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

THE FOREST THREATNET

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Researchers are looking for conservation clues in the genes of ponderosa pine. See p. 3.
Photo by Kevin Potter.

Danny C. Lee, PhD
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EXPANDING THE USE OF RESPECTED SCIENCE

by Sarah Workman, Extension and Technology Transfer Specialist

Making practical tools and products based on respected science is on the 'to do' list for the Eastern and Western Threat Centers. For example, our research groups have successfully launched ArcFuels, *ForWarn*, Template for Assessing Climate Change Impacts and Management Options (TACCIMO), Seed Zone Mapper, and Water Supply Stress Index (WaSSI) – all generated from work by Center scientists. The Eastern Threat Center's work through the National Science and Analysis Team that evaluated risks and trade-offs associated with various wildland fire management alternatives continues to hold promise for national guidance though increasingly challenging wildfire seasons. Center scientists have been collaborating to develop a unique invasive plant database from the national Forest Inventory and Analysis program and have made contributions to the North American Carbon Program biometric database. Map products that visualize a variety of issues across the landscape will soon be published as part of the new Southern Research Station Research Map Series. The U.S. Forest Service Research & Development program provides a national showcase for many Center publications and products, archived datasets, and examples of tool applications such as TACCIMO, which bridges managers' information needs during development of Forest Plans and State Assessments.

It's been an interesting and inspiring introduction to these efforts since I joined the Eastern Threat Center a year ago, and it's clear that many opportunities exist for getting Center science into the hands of more users who can benefit from these outputs – from Regional Planners to national and state forests to academic partners and other work units.

Emerging emphasis on sharing information and synthesizing data about ecosystem services from our forests and grasslands as well as options for new collaborative work with sister research and land management agencies give me additional motivation to develop messages to support users of Center products. I kindly invite Center partners to contact me to discuss ideas for further expansion of technology transfer and extension of Threat Center tools and products. Let's work together to enlarge the audience for our good science!

The American Water Resources Association has selected Ge Sun to be a Fellow Member (p. 2).

INSIDE THIS ISSUE

EASTERN THREAT CENTER HIGHLIGHTS

From Fan to Fellow: Research Hydrologist Honored by Organization that Inspired his Career

Long before **Ge Sun** became an associate editor of forest hydrology for the *Journal of the American Water Resources Association* (AWRA), he was a big fan. "The publications by AWRA with a strong focus on the comprehensive nature of waters inspired my early interest in forest hydrology and watershed management even before I moved to the United States in the early 1990s," says Sun, a native of China and a research hydrologist with the Eastern Threat Center. Throughout his productive research career, Sun has remained devoted to the journal and AWRA's mission. He recently learned that AWRA's Board of Directors and members selected him to be a Fellow Member, an honor that recognizes outstanding service to AWRA and the water resources profession. Joining a distinguished group of Fellows designated annually since 1974, Sun will receive the Fellow Member award on November 15 at the AWRA President's Reception during the 50th Annual Water Resources Conference in Denver, Colorado. *Read more in CompassLive…*

Computational Landscape Ecologists Look Ahead During Symposium

Technological advances and changing ecosystems have led to increased emphasis on and opportunities in the field of computational landscape ecology—the development of models and tools that can quantify ecosystem impacts from land use, land cover, and climatic changes. To outline a 10-year research agenda and guide young researchers in the field, Eastern Threat Center research ecologist **Kurt Riitters** co-organized a symposium, "Research Priorities in Computational Landscape Ecology," for the 9th World Congress of the International Association for Landscape Ecology (IALE) held in Portland, Oregon. Approximately 75 scientists and students attended the 10 symposium presentations, which were followed by a discussion session. An effort is underway to prepare a symposium summary for publication. Among the symposium speakers were Center research ecologist **Bill Hargrove** and *ForWarn* collaborator Forrest Hoffman from Oak Ridge National Laboratory.

