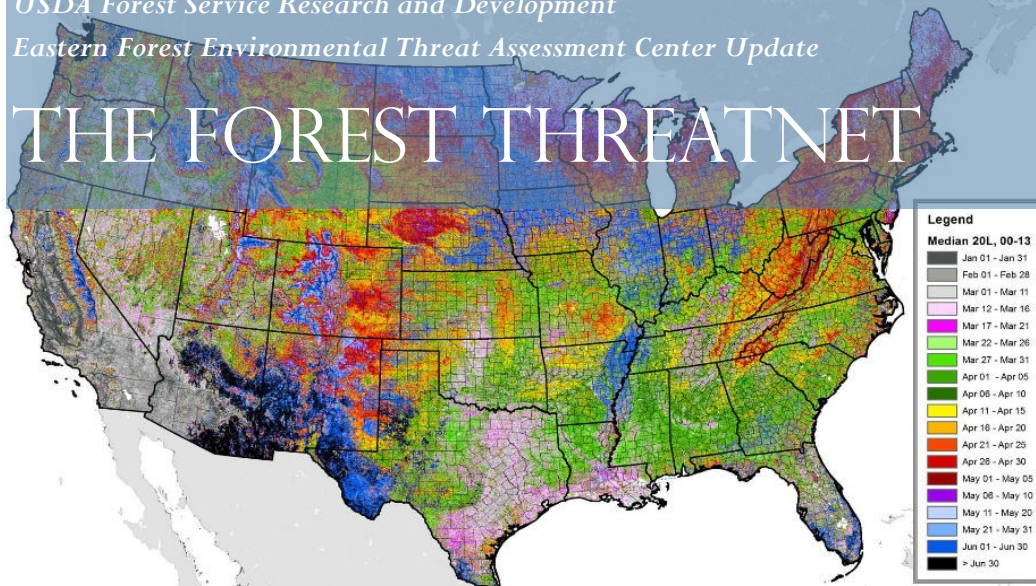


THE FOREST THREATNET



A *ForWarn* map shows typical dates of vegetation greenup across all lands.



March/April 2015



Danny C. Lee, PhD
Eastern Threat Center Director

RESEARCHERS MAP SEASONAL GREENING IN U.S. FORESTS, FIELDS, AND URBAN AREAS

With signs of spring emerging across most of the United States, Eastern Threat Center researchers are monitoring the growth and development of vegetation, signaling winter's end and the awakening of a new growing season. Now these researchers have devised a means of characterizing and tracking this transition to help land managers plan their work and understand how the timing of this year's greenup compares to that of the 14 previous years.

Using nationwide satellite imagery and data collected between 2000 and 2013, researchers quantified the seasonal progression from vegetation dormancy to full greenup using a common scale from 0 to 100%. Researchers selected the median date associated with the 20th percentile at each location as a common reference point indicating a clear launch of the growing season. Three maps detailing the typical dates of seasonal greenup in forests and grasslands, agricultural lands, and

urban areas are available via [ForWarn](#).

ForWarn is an assessment tool that delivers weekly maps of seasonal vegetation growth and development detected by satellites, known as Land Surface Phenology (LSP), as well as national maps showing vegetation disturbances. "In contrast to field observations that track leaf emergence for particular species of trees or herbaceous plants, *ForWarn's* LSP map products capture the response of the mixture of natural vegetation that can be seen from space," explains Center research ecologist **Bill Hargrove**.

"The start of the annual growing season is among the most important climate-sensitive measures that *ForWarn* can provide," says Center research ecologist **Steve Norman**. Because conifer forests are evergreen, the map's median green-up dates are particularly useful for managers of deciduous forests, grasslands, and

crops. "Just as gardeners look to climate data to determine the typical last frost date, the typical green-up dates provide a baseline for land managers to establish expectations for seasonal duration and productivity," says Norman. Managers who know more precisely when the growing season begins can better anticipate the risks and impacts of disturbances, such as those from wind, hail, frost, and fire, and can more efficiently monitor for defoliating insect pests that become active when leaves appear, for example.

A team of university and federal partners developed *ForWarn*, which was among the top 25 tools selected for inclusion in the White House's U.S. Climate Resilience Toolkit in 2014. Users can see and share the maps via *ForWarn's* recently upgraded Forest Change Assessment Viewer, which can also be viewed on smart phones and tablets.

INSIDE THIS ISSUE

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Western Threat Center Highlights. One-stop source for forest plans.

