming FFACCTs topics.
- [New Publications and Products](#) (search *Treesearch* for all pubs and abstracts):



Isbell, F. et al. (including **Q. Guo**). 2015. Biodiversity increases the resistance of ecosystem productivity to climate extremes. *Nature* 526:574-589.

Potter, K.M., F.H. Koch, C.M. Oswalt, and B.V. Iannone. 2015. Data, data everywhere: detecting spatial patterns in fine-scale ecological information collected across a continent. *Landscape Ecology* 31:67-84.

Sun, S., **G. Sun, E. Cohen, S.G. McNulty**, P. Caldwell, K. Duan, and Y. Zhang. 2015. Predicting future US water yield and ecosystem productivity by linking an ecohydrological model to WRF dynamically downscaled climate projections. *Hydrology and Earth System Sciences Discussion* 12(12):12703-12746.

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USDA Forest Service Research and Development • Eastern Forest Environmental Threat Assessment Center

The interdisciplinary Eastern Threat Center develops new technology and tools to anticipate and respond to emerging forest threats. The Eastern and Western Threat Centers are a joint effort of the USDA Forest Service Research and Development, National Forest System, and State and Private Forestry. The Eastern Threat Center is headquartered with the Southern Research Station in Asheville and has offices in Raleigh and Research Triangle Park, NC.

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