Forest ThreatNet

...sharing knowledge and tools needed to anticipate and respond to emerging forest threats

Volume 1 Issue 1 **Fall 2007**

From the Director

Welcome to the inaugural issue of the **Forest ThreatNet**, our quarterly newsletter designed to update our customers and partners about ongoing efforts within the Eastern Forest Environmental Threat Assessment Center (EFETAC).

Much has happened since I first arrived in July 2005. At that time, the Center was just empty office space and a promise of something special to come. The Center has grown tremendously since then, both by adding new staff and consolidating with two other units from the Southern Research Station: the Southern Global Change Program and the National Forest Health Monitoring Unit. We've also established long-term relationships with local, State, and Federal organizations that will enable us to develop advanced products and tools that will be useful to forest landowners and managers. We're working hard to make sure our Web site, www.forestthreats.org, becomes a timely and reliable source of information for anyone interested in environmental threats.

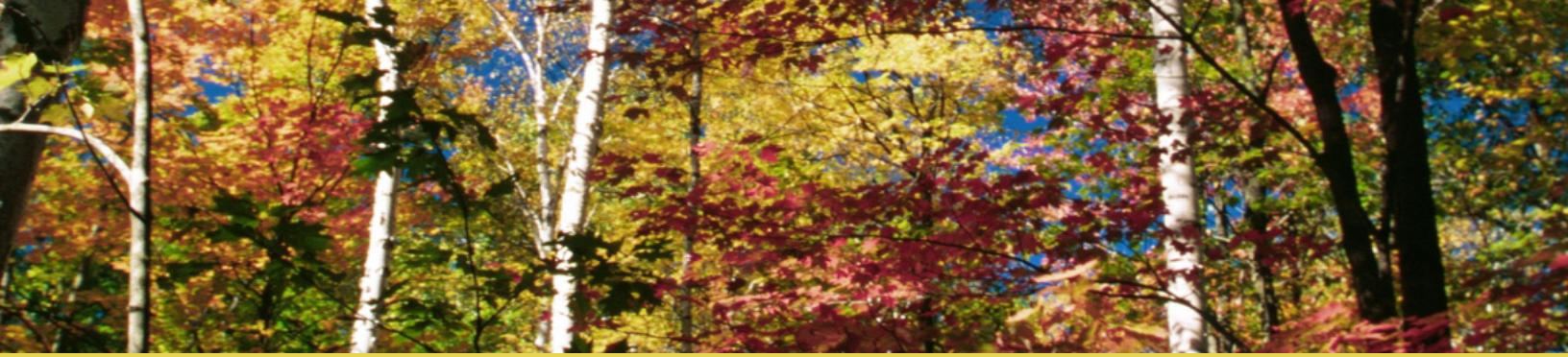
A recent retreat with our sister center, the Western Wildland Environmental Threat Assessment Center, has led to greater collaboration on challenging issues such as climate change, risk mapping, early warning systems, and science delivery. Our time together helped build individual and group relationships that are critical to present and future research. Stay tuned for events that will cross geographical boundaries and benefit researchers, national forest land managers, and State and private forestry partners.

The following pages touch on some recent highlights of our work, but by no means describe all that we're doing. Please visit our Web site or feel free to contact us for more information. We welcome your comments and look forward to serving you as best we can.

Until next time....

Danny C. Lee

IN THIS ISSUE



Forest ThreatNet
is a Quarterly Newsletter

EFETAC is an interdisciplinary resource actively developing new technology and tools to anticipate and respond to emerging eastern forest threats. The Center is a joint effort of the Forest Service's Research and Development, National Forest System, and State and Private Forestry and housed within the Southern Research Station.

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EFETAC Expands Team Dynamics...