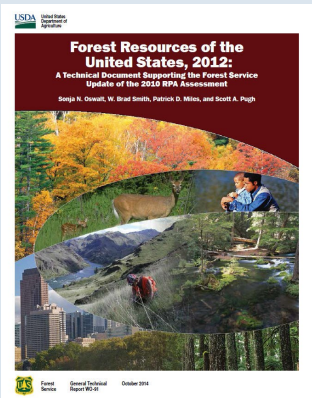


William Foster,
Eastern Threat Center
program support
assistant, retired on
March 31. (p. 3)

EASTERN THREAT CENTER HIGHLIGHTS

New Information about U.S. Forest Resources Supports Long-Term Assessment and Planning

Every five years, the U.S. Forest Service updates the [Resources Planning Act \(RPA\) Assessment](#), a report on the status of forest resources across the nation. To support the 2015 update,



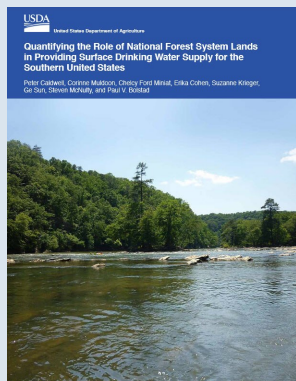
Southern Research Station (SRS) scientists coordinated a [technical document](#) describing recent trends in forest area, growth, and mortality, as well as timber product outputs and other activities. Eastern Threat Center research ecologist **Kurt Riitters** contributed maps and information about forest fragmentation to the [Forest Atlas of the United States](#), a

source used by the SRS scientists who developed the technical document. As part of the larger RPA Assessment effort, Riitters is responsible for reporting current landscape patterns and forest fragmentation based on data from the [National Land Cover Database](#) and [Forest Inventory and Analysis](#) plots in addition to the status of protected area designations of all lands in the United States. The 2015 RPA Assessment is expected to be released in early 2016. [Read more in CompassLive...](#)

Report Provides New Level of Detail about Water from Forested Lands

For over 19 million people in the South – roughly the population of Florida – clean water begins in the region's national forests. Authors from the Forest Service Southern Region and Southern Research Station, including scientists from the Eastern Threat Center, released a [report](#) on the amount of surface drinking water originating from national forest lands in the South. Using the [Water Supply Stress Index \(WaSSI\)](#) model and information on surface water intakes, researchers determined that 8 trillion gallons of water flow from southern national forests each year to serve the needs of more than 2,100 communities and cities, including Houston, Atlanta, Knoxville, and Birmingham.

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



Urbanization Impacts Stream Water Quantity and Quality

Since the 1950s, urban areas have increased by more than 400 percent and are now home to 80 percent of Americans. Urbanization affects streams by altering microclimate, surface water dynamics, groundwater recharge, stream geomorphology, biogeochemistry, and stream ecology. These changes impact both water quantity and quality (nutrient, sediment, and pollutant levels), threatening water resources in urban areas. Eastern Threat Center research hydrologist **Ge Sun** and a partner from the Southern Research Station's Coweeta Hydrologic Laboratory recently reviewed urbanization and its impacts on water and [published their findings](#) in the *Water Resources Impact* journal. [Read more in CompassLive...](#)



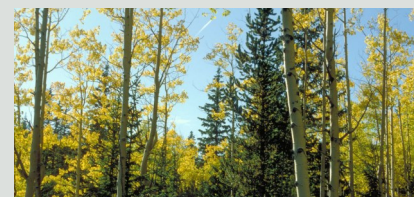
Impervious surfaces like pavement can cause water to flow into streams more rapidly, carrying pollutants such as sediments along with it. Photo by USDA Natural Resources Conservation Service.

WESTERN THREAT CENTER HIGHLIGHTS

Coming Soon: A One-Stop Source for Forest Plans

How many acres of high-elevation aspen woodlands cover a national forest or region? How did an adjacent national forest planning team propose to manage a Research Natural Area with similar stand types and purpose? How many areas are available for primitive camping site development on a national forest? Soon, forest planners

and managers will be able to find the answers to these kinds of questions and more in FP_DECK, the Forest Plan Database and Exchange of Current Knowledge. The



Aspen and conifers. Photo by Dave Powell, USDA Forest Service (retired), Bugwood.org.

Western and Eastern Threat Centers are collaboratively developing FP_DECK in response to regional and state needs for a searchable online archive of land and resource management plans (forest plans). To submit a forest plan for inclusion in FP-DECK, please contact technical information specialist Lisa Balduman at lbalduman@fs.fed.us.

More information: www.fs.fed.us/wwetac

EASTERN THREAT CENTER HIGHLIGHTS

A Future for Freeze-Tolerant Eucalyptus in the South?

Eucalyptus, a fast-growing tree native to Australia and Indonesia, is planted across large areas of Asia, Africa, and South America as a major source of hardwood fiber for paper and biofuels. Because of its sensitivity to freezing temperatures, Eucalyptus hasn't been planted extensively in the U.S., where fiber markets are dominated by softwood from pines grown in the Southeast, but there is increasing interest in the South in the development of a freeze-tolerant Eucalyptus species to grow in plantations as a hardwood fiber source.



Fast-growing Eucalyptus in south Florida. Photo by Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org.

