North Carolina Forest Stewardship News

Summer 2013

Bagging His First Turkey

Thanks to the Staff at Tuttle Educational State Forest

Scott Leatherwood and the staff at Tuttle Educational State Forest (TESF) have been working closely with the Wildlife Resources Commission (WRC) over the past couple of years to provide a Youth Fishing Day and a Youth Hunting Day, both have been very successful. This year, Leatherwood was contacted by the WRC about a local handicapped young man and his father who wanted the opportunity to go on a turkey hunt. Scott and the staff at TESF provided them that opportunity. Aaron was successful in his hunt, bagging this gobbler (9+ " beard and 1&1/4" spurs). Scott said that Aaron had a smile on his face from ear to ear, and was still thanking them as he and his dad drove away from the forest.

The Stewardship Coordinator's Corner

I've been your Forest Stewardship Coordinator for more than 7 years. Many changes have happened with the program since I walked into this office in 2006. Among the most recent and significant changes is the Memorandum of Agreement between the N.C. Forest Stewardship Program, the N.C. Tree Farm Program and the Natural Resources Conservation Service (NRCS) that was signed in January 2011. We are currently in the implementation stages of this agreement. Letters are being mailed to current Forest Stewardship landowners to invite them to participate in the N.C. Tree Farm Program. This is an opportunity for landowners to expand on sources of information to manage the multiple forest resources on their land. Participation in the N.C. Tree Farm program also enables landowners to have third-party certification for their woodland through The Programme for the Endorsement of Forest Certification (PEFC), currently at no costs.

I hope you enjoy this edition of the Forest Stewardship Newsletter. I've tried to include diverse topics so the information presented pertains to as many forest landowners as possible. If you see news articles in your area you believe would be good to include in this newsletter, please send them to me. I am particularly interested in stories about landowner successes in managing their woodlands to suit their needs and objectives.

Also, since this newsletter went electronic we are still building our email list so it reaches as many as possible. If you received this from a second or third source and would like to be on our email list, please send me your email address. I can be reached at les.hunter@ncagr.gov and my phone number is (919) 857-4833.

Thank you,

Les Hunter

Stewardship Coordinator

People

Forest Service Co-Sponsors Minority Landowner Magazine Conference

Posted on April 17, 2013 by zhoyle

The conference panel discussion on "Agriculture: Past, Present and Future" featured small farming perspectives from seasoned landowners, young farmers, and North Carolina A&T University students. Photo by U.S. Forest Service.

The annual *Minority Landowner Magazine* conference is a favorite among small and limited resource landowners. This year's seventh anniversary conference in Greensboro, North Carolina, themed "Keeping Your Farm Productive, Profitable and Yours," engaged more than 250 participants, including federal, state, university, and private agencies and organizations sharing information to help maintain family farms. What keeps participants returning year-to-year? Off-farm networking, advanced technology, and sound advice that enhance their operations' sustainability, profitability, and efficiency.

The U.S. Forest Service has offered ground floor support since the magazine's inception. "The Southern Research Station (SRS) has been a tremendous partner," said magazine publisher Victor Harris, who organized the conference with help from sponsors and volunteers. "Since the very beginning, the Station has risen to the top in showing support to help minority landowners improve operations." SRS joined the Forest Service Cooperative Forestry, Conservation Trust of North Carolina, and Carolina Farm Credit as conference co-sponsors.

Forest Service representatives from the agency's three Deputy Chief Areas – National Forest System, Research and Development, and Cooperative Forestry – discussed available forest and science-based resources, including SRS Project Leader Dr. Jeff Prestemon, Eastern Forest Environmental Threat Assessment Center Communications Director Perdita Spriggs, Cooperative Forestry Management Analyst Cheryl Bailey, Southern Region Civil Rights Director Debra Harrell, and Regional Outreach Coordinator Amadou Diop. Other USDA agencies, including the Natural Resources Conservation Service, Farm Service Agency, and Agricultural Marketing Service shared conservation, loan, and marketing assistance.

Harris carefully chose topics that resounded with generational family farmers and messages focused on estate planning, forest land management, legacy farming, and conservation programs. Successful minority and female farmers shared their paths to success, including keynote speaker Jim McClain, owner of McClain's Flying Leatherneck

(Continued on page 4)

(Continued from page 3)

Ranch in North and South Carolina, who emphasized, "There's nothing like owning a piece of land free and clear."

Mississippi farmer Vickie Roberts shared her rules for land retention and offered "destination farming," similar to agri-tourism, as an option for expanding traditional operations. Banquet speaker Dr. Jewel Hairston, Dean of Virginia State University's School of Agriculture, encouraged farmers to "look for unique opportunities, like urban agriculture and niche markets…and embrace social media because that's how consumers communicate and share information."

The conference wrapped up with the *Agriculture: Past, Present and Future* panel discussion, providing seasoned landowners, young farmers, and North Carolina A&T University agriculture students time to share small farming perspectives, challenges, and dreams.–*Perdita B. Spriggs, Eastern Forest Threat Center*

For more information, email Perdita Spriggs at pspriggs@fs.fed.us .

Access the latest publications by SRS scientists.

District 11 wins N.C. Forest Service's Moreland Gueth Water Quality Award

The N.C. Forest Service's District 11 team is the 2012 recipient of the Moreland Gueth Water Quality Award. The award is given in honor of Moreland Gueth, who had a dedicated and commonsense approach to working with people and protecting water quality. Gueth was the Forest Service's statewide water quality and wetlands staff forester, a position he held from 1996 to 2005 before becoming the agency's training officer. Gueth died unexpectedly in 2008.

District 11 Forester John Howard receives the Moreland Gueth Water Quality Award from Assistant Commissioner Scott Bissette.

In the last 11 years, Hillsborough-based District 11 has consistently ranked first or second statewide in total number of water quality accomplishments. Many of the district's water quality inspections have occurred on sites that were being actively harvested. In fact, over the past three years, 65 to 68 percent of the initial inspections done on harvest sites have been while the site was active.

Jennifer Roach, assistant district forester, said "it's not just the people in the district office that make this program work. It takes everyone in the district, at every job level, to contribute and do their part in making sure that a consistent program is carried out."

The District 11 team consists of staff working in Alamance, Caswell, Durham, Granville, Orange, Person, Vance and Wake counties.

District 11 personnel not only have to inspect sites for compliance with N.C. Forest Practices Guidelines, but they also must be knowledgeable of the N.C. Division of Water Quality Riparian Buffer Rules, Roach said. Because all of

(Continued on page 5)

(Continued from page 4)

the district's counties except one are split by multiple watersheds, the staff must understand the differences in rules and regulations for the various watersheds. "The Neuse River, Tar-Pamlico River and Jordan Lake Watershed Buffer Rules all fall within District 11," she said.

Adding to the challenge is the fact that the district is a mix of both urban and rural counties. Urban and suburban sprawl brings many questions and concerns about forest management and its impact on local water resources.

Personnel have formed the necessary working relationships with local government staff to help answer the questions that occur with forestry activities. Often, they also find they must be able to explain the details and limitations of the Right to Practice Forestry legislation in addition to the FPGs, Riparian Buffer Rules and best management practices to fully educate landowners about their rights regarding forest harvesting and water quality regulations.

Like other districts in NCFS, the staff in District 11 works with a variety of landowners and community partners to help protect or enhance local water resources. Staff members have participated in local meetings of the Falls Lake Watershed and the Jordan Lake Buffer rules as well as in meetings with DWQ. All of these rules have a significant impact on the way forest management is carried out within District 11.