Bill Bechtold

When the Southern Research Station reorganized in 2006, two additional research work units joined EFETAC—the Southern Global Change Program (SGCP) in Raleigh and Forest Health Monitoring (FHM) in Research Triangle Park, NC. Steve McNulty is the team leader for SGCP, which examines the ecological and hydrologic consequences of global change. FHM, led by Bill Bechtold, develops monitoring protocols and analytical tools for tracking the health and sustainability of the Nation's forests. Each team's existing programs have been woven into EFETAC's broader mission, thus substantially enhancing the capability for comprehensive, integrated research.

Steve McNulty

...Adds New Scientists

Four new scientists have also joined the EFETAC Threat Assessment Team

William H. Hargrove

Notable landscape ecologist, William Hargrove, joined EFETAC in October 2006. His current research focuses on designing a national early warning system using satellite imagery and other ancillary information to highlight landscape changes indicative of forest threats. Previously a researcher with the Oak Ridge National Laboratory, Hargrove continues to work closely with Oak Ridge and other high-tech partners (see p. 4).

William Hargrove

Qinfeng Guo

Qinfeng Guo

Qinfeng Guo joined EFETAC in 2006 as a research ecologist and is currently conducting collaborative research (1) using plant traits in life history and genetics to predict invasiveness of introduced species, and (2) using life history and distribution information from both native and exotic habitats to simulate/predict the spread of invasive species under various climatic scenarios. Prior to EFETAC, Guo worked with the U.S. Geological Survey. He received a Ph.D. in biology (ecology) from the University of New Mexico.

Stephen Creed

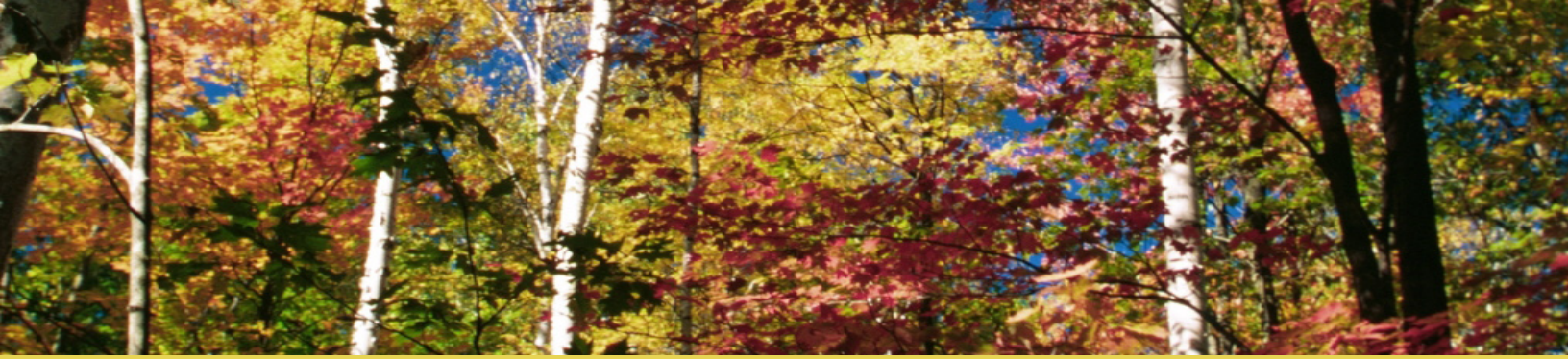
Stephen Creed joined EFETAC in January 2007 as a GIS specialist and is applying geo-technologies with other unit scientists to develop an early warning system for detecting natural and human forest threats. Previously, Creed worked with the Forest Service's Southwestern Regional Office's GIS unit. He completed a master's degree in geography at Southwest Texas State University.

Stephen Creed

Steve Norman

Steve Norman

Steve Norman joined EFETAC in 2005 as an ecologist. His work on the fire history and vegetation dynamics of coastal redwood forests examines the tradeoffs associated with wildfire management and prescribed fire. Prior to EFETAC, Norman worked with EFETAC Director, Danny Lee, and others at the Forest Service's Pacific Southwest Research Station to develop a comparative risk assessment framework. He received a Ph.D. in geography from Penn State.