U.S. Forest Service attendees at the IALE World Congress. Photo by U.S. Forest Service.

Save the date! The Eastern Threat Center will host the next meeting of the US-IALE in Asheville, NC, April 2-8, 2016.

EPA Report Highlights Forest Loss and Fragmentation

Between 2001 and 2011, the contiguous United States lost three percent of its forested land cover area, according to the Environmental Protection Agency's (EPA) latest *Report on the Environment* (ROE). Along with this forest loss came more fragmentation when core forest--critical for sustaining biological communities and ecosystem services that require large, intact areas--decreased by 12.8 percent over the time period.

Road building and other human activities fragment forests. Photo by Larry Korhnak, InterfaceSouth.

These findings come from Eastern Threat Center research ecologist **Kurt Riitters'** collaborative studies and analyses of the National Land Cover Database, which is updated every five years. Forest fragmentation is one of 85 indicators of environmental and human health changes described in the EPA ROE. *Learn more about recent forest fragmentation across the nation and within each EPA region.*

WESTERN THREAT CENTER HIGHLIGHTS

How are Changing Shorelines Affecting Subsistence Resources?

Climatic, tectonic, and human-related impacts are altering Alaskan shorelines and the associated distribution of food sources and habitats important to Native communities. The Western Threat Center is supporting a study of current and future shoreline geomorphic-biotic relationships in Southeast Alaska that could reveal potential impacts to patterns of traditional gathering of these subsistence resources. Pacific Northwest Research Station scientists Linda Kruger and Adelaide Johnson and partners are using the NOAA ShoreZone database, measures of shoreline change, and local observations and knowledge from six rural communities to develop a vulnerability assessment strategy. They will also summarize predicted coastal change and potential threats to near-shore marine species including blue mussel, green algae, eel grass, red algae, and bull kelp, as well as other intratidal and intertidal species groups. Results will provide guidance for management and research agencies to improve research and services for diverse resource users.

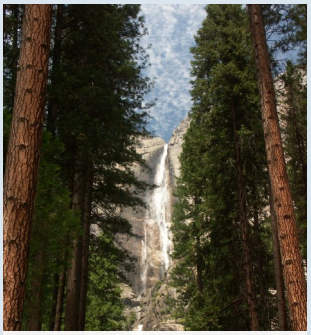
Goose tongue leaves are a shoreline food source. Photo by Linda Kruger.

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

EASTERN THREAT CENTER HIGHLIGHTS

Genetic Studies Reveal a Tree's History to Ensure its Future

It can reach heights of 200 feet and live 500 years, and occupies landscapes across the western United States. It grows in a variety of soils and climates and survives fires that consume other species.



Ponderosa pines stand tall in front of Yosemite Falls in California. Photo by Kevin Potter.

It is also an ecologically and economically valuable tree that provides food, habitat, and ponderous (heavy) lumber. It is the iconic ponderosa pine. But the world is changing, and ponderosa pine is vulnerable to climate shifts, high-intensity wildfires, and bark beetles — as well as development that replaces trees. **Kevin Potter**, a North Carolina State University scientist cooperating with the Eastern Threat Center, has led a study of the genetic diversity between and within what researchers have believed to be two varieties of ponderosa pine. Results, which were recently published in the journal *Tree Genetics & Genomes*, can help managers plan for conservation of existing trees and restoration of lost populations.

Read more in CompassLive…

For Loblolly Pines, A Fertilization and Water Scarcity Paradox

As in natural forests, the growth of loblolly pines in plantations is limited by essential resources: sunlight, nutrients, and water. Fertilization — an increasingly common practice for adding nutrients to boost wood production — allows trees to shift their growth away from roots to leaves and stems. Since a tree is dependent on its roots to provide water, how does a fertilized tree respond when water supplies are limited in times of drought? University and Eastern Threat Center researchers experimented with fertilization treatments and simulated drought during a two-year study in a loblolly pine plantation located in central Virginia. Their findings, recently published in the journal *Forest Ecology and Management*, indicate that fertilized trees use water more efficiently, but may suffer the most in drought.