Personnel also work with local erosion control boards, county soil and water groups, the Natural Resources Conservation Service, local land conservation trusts and other community watch groups. Over the past four years, district personnel have worked closely with land conservation trusts to find stewardship and forest management opportunities that will help protect water quality in the Upper Neuse Watershed. In the past seven years, they have assisted local erosion control and soil and water groups to enhance or protect water quality on local government properties such as schools, parks and county farms. The staff has also assisted local governments in the use of best management practices that protect water quality.

Staff members often work one on one with landowners, community groups, loggers, timber buyers and consulting foresters, explaining the use of guidelines and best management practices and expressing any concerns or issues that need to be addressed.

The district also provided daylong training to loggers, timber buyers and consulting foresters on the Jordan Lake Buffer Rules when they were instituted; participated in public community outreach meetings for Orange Water and Sewer Authority; assisted with three pro-logger trainings; and performed two trainings on best management practices for forest industry members working in District 11. The district also continues to assist with annual training of local university and college students.

"District personnel work with loggers to improve use of best management practices, place an emphasis on inspecting forest harvesting operations while active, educate landowners so that water quality is not impacted during forest management activities, respond to the concerns of our citizens, and assist community partners in meeting their water quality program goals," Roach said. "The personnel in District 11 work together as a dynamic team that takes pride in promoting a proactive approach to protecting water quality."

Commission Biologist Honored for Work with Quail Habitat

Award-winning biologist Benjy Strope at a prescribed burn.

RALEIGH, N.C. — Benjy Strope, a technical assistance biologist with the N.C. Wildlife Resources Commission, has been given the Wildlife Management Excellence Award from the Southeastern Section of The Wildlife Society. The award recognizes his work in establishing and managing early-successional habitat on corporate-owned swine farms and private lands in southeastern North Carolina.

Strope, who has worked at the Commission for 11 years, received the award during the recent annual conference of the Southeastern Association of Fish and Wildlife Agencies. Strope has been instrumental in securing and managing $566,000 in grants to improve more than 1,000 acres of quail habitat. This year, the area in which he worked demonstrated what is likely the highest density of quail populations in North Carolina.

"Integrating natural resource management strategies into the management of large farms will continue to be a challenging but necessary process if agricultural producers are to address wildlife and environmental quality," said Commission Wildlife Management Chief David Cobb. "This is a model that can be replicated in other areas of the state and on corporate farms across the nation. The Wildlife Management Excellence Award is fitting recognition of his hard work, dedication and leadership."

Strope mainly works with corporate farmers, successfully convincing farmers that making a profit can be accomplished while providing wildlife habitat and improving water quality. He monitors nutrients and pollutants in ditches and waterways on his project farms to improve water quality, and conducts spring bird counts to monitor quail and other early-successional bird species. He also coordinates surveys to determine wildlife response to habitat improvements.

As a direct result of his habitat improvements, there are frequent observations of high-priority and shrinking populations of songbirds, such as blue grosbeaks, indigo buntings and dicksissels. In addition to conducting field days and workshops for local farmers, Strope is sought out by farmers for his expertise. Strope also coordinates with scientists from local universities to study habitat improvement methods.

Strope graduated from California University of Pennsylvania with a B.S. in Wildlife Biology in 1996 and worked for the Pennsylvania Game Commission, the Virginia Department of Game & Inland Fisheries and the Foundation for California University before going to work for the N.C. Wildlife Resources Commission in 2001. He was named the Division of Wildlife Management Biologist of the Year in 2011.

The Time My Dad Took My Class on a Hike in the Woods

by Noah Scott

On Friday, May 17, Forest Service research soil scientist Andy Scott took **Ann Iott's** first grade class on a nature hike to talk about forestry, soil, and anything else the kids wanted to discuss along the newly created Bradford Creek Greenway behind Heritage Elementary School in Madison, AL.

*Scott's six-year-old son **Noah** told the following story about the day:*

"Impossible Man" Andy Scott teaches first graders about soil.

My Dad came to my classroom before we went outside. He told us to walk only on the path because there was poison ivy off the path and a lot of people thought everything with three leaves was poison ivy. When we went outside we got to see some leaves from trees and my Dad told us what kind they were. One was pine, one was sweetgum, and one was sassafras. It smelled good when you crumbled it up. Then we found out how you tell how old a tree is.

We found out that a tiny piece of dirt has 5 billion bugs in it. Some soil is red and some is gray because it has iron in it. Then we went to the creek and my Dad told us what foresters wear and do. One of the things they wear is a vest that has tools in it like a thing that tells them how wide trees are and they wear a hardhat and big boots. They come to the woods and see if trees need to be cut down. Some of my Dad's research is to make sure trees grow back well when they cut them down.

Two of the things we saw were a fish and a crawfish. We didn't see them in the water because my Dad caught them and had them in a bucket. We saw poop and my Dad told us what it was and how he knew what it was. He could tell it was coyote poop because it had a lot of hair in it and it was big. It started raining so we had to go in to the classroom.

And then my Dad turned into "Impossible Man" because he knew most everything, which was impossible for us. In the classroom, my Dad showed us some websites. One was how to become a Junior Forest Ranger. Another one was I Heart Soil. It was cool, and had three short videos. It was fun with "Impossible Man."

(Continued on page 8)

(Continued from page 7)

Noah asked his classmates:

Why did you call my dad Impossible Man?

- Emma: "He said there are bugs everywhere, even in our stomachs! It was awkward and impossible!"

What was your favorite part of the day?

- Sam: Learning how to tell how old a tree is.
- Bhavya, Will, Sophie, Angela, John Allan: Our favorite part was when we got to see the crayfish and the fish.
- Michael: I liked smelling the sassafras leaves!
- Cody liked learning about the poop!
- Mary Frances: All those bugs in just a little bit of dirt.
- Chrishion: loved being in the woods. It was my first time.
- We all liked meeting Impossible Man!!!!!

For more information, email Andy Scott at andyscott@fs.fed.us.

Dr. Mark Megalos Selected as the 2013 Henry Hardtner Award recipient

Dr. Mark Megalos of CNR's Extension Forestry Group has been selected as the 2013 Henry Hardtner Award recipient by the Southern Group of State Foresters (SGSF) Forest Management Chiefs Committee. The award recognizes significant efforts that directly contribute to increased forest stewardship/sustainable forest management on NIPF lands and/or the delivery of a positive and influential forest management message to landowners and the general public. The award was presented during the upcoming SGSF Summer Meeting in Savannah, GA.

CONGRATULATIONS MARK!

Upcoming Events

August 2013

- 8/7 - SLTC Meeting, Smithfield Chamber of Commerce, Smithfield, NC
- 8/21 - NC SFI Meeting, NCFA Office, Raleigh, NC

September 2013

- 9/21 - Mid-Atlantic Logging & Biomass Expo, Smithfield Area, NC

October 2013

- 10/2-4 - NCFA Annual Meeting, New Bern, NC (http://www.ncforestry.org/members/ncfa-annual-meeting-new-bern-october-2-4-2013/), titled, "Dynamic Markets & Sustainable Opportunities," will discuss how markets, both traditional and new, will be impacting the state's forests. The meeting will follow the same format as previous years with recreational activities on Wednesday followed by a welcome reception for the membership, but with a special focus on recognizing the young professionals at the meeting.
- 10/4 - NCFA Board of Directors, New Bern, NC

November 2013

- 11/2 - NC Tree Farm Annual Meeting, Batts Tree Farm, Macclesfield, NC Farm
- 11/6 - Drake Landing, Fuquay-Varina, NC
- 11/13 - NC SFI SIC Meeting, TBD
- 11/13-15 - NC Wood Exports Conference, New Bern, NC

Forest Health

Are my sycamores sick? Are my oaks OK?