Threat Centers Share Common Ground

East and West Teams Meet for Joint Retreat

Watch out forest threats! The Eastern Forest Environmental Threat Assessment Center (EFETAC) and the Western Wildland Environmental Threat Assessment Center (WWETAC), headquartered in Prineville, OR, recently convened their first joint work retreat–held September 10-14, 2007, on Pawley's Island, SC. EFETAC hosted the event, which provided an excellent opportunity for both teams to connect across geographical boundaries and discuss projects of mutual interest as well as establish more open lines of communication.

Center Directors Danny Lee (EFETAC) and Jerry Beatty (WWETAC) facilitated lively, interactive discussions and brainstorming sessions sparked by key project presentations. Scientists and partners provided snapshot and in-depth views of projects, including early warning systems, forest health monitoring, invasive plants, climate change, wildfire risk mitigation, pathogen and bark beetle rapid assessments, and other collaborative efforts. Two key EFETAC partners–the National Environmental Modeling and Analysis Center (NEMAC) and North Carolina State University (NCSU)–attended and identified opportunities to share resources and information with the western center.

"I believe the retreat was extremely beneficial for both centers," said Lee. "Being together provided us opportunity to explore shared objectives and challenges, identify potential collaborative efforts, and network on individual research topics of interest."

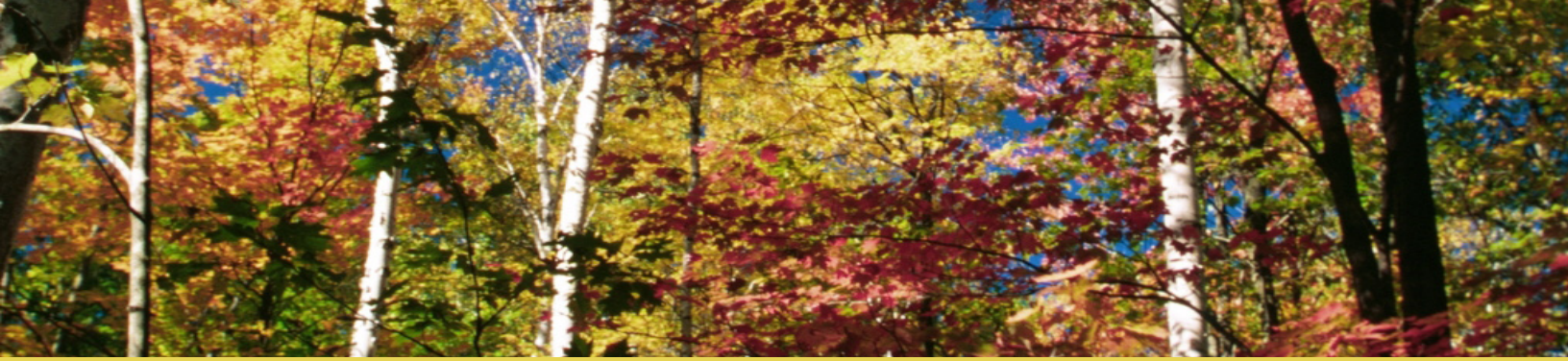
Barbara Conkling (above) and Judy Haigler (below) participate in a team building exercise during the threat centers' joint retreat.

Alan Ager, WWETAC operations research analyst, helped plan the retreat and felt his first trip to the South was worthwhile. "It was a great opportunity to meet scientists from the Southern Research Station and learn about their research programs in addition to understanding more about EFETAC's activities. I definitely look forward to working on projects of common interest."

Teams also spent time in small groups, capturing ideas focused on general monitoring of stress and change, climate change, science delivery and communications, and risk mapping and assessment. Ideas enhanced current projects, provided suggestions for future research, and emphasized the importance of sharing information with the scientific community, forest managers, policy makers, and the general public.