Recently published research by Southern Research Station and Eastern Threat Center scientists provides important first-time analyses of the potential impacts of introducing plantations of freeze-tolerant Eucalyptus into the South. [Read more in CompassLive...](#)

The Forest Family: Relationships among Tree Species

Like all species, forest trees have their own web of relationships. Studying their evolutionary ties is the main focus of phylogenetics, and can assist in forest health assessment. "Understanding relationships among tree species can show how they interact with each other and with the environment," says North Carolina State University scientist **Kevin Potter**. "Phylogenetics can be used to assess forest health from the perspective of biodiversity and resilience to stress." Potter, a research cooperater with the Eastern Threat Center, is lead author of a new study that analyzes forest phylogenetics across the entire United States. The study was coauthored by Center research ecologist **Frank Koch**, and was [recently published](#) in *Forest Science*. [Read more in CompassLive...](#)

The Future of Streams: Using Air Temperature to Model Stream Warming

Stream temperatures affect the health of aquatic animals as well as many other biological and ecological processes. However, finding out whether – or how much – streams are warming has been difficult, as long-term temperature data do not exist for many waterways. A new Southern Research Station-led [study](#) supported by the Eastern Threat Center shows that long-term historic air temperature data can be coupled with short-term stream temperature to predict future warming in streams. [Read more in CompassLive...](#)

Center Scientist Makes Tracks with Science Sprouts

Eastern Threat Center research ecologist **Bill Hargrove** made tracks through the [Colburn Earth Science Museum](#) in downtown Asheville, North Carolina. Dinosaur tracks, that is, and he wasn't the only one making them. Hargrove led seven second-grade Science Sprouts on a journey into the Mesozoic Era, the period some 65 million years ago when dinosaurs roamed the earth. Among their activities, students rolled out paper, dunked hands and feet in paint, simulated dinosaur trackways (right), and then compared their tracks to fossilized theropod and sauropod trackways at the museum. [Read more in CompassLive...](#)



University Collaboration Enhances Climate Research and Information Sharing

Working landowners across the Southeast are as diverse as the landscape itself, but they share one goal. "From an individual standpoint, they all want the same thing, which is the sustainability of their range, agricultural and forest lands," says Eastern Threat Center research ecologist **Steve McNulty** in North Carolina State University's (NCSU) *Results* magazine. In the article, McNulty discusses the importance of finding common ground with land managers who need information to sustain their operations in times of changing conditions and the partnership with NCSU that enables researchers to monitor climate effects across the region. [Read the article...](#)



NCSU researcher John King and Steve McNulty (right) collaborate to monitor climate effects. Photo by NCSU.

William Foster Retires after 20 Years of Federal Service

Eastern Threat Center program support assistant **William "Pete" Foster** has served the American people for 20 years through careers with the U.S. Postal Service, U.S. Coast Guard, and U.S. Forest Service. Since he joined the Forest Service in 1998, he has lent his expertise in budget, finance, grants, and much more to sustain daily operations. He has served as Chairman and Vice Chairman of the Southern Research Station Civil Rights Committee and as a Civil Rights Zone Representative. In recent years, he was a member of the Southern Regional National Buying Team #1, which provided support during numerous wildfire management operations across the South. He retired on March 31. Congratulations, William!

Center News, Publications, Products, and Events

- The Eastern Threat Center-hosted [Southeast Regional Climate Hub](#) welcomes **Lisa Fouladbash** as its partnership facilitator. Welcome, Lisa!
- A new version of the [Template for Assessing Climate Change Impacts and Management Options \(TACCIMO\)](#) is available. TACCIMO v3.0 is based on the tool's application in land and resource management planning at a variety of scales, and will remain in a beta testing mode until mid-2015 to allow plenty of time for users and collaborators to [provide feedback](#).
- The annual Forest Health Monitoring National Report presents forest health status and trends from national and regional perspectives. The 2014 report, edited by North Carolina State University cooperating scientists **Kevin Potter** and **Barb Conkling**, is [available in draft form](#).
- The Climate Change Resource Center (CCRC) has released a new interactive online education module, "[Climate Change Effects on Forests and Grasslands: What You Need to Know](#)." Visit the [CCRC](#) for additional climate tools and information.
- Visit the [First Friday All Climate Change Talks \(FFACCTs\)](#) webpage for archived resources and upcoming FFACCTs topics.
- USDA and the nation celebrated Women's History Month in March (right) and paid tribute to generations of women committed to nature, the planet, and the betterment of society. Learn more: www.womenshistorymonth.gov.
- [New Publications and Products](#) (search [Treesearch](#) for all pubs and abstracts):



*Sally Ride, America's first woman astronaut.
Photo courtesy of the U.S. National Archives.*

Withrow, J.R., E.L. Smith, **F.H. Koch**, and D. Yemshanov. 2015. Managing outbreaks of invasive species — A new method to prioritize preemptive quarantine efforts across large geographic regions. *Journal of Environmental Management* 150:367-377.

Oswalt, C.M., S. Fei, **Q. Guo**, B.V. Iannone III, S.N. Oswalt, B.C. Pijanowski, and **K.M. Potter**. 2015. A subcontinental view of forest plant invasions. *NeoBiota* 24:49-54.

Zhang, Y., B. Zheng, **G. Sun**, and P. Fan. 2015. The American lawn revisited: awareness education and culture as public policies toward sustainable lawn. *Problemy Ekorożwojo/Problems of Sustainable Development* 10(1):107-115.

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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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