The weather has finally gotten more seasonal, but the past few months were anything but typical. Our spring was cold, wet, chilly and damp. If we struggled with wearing jackets in early May, how did our trees handle this indecisive weather? While trees enjoy the soil moisture, they also struggle with certain fungi that infect newly emerged leaves during periods of sustained wetness and cool temperatures.

Early sycamore anthracnose symptoms. Image: Clemson University, Bugwood.org.

Advanced sycamore anthracnose symptoms. Image: Robert Anderson, Bugwood.org.

Anthracnose diseases are caused by a group of fungi, which thrive in such weather. They can be spread by wind and/or rain splash. The fungus takes nutrients from cells within the leaves, in turn killing the cells and creating a leaf lesion. The lesion expands as the fungus spreads. During periods of sustained leaf wetness and cool temperatures, spores are produced from these lesions which can re-infect the same leaf or neighboring leaves. The result is a tree with leaf lesions so plentiful that it looks like the entire tree may be dying. They can be small dark spots or large yellow, tan, grey, reddish brown or brown blotches. Lesions tend to begin along leaf veins because depressions along veins hold water for a longer period of time prolonging wetness and allowing spores to collect. However, lesions often rapidly expand and several lesions may become conjoined and appear as a single lesion.

A large number of hardwood species such as oaks, maples, ash, walnut, dogwood and sycamore are infected by anthracnose. During a spring like the one we are currently experiencing, sycamore trees seem to fair the worst. In addition, the fungus is able to grow out of sycamore leaves into adjacent twigs where it causes small stem cankers and/or deformed twigs.

Oak anthracnose. Image: Joseph O'Brien, Bugwood.org.

For the most part, anthracnose diseases are generally cosmetic and cause no serious long-term damage to the trees. In years of severe disease infection, trees can become unsightly or even appear to be dying. The unsightliness usually bothers homeowners more than it bothers the trees. Some trees respond to infection by prematurely shedding leaves (sycamore and ash), but others retain their leaves until normal leaf drop in the fall (oak). Unless the trees were in poor health before the infection, they should be fine the following spring.

While there is nothing that can be done to suppress the fungus once it has infected the leaves, there is some hope for reducing infections for next year. Anthracnose fungi can stay in fallen leaves laying on the ground over the winter. Raking fallen infected leaves, bagging and disposing of them in another location will reduce the amount of spores available the following spring.

Emerald ash borer found for the first time in North Carolina

An adult emerald ash borer (Granville County).

On May 28, the N.C. Forest Service was un-warmly welcomed back from the long holiday weekend. During a standard check of emerald ash borer traps in Granville County, Forest Health staff and county personnel found the first evidence of emerald ash borer in North Carolina. N.C. Forest Service and NCDA&CS Plant Industry Division checked neighboring counties and found indications that the emerald ash borer is also present in Person and Vance counties.

While this finding was expected at some point, its presence in the state is nonetheless unfortunate. The emerald ash borer, which is native to Asia, is a wood-boring beetle that infests and kills all species of ash in the U.S. In North Carolina, four species of ash are threatened: green ash, white ash, Carolina ash and pumpkin ash.

Infested ash trees exhibit general decline in tree health. The crown thins and whole branches may die. In addition, there could be sprouts growing from the trunk of the tree, vertical splits in the bark, and/or increased woodpecker activity. When any combination of these symptoms is noticed, a closer inspection for direct evidence of the beetle should occur. The most obvious sign of the beetle is the quarter-inch D-shaped exit holes in the bark, caused when the adult beetle emerges from the tree. Upon removing the bark from the tree, winding, S-shaped larval galleries can be seen.

It is these larval galleries that sign the death warrant for an infested ash. As the larvae grow and eat the tissues of the tree, the tree loses its ability to transport water and nutrients. Effectively, the tree is girdled.

Clockwise from left: An ash with a thinning crown, a D-shaped exit hole, winding larval galleries (Granville County).

Most infested ash trees in the state will likely succumb to the beetles' attack. However, for those willing to spend the time and money protecting their ash trees, insecticide options are available. These insecticides can protect the tree for one to two years, and should not be applied until the emerald ash borer is within 15 miles. The same insecticides may offer recovery for

(Continued on page 11)

(Continued from page 10)

trees with minimal infestations and at least half of the tree crown healthy. Contact your county ranger for more information.

Granville, Person and Vance counties are now under a state quarantine to prevent the spread of this pest throughout the state. The movement of ash wood products and hardwood firewood outside the quarantine area is not permitted without a permit from the NCDA&CS.

This is the second time this year that the NCDA&CS announced the findings of a new invasive forest pest in North Carolina. In January, thousand cankers disease and the quarantine of walnut wood in Haywood County was announced.

To learn more about the emerald ash borer, visit the Forest Service's FAQ on emerald ash borer.

N.C. Forest Service finds laurel wilt disease in New Hanover County

RALEIGH – The N.C. Forest Service has confirmed that laurel wilt, a devastating disease of redbay and other plants in the laurel family, has been identified in New Hanover County in an area near the western edge of Wilmington.

The disease has been identified across the Southeast in portions of South Carolina, Georgia and Florida. In North Carolina, it was first discovered in Bladen, Columbus, Pender and Sampson counties in 2011, and in Brunswick County in 2012.

In North Carolina, sassafras, pondberry, pondspice, swampbay and spicebush also fall in the laurel family and could be affected by this disease.

Laurel wilt is introduced into the tree by the non-native redbay ambrosia beetle. The female beetle bores into the bark of the tree, carrying the fungus. Once the beetle is inside the tree, she makes tunnels where she will lay eggs. Fungal spores grow in these tunnels, blocking the movement of water from the tree roots and causing the tree to wilt and eventually die from lack of water. This fungus is extremely fast-acting, and trees typically die within a month of infection.

Symptoms of laurel wilt disease include drooping reddish or purplish foliage. Evidence of redbay ambrosia beetle attack may be found in the main stem; often strings of chewed wood, called frass toothpicks can be seen sticking out of entry holes. Removal of tree bark reveals black streaking in the outer wood.

It is believed the pest can travel about 20 miles per year naturally, but can spread more quickly when the fungus-carrying beetles are transported in wood, such as firewood, to new areas. Homeowners with dead redbay trees are encouraged to keep cut trees on their property. Dead trees should not be removed to a landfill or off site to be used as firewood. Proper disposal of redbay includes leaving wood on site, cutting or chipping wood on site or burning wood on site in compliance with local and state ordinances. In areas where burning is allowed, a permit can be obtained from the N.C. Forest Service through a local burn permit agent, a county ranger's office, or online at http://

(Continued on page 12)

(Continued from page 11)

ncforestservice.gov/. Look for "Burn Permits" under the quick links section.

This destructive pest was first discovered in Georgia in 2002. It is believed the fungus associated with the red-bay ambrosia beetle arrived in the U.S. along with the pest in wooden crating material from Southeast Asia. The most recent detection of laurel wilt in New Hanover County was reported by N.C. Forest Service personnel, and confirmed by N.C. State University's Plant Disease and Insect Clinic laboratory.