The retreat encouraged EFETAC and WWETAC to continue working toward their shared common ground – anticipating and responding to forests and wildland threats by developing new projects, expanding partnerships, and exploring cutting edge technology.

The eastern and western threat assessment centers recently held a joint retreat in South Carolina. From left to right (1st row)–Bill Smith (EFETAC), Danny C. Lee (EFETAC), Michelle Buonopane (WWETAC), Alan Ager (WWETAC), Barbara Conkling (NCSU), Claire Payne (SRS-facilitator), Erika Cohen (EFETAC); (2nd row)–Ginny Burgess (EFETAC), Perdita Spriggs (EFETAC), Stephen Creed (EFETAC), Frank Koch (NCSU), Steve Norman (EFETAC), Stephanie Worley-Firley (EFETAC); (3rd row)–Jennifer Moore Myers (EFETAC), Ge Sun (EFETAC), Kevin Potter (NCSU), Bridgett Naylor (WWETAC), Karin Lichtenstein (NEMAC); (4th row)–William Foster (EFETAC), Judy Haigler (WWETAC), Becky Kerns (WWETAC), Johnny Boggs (EFETAC), Mark Ambrose (NCSU); (5th row) –Ken Stolte (EFETAC), Asko Noormets (NCSU), Steve McNulty (EFETAC), Jim Fox (NEMAC), Valerie Cooper (EFETAC), Michael Gavazzi (EFETAC), Jerry Beatty (WWETAC), Qinfeng Guo (EFETAC), Bill Hargrove (EFETAC), Terry Shaw (WWETAC), and Darlene Tolman (EFETAC). EFETAC members not pictured–Bill Bechtold, Kurt Riitters and Rob Herring.



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It's All About Relationships...

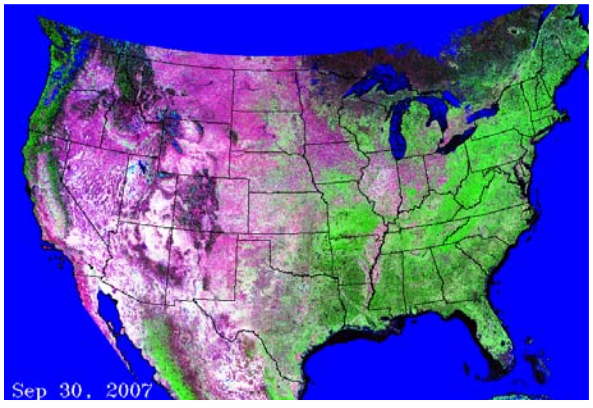
Partnerships leverage expertise and resources to help tackle emerging forest threats. Highlighted in this issue are EFETAC's joint efforts with the John C. Stennis Space Center and the National Environmental Modeling and Analysis Center.

NASA Aids with Threat Detection

Satellite imagery provides a fresh look at forest science

An early warning system to detect forest threats is among EFETAC's priorities. Enter NASA's John C. Stennis Space Center, an applied research and technology dynamo. EFETAC was attracted to Stennis' applied research and technology project office which was created to bridge the gap between Earth science research and data use to help partner agencies make better informed decisions.

The EFETAC/Stennis partnership goal is to develop an integrated, national early warning system to detect changes in forest and wildland conditions that are associated with environmental stressors or disturbance. System development requires interdisciplinary expertise–foresters, landscape ecologists, computer scientists, engineers, image processors, statisticians, geographers, and mathematicians–to bring it all together. Additional partners from the Institute for Technology Development, Science Systems & Applications, Inc. (SSAI), Computer Sciences Corporation (CSC), and Lockheed Martin have also joined the team.