An exclusion structure allowed researchers to simulate a 30 percent rainfall reduction in loblolly plots. Photo by Andy Laviner, Virginia Tech.

Read more in CompassLive…

Study Finds No Evidence for Widespread Southern Pine Decline

Millions of acres of southern pine forests form the foundation of forest industry in the South, so the presence of widespread southern pine decline would have important and costly implications. A study by University of Georgia and U.S. Forest Service scientists, including Eastern Threat Center research ecologist **Frank Koch**, found no evidence for the widespread occurrence of southern pine decline. Researchers believe that if this phenomenon--tree weakness and death involving multiple factors--is occurring, it is not apparent at the landscape level.

Read more in CompassLive…

Model Comparison Study Helps Aquatic Wildlife Managers Navigate the River of Streamflow Models

Climate change, land cover change, and withdrawals threaten aquatic ecosystem health in the Southeast, so managers rely on hydrologic models to predict streamflow changes as a result of these threats. But how do the many available models compare? A Southern Research Station-led study involving Eastern Threat Center researchers applied six models (including the Water Supply Stress Index) ranging in complexity to five study sites in the Apalachicola-Chattahoochee-Flint River Basin, an important source of water for people and aquatic ecosystems. Researchers found that all models were comparable and fairly accurate at predicting streamflow, with model calibration and available data being key factors in model performance.

Read more in CompassLive…

Following a Clearcut, Riparian Buffer Trees Use More Water

Maintaining a riparian buffer--an area of standing trees along a river or stream--is an important best management practice that protects water quality. When trees are harvested, the amount of water flowing through streams usually increases, but researchers have not previously known if changes in water use by riparian buffer trees could affect flow amounts (stream discharge). A recently published study in North Carolina State University's Hill Demonstration Forest led by Eastern Threat Center biological scientist **Johnny Boggs** found that, after a clearcut, remaining buffer trees used 43 percent more water. These water use changes lessened the expected stream discharge increases and associated water quality impacts in downstream areas.

Maintaining a riparian buffer is an important best management practice. Photo by Duk, Wikimedia Commons.

Read more in CompassLive…

Center News, Publications, Products, and Events

- Five students have received Native American Natural Resource Scholarships and opportunities to connect with Forest Service scientists as part of an ongoing partnership between the Intertribal Timber Council and Southern Research Station.
- Research ecologist **Bill Hargrove** is an entomologist by training, and he now conducts research at the landscape scale. His life and work are highlighted in a Faces of the Forest Service feature.
- The Eastern Threat Center has a revised research work unit description which features three problem areas to be addressed with collaborative research efforts.
- Visit the First Friday All Climate Change Talks (FFACCTs) webpage for archived resources and upcoming FFACCTs topics.
- Thousands of volunteers and visitors will celebrate National Public Lands Day on Saturday, September 26 (right). Visit www.publiclandsday.org to find an event and get involved.

- *New Publications and Products (search Treesearch for all pubs and abstracts):*

Jewitt, D., B.F.N. Erasmus, P.S. Goodman, T.G. O'Connor, **W.W. Hargrove**, D.M. Maddalena, and E.T.F. Witkowski. 2015. Climate-induced change of environmentally defined floristic domains: A conservation based vulnerability framework. Applied Geography 63:33-42.

Nelson, M., G. Robertson, and **K. Riitters**. 2015. Conserving forest biological diversity: How the Montreal Process helps achieve sustainability. The Wildlife Professional 9(2):44-48.

Sun, S., **G. Sun**, P. Caldwell, **S.G. McNulty**, **E. Cohen**, J. Xiao, and Y. Zhang. 2015. Drought impacts on ecosystem functions of the U.S. National Forests and Grasslands: Part II assessment results and management implications. Forest Ecology and Management 353:269-279.

CONTACT US

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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