To learn more about laurel wilt, go to http://ncforestservice.gov/ and follow the links under the Forest Health section, or call Jason Moan, N.C. Forest Service, forest health monitoring coordinator at (919) 553-6178 ext. 223.

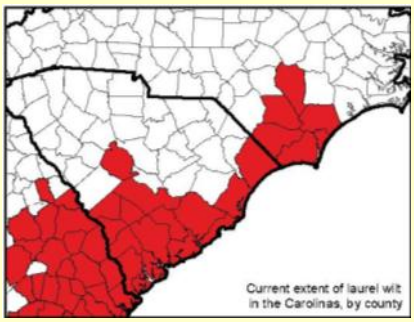
NORTH CAROLINA FOREST SERVICE NC

Forest Health Notes

VOLUME NO. 201302-LW **April 2013**

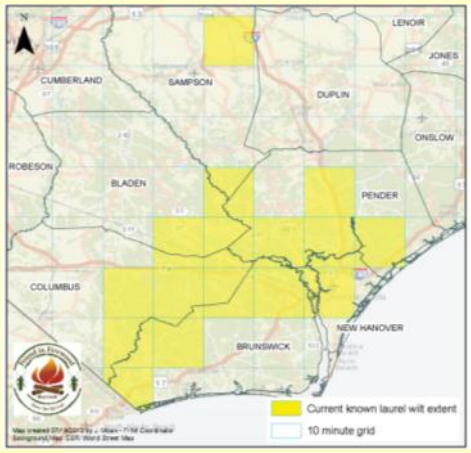
Laurel Wilt Continues Slow Spread In Southeastern North Carolina

Surveys for the devastating laurel wilt disease have been completed for this survey season and the disease was not found to exist in any new counties in North Carolina. The surveys are conducted during the winter months when dying redbay, which retain their dead leaves, can be easily identified. The disease was first found in North Carolina in Bladen County in March of 2011. To date, laurel wilt has been confirmed in Bladen, Brunswick, Columbus, Pender, and Sampson Counties.



Current Known Distribution of Laurel Wilt in North Carolina

The North Carolina Forest Service (NCFS) - Forest Health Branch actively surveys the affected counties and surrounding areas to determine the extent of the disease. In an effort to track the disease on a finer scale than county level, a 10 minute (or roughly 10 mile) grid was applied to the region. As the disease is confirmed in a given location, the corresponding grid square is highlighted. Keep in mind that the map product is intended to give an approximate location of the generally affected area. Our surveying resources continue to be limited and laurel wilt may also be present in areas adjacent to the known locations, specifically in Columbus and Brunswick counties along the Waccamaw River and in the Green Swamp.



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Thus far, our hardest hit area appears to be concentrated near Kelly in Bladen County, where nearly half of the redbay are dead or dying (visually estimated). Additionally, visual estimates of around 30 percent redbay mortality are also being seen around Lake Waccamaw, where the disease appears to be spreading rapidly. Areas on the periphery of these two locations appear to be experiencing much more scattered mortality. The moderate to low mortality rates being observed in all affected areas suggests that the disease has likely not been present in North Carolina for very long. If the disease behaves in North Carolina as it has in states farther south, where it has killed more than 90 percent of the mature redbay, we can expect the redbay mortality rate to continue to increase over time.

At present, laurel wilt has only been observed affecting redbay trees in North Carolina. Sassafras trees can also be killed by laurel wilt and have been killed by the disease elsewhere in the South. This summer, a sassafras monitoring effort will be initiated in the area of the state where laurel wilt is already present. It is not currently known what impact laurel wilt will have on sassafras in North Carolina.

What is laurel wilt?

Laurel wilt is caused by a fungus (*Raffaelea lauricola)* that is introduced into trees in the Laurel family by a tiny non-native beetle known as the redbay ambrosia beetle (*Xyleborus glabratus*). Trees and shrubs susceptible to this disease include redbay and swampbay, and to a lesser extent, sassafras, spicebush, pondspice, and pondberry. **Note that mountain-laurel, loblolly bay, sweetbay, and rhododendrons are not susceptible to this disease.**

Ambrosia beetles are fungus farmers. As a female ambrosia beetle bores into a host tree, she releases ambrosia fungus spores. She and her offspring will later feed on the fungus that grows from these spores. All ambrosia beetles carry spores for their preferred ambrosia fungus. The ambrosia fungus carried by the redbay ambrosia beetle is unique in that it kills its host trees. As the fungus grows, the tree tries to block its spread and essentially chokes off the movement of water, causing the tree to wilt and die. The laurel wilt fungus spreads quickly and infected trees often die within a month. The ambrosia fungus is virulent, and it is believed that a single beetle can introduce enough fungus to kill a tree.

Where did it come from?

The redbay ambrosia beetle is native to Asia, but was brought to the U.S. in wood packing material. Laurel wilt was originally observed killing redbay trees in Georgia and South Carolina in 2003. Since that time, the disease has been spreading outward, predominantly south and west. The redbay ambrosia beetle is estimated to spread naturally at a rate of 15-20 miles per year, but evidence suggests the introductions in North Carolina were likely human-assisted. **The redbay ambrosia beetle can easily be moved in wood products, such as logs, firewood, and other unprocessed woody material from trees in the Laurel family.**

How will I recognize laurel wilt?

Symptoms of laurel wilt on redbay include drooping reddish-brown and/or purplish leaves. Even after the tree is dead, these leaves may stay attached for several years. In sassafras, the disease may be less readily visible as the wilted leaves are not retained. Evidence of the ambrosia beetle attack can be found by looking at the main stem of the

(Continued on page 14)

(Continued from page 13)

tree. When the beetles bore into the tree, they push out toothpick-like strings of wood called frass. These toothpick-like frass strings may not be present after wind or rain events and are not diagnostic of the redbay ambrosia beetle. Trees with this disease will also have black staining in the outer sapwood, which can be seen after removing a section of the tree's bark. **Any tools used on a suspected laurel wilt-killed tree should be sanitized with a bleach or alcohol solution before their next use.**

What can be done?

Currently, there is no reliable way to save a wilting tree. **Avoiding the movement of infested wood will slow the spread of the beetle and fungus**. **This non-native invasive pest is easily moved to new locations by people via the movement of infested wood products such as firewood or yard debris. Confirmed laurel wilt-killed trees should not be removed from the site.** Preferred methods of disposal include cutting the tree and leaving it **on the site,** or burying or burning dead trees **on the site** following all state and local regulations.

How do I report a new laurel wilt location?

If a suspected laurel wilt-killed redbay tree appears to be outside of the highlighted grid squares on the map (pg. 12) or if you suspect laurel wilt in a sassafras tree, please contact the NCFS Forest Health Branch for confirmation and documentation. Our contact information is shown below.