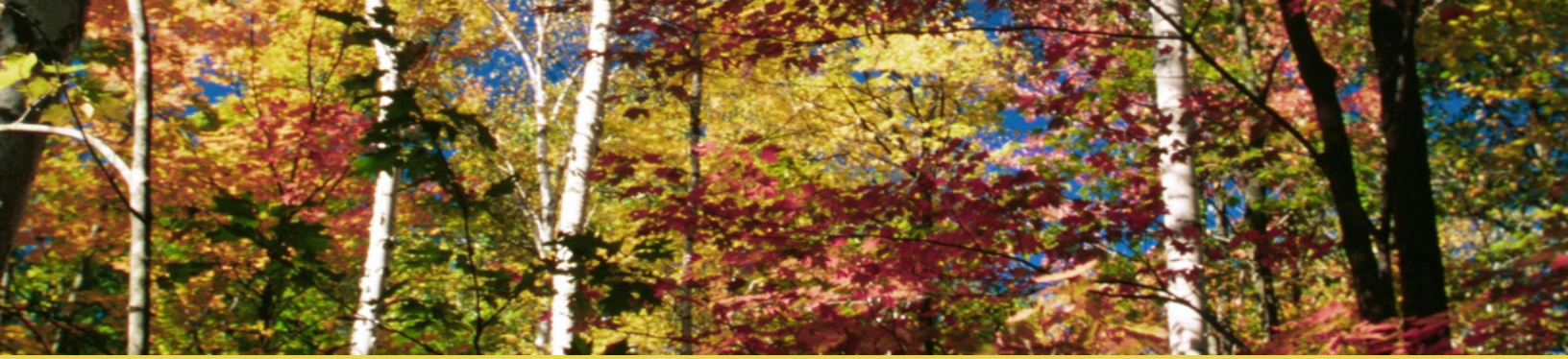
NASA Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery will be a key component of the early warning system, detecting changes at various scales and timeframes. Remote sensing imagery in this map shows significant changes in vegetation nationally (dense-green, sparse-red).

Picture an early warning system that highlights unexpected changes in vegetation using satellite imagery to examine the lower 48 United States at a 500-meter resolution every eight days.

The system is envisioned to be a multi-source, multi-scale tool that provides broad area, high frequency reconnaissance; detailed, location-specific analysis using higher resolution imagery and ground data; and predictive modeling of existing and potential environmental threats.

Several objectives must be met for the system to be successful. First, the system must detect meaningful changes in plant vigor and environmental conditions to enable monitoring of disturbance events or stress. Second, it must balance the spatial resolution needed to detect changes with practical limitations imposed by nation-wide coverage. Third, it must be updated relatively frequently and in near real-time in order to provide timely detections. Finally, the system must be able to process and deliver its results efficiently and affordably.

EFETAC, Stennis, and UNC Asheville's National Enviromental Modeling and Analysis Center and other partners are planning a phased approach to development and implementation of the early warning system–a unique national asset not currently available. Development of the early warning system is in its early stages, but preliminary results are promising. Much of the system utilizes existing technology. The final system will monitor all lands, not just forests, making the information generated useful to numerous Federal, State, and local land managers.



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University Expertise Expands Database Development

EFETAC and NEMAC explore high-tech data management

Emerging threats ….Complex databases ….Information management….All key components in EFETAC's road to becoming a "resource of choice" throughout the environmental threats community. And who better to partner with than University of North Carolina Asheville's National Environmental Modeling and Analysis Center (NEMAC), a local resource with nationally recognized expertise in environmental modeling, web technology, and database development. NEMAC and EFETAC joined forces early on, working seamlessly with the Southern Regional Extention Forestry (based at the University of Georgia) to begin development of the Center's interactive Web site.

National Environmental Modeling & Analysis Center

University of North Carolina Asheville

Part of the dynamic University of North Carolina system, NEMAC was designed as a model for university, government, and private sector research. Open dialogue is maintained with faculty and student researchers in addition to administrators and staff from other universities, government agencies, commercial businesses, and non-profit organizations. Collaborative ventures are the focal point of NEMAC efforts, working with local, State, and Federal officials to become an integral component of the environmental modeling and economic development planning process.

Bridget O'Hara, Jim Fox, and Karin Lichtenstein partner with EFETAC to explore advanced information management techniques.

NEMAC's success in building the Time Integrated Random Access NEXRAD Database (TIRAND) made partnership with EFETAC a natural fit. TIRAND, created in part by UNC Asheville professor Dr. Joe Brownsmith, allows users to automatically search millions of weather data archives from the National Climatic Data Center.

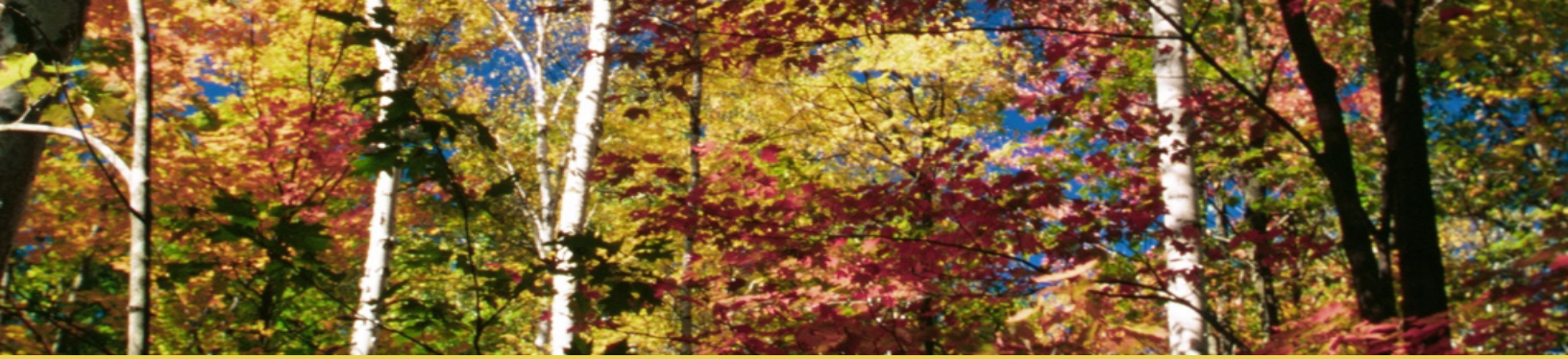
NEMAC's multidisciplinary team – specializing in geographic information systems, databases, and Web integration – is creating user-friendly tools for EFETAC to share with scientists, forest managers, policy makers, and the general public. Collaborative deliverables include –

- Assessing and compiling information and data needs for integrated environmental risk assessments.
- Helping to develop the infrastructure (equipment and software) needed for high-speed access, sharing and analysis of relevant environmental and socioeconomic databases.
- Designing data-synthesis, mining and analysis tools to meet specific information needs.
- Improving end-user capabilities and expertise for comparative risk assessment with the further development of the Comparative Risk Assessment Framework and Tools (CRAFT).
- Providing a central point of coordination and contact for numerous EFETAC partners.

Ultimately, NEMAC's goal is to assist EFETAC in creating a database of forest threats data, accessible from anywhere in the world.

NEMAC is also host for Chocolate Fridays–biweekly scientific research sharing sessions held during the spring and fall semesters at the Asheville Convention and Visitors Center–that stimulate collaborations among universities, government agencies, commercial businesses, and non-profit organizations.

For additional information, please contact Jim Fox, NEMAC Director of Operations, jfox@unca.edu, (828) 301-2075; Karin Lichtenstein, Project Manager, klichten@unca.edu, (828) 250-3892; or Bridget O'Hara, Communications Specialist, bohara@unca.edu, (828) 250-3882.