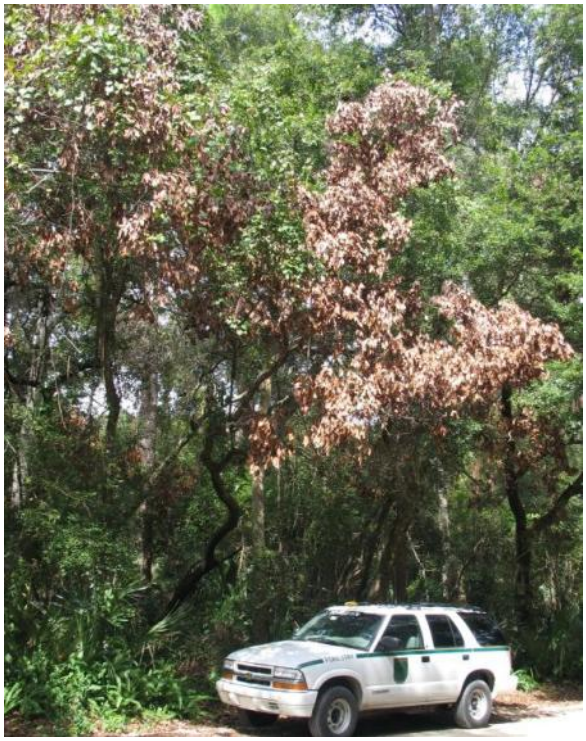
Additional information on the redbay ambrosia beetle and laurel wilt disease can be found at:

http://www.ncforestservice.gov/forest_health/forest_health_laurelwiltfaq.htm

For other non-native forest pests of concern in North Carolina, please visit:

http://www.ncforestservice.gov/forest_health/fh_firewood.htm

Laurel wilt in redbay trees



Toothpick-like frass strings (Top-Right) J. Johnson, Georgia Forestry Commission
Dying redbay (Left) A. Mayfield, Florida DACS Division of Forestry
Staining in sapwood (Bottom-Right) J. Moan, N.C. Forest Service

(Continued on page 15)

(Continued from page 14)

Laurel wilt in sassafras trees

Frass strings (Top-left), Ring of vascular staining (Top-right), Wilting and dying sassafras (Bottom)
C. Bates, Georgia Forestry Commission

Female redbay ambrosia beetle
(~1/16th inch)
M. Thomas, Florida DACS Division of Plant Industry

Forest Health (FH) - East Contact Information

Wayne Langston - FH Tech East
O: 919-731-7988 x214
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Loss of Eastern Hemlock Will Affect Forest Water Use

Hemlock woolly adelgids are killing eastern hemlocks in the Southern Appalachian region. The loss of hemlock will have long-term implications for hydrological cycles as well as plant and animal communities. Photo by Chelcy Ford.

Eastern hemlock grows in streamside areas throughout the southern Appalachian Mountains, where it is a keystone species. Because of its dense evergreen foliage, constant year-round transpiration (loss of water from needles) rate, and dominance in riparian and cove habitats, eastern hemlock plays an important role in the area's water cycle, and regulates stream flow year round.

Eastern hemlocks are facing widespread decline and mortality because of an exotic invasive insect, the hemlock woolly adelgid. The loss of hemlock from southern Appalachian forests can be compared to the loss of American chestnut, which became functionally extinct in eastern forests after the introduction of an exotic fungus in the early 20th century.

"The loss of eastern hemlock is expected to have a major impact on forest processes, including transpiration, and could permanently change the area's hydrologic cycle,"

says **Steven Brantley**, a post-doctoral researcher at Coweeta Hydrological Laboratory and lead author of a new paper about hemlock, future species composition, and the water cycle.

Coweeta researchers estimated changes in transpiration at the forest-level since hemlock woolly adelgid infestation by monitoring tree water use and changes in forest composition from 2004 to 2011. The four studied stands were once dominated by eastern hemlock trees, and are located in the Coweeta watersheds.

Changes in local forest hydrology from the loss of eastern hemlock will largely depend on which species replace it. Rhododendron, a woody evergreen shrub common in southern Appalachian forests, is one of the species replacing eastern hemlock trees. Although rhododendron is evergreen, it has lower leaf area than hemlock, and thus transpiration by rhododendron is lower than that of healthy hemlock trees. Most of the other species replacing eastern hemlock trees are deciduous, such as sweet birch, which unlike the evergreen rhododendron and eastern hemlock, do not transpire during the winter when they lose their leaves. Sweet birch trees also have a much higher transpiration rate than eastern hemlock trees during the growing season.

"These species changes will probably mean permanent changes in seasonal transpiration patterns, which will affect streamflow," says Brantley. "In the growing season, transpiration rates will likely rise, leading to lower streamflow in the summer. However, transpiration rates in the winter will be reduced, which could cause increased winter

(Continued on page 17)

(Continued from page 16)

stream discharge." Exploring how the loss of hemlock has affected annual and seasonal streamflow, as well as streamflow after individual storms is a current area of research at Coweeta.

Whichever species eventually replace eastern hemlock, there will be important long-term implications beyond stream flow. Without the shade provided by eastern hemlock, stream temperatures could rise, threatening aquatic animals such as eastern brook trout that require cold water for survival. The loss of eastern hemlock will not only affect the animal and plant communities in streamside habitats, but ecosystem function throughout these areas.

The study was conducted at the U.S. Forest Service Coweeta Hydrologic Laboratory, in the Nantahala Mountains of western North Carolina. Coweeta is one of the oldest continuous environmental studies in North America. Since 1934, precipitation, temperature, and stream flow have been continuously recorded at Coweeta, a U.S. Forest Service Southern Research Station facility. *–Sarah Farmer, Science Delivery Group*

For more information contact Steven Brantley at sbrantle@umn.edu or (828) 524-2128 ext. 116

Read the full text of the article (preprint version) .

Access the latest publications by SRS scientists.

Weeding out cogongrass in North Carolina

Clockwise from left: Cogongrass patch in Stanly County, off-center mid-vein of cogongrass blades, sharp rhizomes.

When invasive plants are introduced into an environment, they can cause major problems for native plants and wildlife. Some are worse than others, such as kudzu. But another non-native plant threatens the state and is thought to be much worse than kudzu and its car-engulfing capabilities. Cogongrass – considered by many experts to be one of the world's worst weeds – has spread across the southeastern landscape and is at North Carolina's doorstep.

Recently, a patch of cogongrass was found in Stanly County by Tom White and Jeremy Callicutt of the N.C. Forest Service. The infestation is being eliminated and surveys are being conducted nearby to determine if other patches are growing nearby. Last year, the first patch of cogongrass in the state was found and treated in Pender County.

Cogongrass can easily invade new areas if seeds or rhizomes (roots) are transported to another location. This can occur if equipment or commodities, such as hay, are contaminated. This sneaky grass is also difficult to spot with an untrained eye. In the case of cogongrass, the metaphorical snake in the grass *i*s the grass!

(Continued on page 18)

(Continued from page 17)

Cogongrass can cause higher-intensity and more frequent fires than is suitable for native longleaf pine stands (Pender County).

There are several characteristics of cogongrass which put it on the "worst weeds" list. It can easily invade diverse areas and quickly displace native vegetation. Subsequently, ecosystem functions also change dramatically. For example, in a stand of longleaf pine, cogongrass causes more frequent and hotter wildfires compared to wildfires occurring in native longleaf pine habitats. Even though longleaf pine is adapted to fire, longleaf pine seedlings are unable to tolerate the frequent and hotter fires created by an established cogongrass stand.

The N.C. Forest Service and NCDA&CS Plant Industry Division are working together to prevent the establishment of cogongrass in the state. Personnel from both divisions are trained to identify the weed. When new spots are located, measures to eradicate are swiftly implemented.

It is helpful to have as many eyes in the field as possible. Cogongrass patches are typically circular. The grass blades have an off-center mid-vein and the rhizomes have sharp points and are scaly. A patch is easiest to spot when the grass is flowering, which occurs in early summer.

They say the grass is greener, but that is certainly not the case with cogongrass. The state hopes to remain cogongrass-free from this persistent and invasive weed. If you think you have spotted a cogongrass patch, call 1-800-206-9333 or send an email tonewpest@ncagr.gov.

Tree Farm

The American Tree Farm System Announces 2013 Regional Outstanding Tree Farmers of the Year

WASHINGTON (May 21, 2013)—The American Tree Farm System® (ATFS), a program of the American Forest Foundation, has announced the 2013 Regional Outstanding Tree Farmers of the Year, an annual sustainable forestry honor sponsored by STIHL, Inc.

The 2013 Regional Outstanding Tree Farmers of the Year, are:

- **Joe Arington of Wisconsin, North Central Regional Outstanding Tree Farmer of the Year**;
- **Bill and Joan Arsenault of Oregon; Western Regional Outstanding Tree Farmers of the Year**;
- **John William Bembry of Georgia, Southern Regional Outstanding Tree Farmer of the Year**;
- **Allen R. Yale, Jr. of Vermont, North East Regional Outstanding Tree Farmer of the Year**.

Every year, ATFS inspecting foresters and state committees nominate certified Tree Farmers whose conservation efforts, outreach efforts to their community, and advocacy for sustainable forest management exceed expectations.

The regional awardees were chosen after Tree Farm site visits by Outstanding Tree Farmer of the Year inspecting forester judges. The National Tree Farmer of the Year, announced at July's **National Tree Farmer Convention** in Minneapolis, is chosen from among these regional honorees, who will all attend this year's convention and participate in a panel discussion about their sustainable forestry work.

The Outstanding Tree Farmer of the Year awards are generously sponsored by **STIHL, Inc.**, manufacturer of the number one selling brand of handheld outdoor power equipment in America. STIHL is proud to support the accomplishments of hard-working Tree Farmers from across the country. The four regional awardees will each receive a $500 Gift Certificate from STIHL and travel assistance to the National Tree Farmer Convention.

*The American Tree Farm System® is a network of 82,000 family forest owners sustainably managing 24 million acres of forestland. It is the largest and oldest sustainable woodland system in the United States, internationally recognized, meeting strict third-party certification standards. The American Tree Farm System® is a program of the American Forest Foundation. Learn more at **www.treefarmsystem.org/awards-recognition**.*

Wildlife

Don’t Touch That Fawn!

RALEIGH, N.C. — We get it. They are awfully cute, and many times look abandoned.

US Fish and Wildlife Service

But the N.C. Wildlife Resources Commission is reminding the public that they should not approach, touch, feed or move fawns seen hiding in the grass, brush or other vegetation. Deer are a “hider species” — which means a female will hide her fawn in vegetation while she feeds elsewhere. She might not return for several hours.

So while the fawn might look abandoned and alone, it is often just waiting for the female to return.

The fawn is well-equipped to protect itself. By the time it is 5 days old it can outrun a human and by 3 to 6 weeks of age the fawn can escape most predators.

“Spotted and lacking scent, fawns are well camouflaged and usually remain undetected by predators. The doe will return to the fawn several times a day to nurse and clean it, staying only a few minutes each time before leaving again to seek food,” said Ann May, a wildlife biologist with the Commission. “Touching, moving or feeding the fawn will do more harm than good.”

Humans usually cannot provide the proper care for the fawn, and moving it might stress it.

Raising a fawn as a pet is illegal in North Carolina and can lead to situations that are dangerous for the animal and humans alike. Wild animals that lose their fear of humans typically don’t survive in the wild and those that do often become threats to people. Deer that have no fear of people will sometimes exert aggression toward people resulting in serious injury.

In March, for example, a **deer attacked a man in Utah**.Wildlife officials say the mule deer did not fear people because it had been raised as a pet. Similar attacks have happened in North Carolina in **recent years**.

Unless a fawn is in imminent danger — for example, under attack by dogs or injured in a mowing accident — the best decision is to leave it alone. If you are concerned, leave the area and come back to check the fawn the next day. Do not remain in the area. A doe is very cautious and will not approach its fawn if she senses your presence.

If the fawn is in the exact location the following day and bleating loudly or lying near a dead doe (likely at the side of a highway), do not take the fawn into your possession. It is illegal to remove a fawn from the wild. Only licensed fawn rehabilitators may keep fawns in captivity for eventual release.

Instead, call the Wildlife Resources Commission at 919-707-0050 for the contact information of a local, permitted rehabilitator or see a **list of fawn rehabilitators**. Follow the guidance of the fawn rehabilitator.

FIRE

The Science Behind Wildfire Prevention

New GTR Summarizes State of Knowledge

Most wildfires are started by people, either accidentally or intentionally. Photo by NOAA.

According to the U.S. Forest Service **National Climate Assessment** now being finalized, by 2050 the area burned each year by severe wildfires will rise to 20 million acres nationwide, at least double of what it is now. Because many of those future fires are likely to burn under severe fire conditions, preventing people from starting fires in the wrong places at the wrong time will become even more important.

Forest Service Southern Research Station (SRS) researchers, experts from state, other federal, and tribal land management agencies as well as representatives from the law enforcement community recently published a review of the science of and recommendations for modeling wildfire occurrences. Based on original work done for the **National Cohesive Wildland Fire Management Strategy**, the new general technical report ***Wildfire Ignitions: A Review of the Science and Recommendations for Empirical Modeling*** summarizes the state of knowledge about the underlying causes of major wildfires and the role of education and law enforcement in preventing them.

"In this report, we describe a model that shows how wildfire ignitions are produced and how they can be affected by management," says **Jeff Prestemon**, lead author of the report and project leader of the SRS **Forest Economics and Policy unit**. "Tools developed based on the models we present could improve the ability of land managers to respond to emerging and ongoing wildfire threats."

Wildfires result from a combination of ignition source, fuels, and conditions that allow flames to spread. Fires either start naturally, primarily from lightning, or are started by humans, either accidentally or intentionally. There's not much land managers can do to prevent ignitions from natural causes like lightning, but they do have a few key options—wildfire prevention education, fuels management, and law enforcement—for dealing with human-caused ignitions

The authors present a model that visualizes how wildfire ignitions are both produced and prevented; the model in turn serves as the groundwork for further statistical modeling that managers could use to predict wildfire occurrences at different spatial scales through different periods of time. The authors discuss biophysical factors that affect ignition—temperature, humidity, precipitation, and others—but devote most of the discussion to research on patterns of human-caused wildfires and the few studies published on the effects of wildfire prevention.

"Evidence shows that human-caused wildfires do cluster around places where there are more people and machines and where it can easily spread," says Prestemon. " In short time frames, human-caused fires cluster in regular, predict-

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(Continued from page 21)

able patterns associated with work, leisure, and time of year. Research also shows that some human-caused fires cluster spatially and temporally, which may be explained by serial and copycat behavior by arsonists. "

The report concludes with 15 specific recommendations for modeling wildfire ignitions and prevention based on the scientific studies covered. Though presently very challenging to develop, tools that could provide wildfire hotspot models, especially for fires ignited by people, could help both land managers and law enforcement personnel in a future with more fire on the landscape.

Access the full text of the General Technical Report.