EFETAC Science Goes Worldwide

Researchers deliver science and build collaborations that cross borders

EFETAC scientists were busy in 2007! Researchers shared science through numerous presentations to scientific, professional, and educational organizations. Additionally, each EFETAC team interacted with a broad spectrum of international researchers. Here are a few highlights—

Threat Assessment

- Ecologist **Qinfeng Guo's** travels to China secured collaborative research opportunities resulting from invasive plant data collection, a symposium presentation at EcoSummit 2007 in Beijing, a lecture at the Inner Mongolia University, and a workshop presentation at the Institute of Geography and Resources at the Chinese Academy of Sciences.
- Ecologist **William Hargove** was involved in the statistical design of INDOFLUX, a new national carbon eddy-covariance flux network for India. INDOFLUX will fill an information void in the global FLUXNET carbon monitoring network.

Forest Health Monitoring (FHM)

- **Kurt Riitters**, landscape ecologist, entered into a formal collaboration agreement with the European Union's Land Management and Natural Hazards Unit of the Institute of Environment and Sustainability in Ispra, Italy, in an effort to harmonize global assessments of forest spatial patterns.
- As one of two invited U.S. forest inventory and monitoring experts, research forester and FHM team leader **Bill Bechtold** shared research with Korean Forest Service officials at a forest health monitoring symposium in Seoul, South Korea, supporting the Korean government's interest in establishing a forest health monitoring program.
- **Bill Smith**, biometrician, consulted with the Norwegian Institute for Agricultural and Environmental Research staff about sampling and risk assessment procedures he developed in the U.S. to detect *Phytopthora ramorum* (sudden oak death), recently detected in Norway.
- **Fred Cubbage**, North Carolina State University professor and EFETAC collaborator, visited and presented to Chilean forestry faculty at Universidad de Concepción, Universidad de Austral, and Universidad de Chile in Santiago, giving an overview of forest health and sustainable forestry.

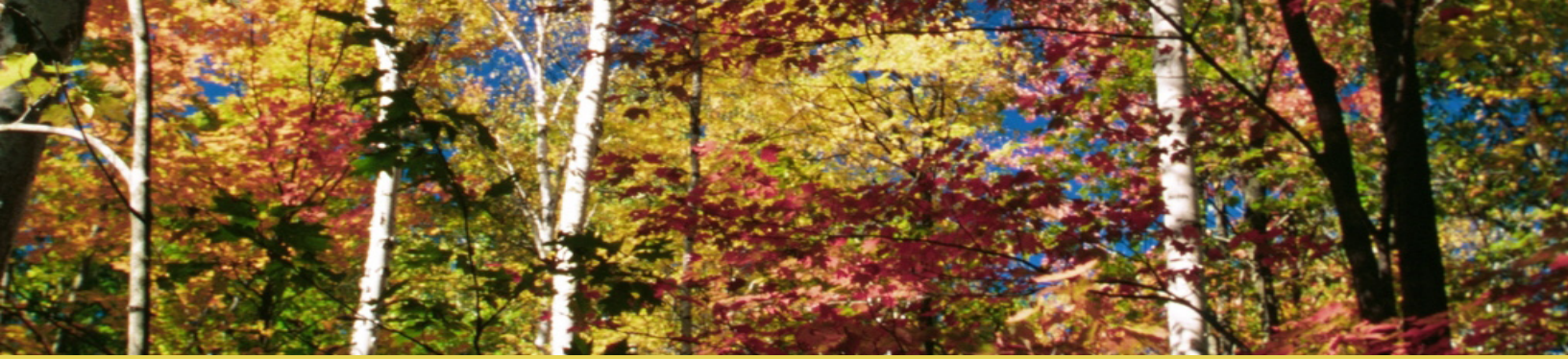
Southern Global Change Program (SGCP)

- Research hydrologist **Ge Sun** recently provided technical assistance on a new collaborative project focusing on Payment for Environment Services in Vietnam. The project explores a mechanism for financing biodiversity conservation management and generating tangible economic benefits for the rural poor.
- SGCP team leader **Steve McNulty** presented at the 23rd Session of the North American Forest Commission (NAFC) in Kamloops, British Columbia, Canada, to help North American forest management agencies better understand climate change and how to best allocate management resources to minimize negative climate change impacts.
- **Johnny Boggs**, biological scientist, presented research findings from a long-term nitrogen fertilization study at the 39th Air Pollution Workshop and Symposium in Guadalajara, Mexico.