For more information, email Jeff Prestemon at jprestemon@fs.fed

Is Your Home at Risk from Wildfire?

Online Wildfire Risk Assessment Tool

Though fire plays an important part in the forest ecosystems of the South, wildfire presents a grave risk to homes built in or near natural areas. The good news is that all homes are not equally at risk, and steps can be taken to reduce risk. Wildfire risk to homes depends on nearby land use, trees, vegetation near the home, and building design and materials.

Wildfires can be a hazard for homes located in or near forests. Photo courtesy of FEMA.

Interface South, one of the science delivery centers within the U.S. Forest Service Southern Research Station **Integrating Human and Natural Systems unit**, provides a Web-based assessment for southern homeowners that quickly generates a risk rating as well as detailed suggestions for reducing wildfire risk.

If you live in a subdivision surrounded by other homes, a development with large open spaces, or an urban area, your wildfire risk is low and this assessment probably doesn't apply to your situation. But if you live out in or near the woods, this information could help you avoid future losses from a wildfire.

The risk assessment is organized around fuel and structure components. The fuel component assesses the vegetation around the home, while the structure component looks at hazardous aspects related to home design and building materials. During a wildfire, the interaction of fuels and structural elements can determine whether a house will survive.

Assess your wildfire risk now. Read the Wildfire Risk Assessment Guide published by InterfaceSouth and partners at the University of Florida for more background information. **Access the latest publications by SRS scientists**.

Forest Service report spotlights fire risk for homes on the edge of wildlands

WASHINGTON, May 10, 2013—U.S. Forest Service researchers recently found that about 90 percent of fuel reduction treatments on national forests were effective in reducing the intensity of wildfire while also allowing for better wildfire control.

The report, "Wildfire, Wildlands, and People: Understanding and Preparing for Wildfire in the Wildland-Urban Interface," synthesizes the latest research and provides examples of what communities in the wildland-urban interface can do to reduce their risk by becoming "fire adapted." Aimed at community planners, the report also underscores the important roles that homeowners and local, state, and federal governments play in reducing risk and describes available tools and resources.

"The Wildfire, Wildlands and People report reminds us that people can and should take steps to protect their homes from wildfires," said U.S. Forest Service Chief Tom Tidwell. "Communities with robust wildfire prevention programs are likely to have fewer human-caused wildfires. In addition, fire intensity is dramatically reduced in areas where restoration work has occurred."

Between 2006 and 2011, some 600 assessments were completed on wildfires that burned into areas where restoration work had taken place. In most of these cases, fire intensity was reduced dramatically in treated areas. Residents can reduce excess vegetation within and around a community to reduce the intensity and growth of future fires and create a relatively safe place for firefighters to work to contain a wildfire, should one occur.

From 2001-2011, an average of 85 percent of wildfires in the U.S. were human caused. The two areas with the highest percentage of wildfires caused by people are the East (99 percent) and the South (96 percent).

The report is part of the Forests on the Edge project, which seeks to identify areas across the country where timber, wildlife habitat and water quality might be affected on private forests by factors such as development, fire, insect pests and diseases.

The project also seeks to understand where increases in housing density on lands adjacent to national forests and grasslands might affect recreation, wildlife, water resources and other important public benefits.

The mission of the Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. The agency manages 193 million acres of public land, provides assistance to state and private landowners, and maintains the largest forestry research organization in the

(Continued on page 24)

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world. Forest Service lands contribute more than $13 billion to the economy each year through visitor spending alone. Those same lands provide 20 percent of the nation's clean water supply, a value estimated at $7.2 billion per year. The agency also has either a direct or indirect role in stewardship of about 80 percent of the 850 million forested acres within the U.S., of which 100 million acres are urban forests where most Americans live.

USDA has made a concerted effort to deliver results for the American people, even as USDA implements sequestration – the across-the-board budget reductions mandated under terms of the Budget Control Act. USDA has already undertaken historic efforts since 2009 to save more than $828 million in taxpayer funds through targeted, common-sense budget reductions. These reductions have put USDA in a better position to carry out its mission, while implementing sequester budget reductions in a fair manner that causes as little disruption as possible.

Timber

PEFC Publishes 2013 Chain of Custody Standard, Aligned with EUTR

The 2013 PEFC Chain of Custody standard, published recently, offers companies an efficient mechanism to demonstrate compliance with EU Timber Regulation (EUTR) requirements. The standard was revised over the past 18 month to satisfy the specific conditions of emerging and existing legislative and regulatory processes, with a particular focus on the EUTR.

The EUTR, which entered into force in March 2013, prohibits illegally harvested timber from being placed on the EU market. It sets out mandatory procedures designed to minimise the risk of illegal timber being sold and applies to both imported and domestically produced timber and is therefore relevant for companies globally.

Key changes to the 2013 Chain of Custody standard include:

- Expanded definition of controversial sources to include EUTR-specific requirements such as compliance with trade and customs legislation in addition to legislation relating to international, national, or local legislation concerning forest-related activities.
- Additional information requirements on tree species and origin to satisfy information needs of various legislative and regulatory processes such as the EUTR
- The PEFC Due Diligence System (DDS) is now an integral element of the PEFC Chain of custody standard and mandatory for all certified entities and all material, including certified material.
- Enhanced scope of prohibited material to include conflict timber

PEFC will provide extensive support to ensure a smooth transition to the 2013 standard, including webinars, FAQs, and face-to-face training sessions. More information will be published shortly.

(Continued on page 25)

The 2013 PEFC Chain of Custody standard was developed in a multi-stakeholder process, in line with PEFC Council Technical Documents Development Procedures (PEFC GD 1003:2009), and benefitted from more than 300 comments received during the global public consultation. Five companies, Papernet, Puumerkki, Steelcase, Weyerhaeuser, and Zellstoff Standal, volunteered to pilot test the requirements, adding on-the-ground experiences to the deliberations of the multi-stakeholder working group.

Chain of Custody of Forest Based Products - Requirements (PEFC ST 2002:2013) officially started on May 24, 2013, with a transition period of nine months. Companies currently certified to the 2010 PEFC Chain of Custody standard can also align their existing system to EUTR requirements until implementation of the 2013 requirements.

Private Forest Owners Make Significant Contribution to U.S. Economy, New Report Shows

WASHINGTON, DC, June 27, 2013 – The National Alliance of Forest Owners (NAFO) today released new data confirming the strong value forest owners provide to the U.S. economy. "The Economic Impact of Privately-Owned Forest in the United States" reveals forest owners support 2.4 million jobs, $87 billion in payroll, $223 billion in sales and 5.7 percent of all U.S. manufacturing. In addition to the **full report**, NAFO's **interactive U.S. map** provides a convenient snapshot of individual state data.

"Private forest owners are a driver of the U.S. economy by providing millions of jobs while producing a broad range of goods and services that improve quality of life in every home and community," said Dave Tenny, NAFO President and CEO. "Private forest owners are able to provide these substantial benefits because they recognize that responsible management today yields sustainable economic and environmental benefits over the long term."

The report, conducted by Forest2Market, is an update to NAFO's inaugural report in 2009. It provides national, regional and state-specific data on jobs, payroll, sales, acreage ownership and contribution to overall manufacturing and gross domestic product. Data is based on 2010, the most recent and complete year for which data is available.