EFETAC scientists visited a reforestation site in Inner Mongolia, Northern China -- in top picture, Ge Sun and Steve McNulty (1st) and 3rd from left) are joined by Carl Trettin (7th), Center for Forested Wetlands team leader in Charleston, SC. Concrete board reads, "Ecology should come ahead of economic development."

Bill Bechtold (2nd from left), Forest Health Monitoring team leader, meets with officials from the Korea Forest Research Institute and Korea Forest Conservation Movement.

EFETAC scientist Johnny Boggs shares impacts of nitrogen fertilization on declining forest health with researchers in Mexico.



EFETAC Co-Sponsors Technical and Science Writing Conferences

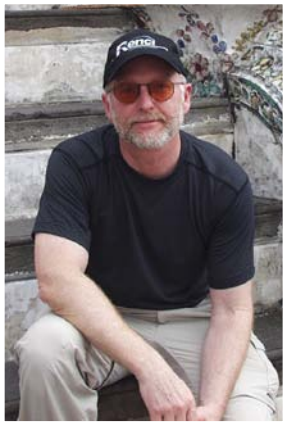
EFETAC Featured in Quarterly Science Magazine

Several EFETAC researchers will be featured in the upcoming issue of **Compass**, the Southern Research Station's quarterly science magazine that addresses the burgeoning interest in a variety of research areas affecting public and private lands. The issue will focus on global climate change and highlight research being conducted by Southern Global Change Program scientists Steve McNulty and Ge Sun and Threat Assessment scientist Qinfeng Guo. Center Director Danny Lee is also profiled, and he reflects on his growing team, his commitment to partnerships, and his vision for the future. In addition, Steve McNulty shares his journey and offers his insight following the recent construction of his earth-friendly home. On newstands in January!

EFETAC co-sponsored two conferences targeted toward forest managers in the South. **"Confronting the Cogongrass Crisis across the South"** was held **November 7 and 8, 2007, in Mobile, Alabama**. Cogongrass is a growing threat as it continues its rapid spread across the Southeast, reducing forest and pasture productivity, destroying wildlife habitat, impacting rights of ways, and presenting an extreme fire hazard. The conference conveyed the latest understanding in restoring lands, managing, controlling, and eradicating cogongrass, and explored existing and needed networks for coordinating strategies for successful cogongrass management. The conference was sponsored by the U.S. Forest Service, Alabama Cooperative Extension System, Auburn University School of Forestry and Wildlife Sciences, and Southeast Exotic Pest Council. A draft version of the conference proceedings and cogongrass management guide is available at www.forestthreats.org.

EFETAC also supported "**Scientific Foundations of Conservation Planning in the Cumberland Plateau and Mountains**" which was held **November 13 and 14, 2007, in Knoxville, Tennessee**. The conference identified, summarized, and evaluated scientific information highly relevant to conservation planning in the Cumberlands. The conference steering committee included representatives from Oak Ridge National Laboratory, The Nature Conservancy in Tennessee, University of Tennessee – Knoxville, U.S. Forest Service – Southern Research Station, and National Council for Air and Stream Improvement.

Science Writing Seminar with Neil Caudle



Neil Caudle

EFETAC and the Southern Research Station Science Delivery Group jointly hosted a science writing seminar on December 7 in Asheville. The seminar was conducted by Neil Caudle, Associate Vice Chancellor for Research at UNC-Chapel Hill, Director for the Office of Information and Communications, and editor of **Endeavors**, the University's award-winning magazine on research and creative activity. The seminar was designed to introduce writers, editors, designers, and scientists to the basics of communicating science through story and visualization.

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