Strong markets for working forests enable forest owners to make investments in forest stewardship that result in the following:

- The U.S. grows more trees than it harvests. USDA reports that the standing inventory (volume of growing trees) in U.S. forests has grown by 50% between 1953 and 2011.
- For the past 100 years, the amount of forestland in the United States has remained relatively stable, at around 755 million acres, thanks to improvements in markets for forest products and reforestation efforts.
- More than half of the freshwater supply, 53 percent, originates on forestlands. Outside of the Western region of the U.S., state and private lands provide 89 percent or higher.
- 20% of US forestland is under some type of conservation program, which is almost twice the world average of 11%.
- Assessments of biodiversity on the nation's forests have found that the annual rate at which species are listed as threatened or endangered has declined fivefold.

(Continued on page 26)

(Continued from page 25)

- Private working forests are essential to achieving our national renewable energy and climate change objectives.
- Energy from forest biomass accounts for roughly 22.2% of renewable energy consumption nationally.
- The EPA reports that carbon storage in U.S. forests continues to increase, offsetting about 14% of annual U.S. emissions from burning fossil fuels.

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NAFO is an organization of private forest owners committed to advancing federal policies that promote the economic and environmental benefits of privately-owned forests at the national level. NAFO membership encompasses more than 80 million acres of private forestland in 47 states. Working forests in the U.S. support 2.4 million jobs. To see the full economic impact of America's working forests, visit **www.nafoalliance.org/economic-impact-report**.

Tips for Timber

Creating a Sound Plan Can Help Get the Most Value for This Resource

Longleaf Pines stand tall in Bladen Lakes State Forest.

Selling timber is a once or maybe twice in a lifetime event for most landowners, so there is a lot at stake to get the sale right. It's important that landowners understand the value of their timber, which varies based on the size, quality and species of the timber on their land.

"Many landowners are unsure of the value of their timber, let alone what to do once their land has been harvested," State Forester Greg Pate says. "Like any agricultural crop, we want to see timber owners get the best return for their investment, but we hope they will commit to replanting so the next generation will also benefit."

The demand and price for many wood products can vary greatly depending on the current market. Landowners who ask the right questions and approach the sale of their timber in a business-like manner, generally see rewards for their efforts.

One such way is to seek professional assistance, whether it's working with staff at the N.C. Forest Service or hiring a private consulting forester. Studies have shown that professional assistance can net the landowner upwards of 23 percent more income per acre than trying to sell the timber without it.

Consulting foresters understand what questions to ask that relate to the current fair market value of the timber. They can also look at a stand of trees and determine if the trees are financially mature and ready to be harvested. Consulting foresters also work closely with timber buyers and can often negotiate a good price on the landowner's behalf.

(Continued on page 27)

(Continued from page 26)

Whether or not a landowner chooses to employ a consulting forester or seek assistance from the N.C. Forest Service, he should take proactive measures such as having a forest management plan. A professional forester can not only prepare such a plan, but also offer supporting information that can help with implementation of the plan's recommendations. Additional information, such as sustainable forest management techniques, contact lists for various types of service providers, and cost-share assistance details can also be found on the N.C. Forest Service website at http://ncforestservice.gov.

Hans Rohr, Chris Williams, Dr. Steve Grado of Mississippi State University, Michael Chesnutt and Dave Andres confer at Bladen Lakes State Forest.

Other Points to Consider

Agriculture Commissioner Steve Troxler cautions landowners to be wary of unsolicited offers from people offering cash for their timber. "If a landowner is serious about selling timber, before entering into any agreement, they should first contact a consulting forester or the N.C. Forest Service," Troxler says. "Whatever they do, they need to be sure to get several quotes to ensure they are receiving fair market value for their timber."

The vast majority of loggers and timber buyers are honest professionals who take pride in their timber harvests, appreciate forest stewardship and respect environmental values. However, problems such as timber trespass situations can occur. Unmarked property lines tend to be the leading cause in timber trespass cases.

Most property boundaries in forests are obscure and "accidental" removal of trees happens. If your boundary lines are unclear, a survey by a licensed surveyor would be a wise investment. Property boundaries should be well-marked with posted signs or paint and should be inspected annually.

Whether the logger is intentionally on your property or not, in most cases the cut trees are discovered after the fact. This can occur years after the harvest, making it difficult to recover financial losses.

If you notice that timber has been cut on your property, you should consider addressing the issue with the logger. If the logger is unresponsive to your concerns or you are unable to locate him, call your county sheriff's office. A consulting forester can also help you address these issues, especially if you have a well-written forest management plan and tract map.

Prior to any harvest activity, the property lines should be properly marked either by the landowner or the consulting forester selling the timber on the landowner's behalf. A map and detailed timber sale contract should also be supplied to every operator on the logging crew. A pre-harvest meeting should be held with the consulting forester, timber buyer, wood dealer, landowner, or anyone else who is involved with the harvesting operation.

Forest owners can protect themselves by walking the boundaries of their woodlots, especially if there are any logging operations occurring near their property.

(Continued on page 28)

(Continued from page 27)

If an adjacent landowner is selling timber, you should walk the line with him or the logger to prevent property line misunderstandings. Landowners should also inspect the property during, and several days after, the neighbor's harvest to prevent illegal entry or their trees from being cut. If the landowner isn't able to do this, he should consider hiring a consulting forester to inspect the forest for him.

Hunters and recreationists who are on the land with permission, as well as neighbors and others, may also be willing to help keep an eye on the property. The fact that the property is being watched may help prevent harvesting mistakes or timber theft.

Landowners should also make a copy of the deed to their property and have it available. This will help protect the landowner by clearly defining ownership. Landowners should have the perimeter of the harvest marked and explain their sale contract policy if unmarked trees are cut.

Check credentials of consulting foresters, timber buyers and loggers prior to agreeing to have them assist you. In many cases, registered foresters are employed by logging companies. A registered forester is held to ethical and technical business standards and can function to purchase, supervise and help execute timber sales.

A grapple skidder is used to transfer small-diameter hardwoods to a deck where they are fed into a chipper.

Landowners should also carefully review any proposed contract to ensure it addresses their best interests. If they need help with the contracting process, landowners should consider hiring a consulting forester. For more complex situations, a contract attorney may be warranted. You should also read the forestry leaflet "Timber Sale Contract Considerations," which can be found on the N.C. Forest Service website at http://ncforestservice.gov/publications.htm.

Visit the "Managing Your Forest" section of the N.C. Forest Service's website to learn more about pre-harvest planning. For a list of consulting foresters in your area, contact your county ranger's office or go to the "Contact Us" link on the N.C. Forest Service website and locate your county in the drop down menu. A list of consulting foresters that service your area can be found on your county contact page.

A forester can help

- By determining the maturity, value, and demand for your timber
- By advising you on selling forest products, applying for cost sharing, and minimizing taxes
- By handling legal and regulatory issues, reforestation planning, and water quality concerns
- By making long-term management plans

(Continued on page 29)

Be informed

- Timber is often sold once in a lifetime.
- Timber prices depend on species, size, quality, competitive markets, and other factors.
- Timber harvesting affects the future of your land, as well as the condition of water, wildlife, aesthetics, and young timber.
- Timber harvesting laws and regulations must be addressed to avoid fines.
- Tax laws on timber sales can be complex, and a forester can help explain them.
- It is important to plan for reforestation. Financial help is available for this.
- Sources: North Carolina Cooperative Extension and North Carolina Forest Service

Before You Sell Your Timber Here Are Some Questions to Ask:

- Which trees should I sell?
- How soon should I market them?
- Are property and cutting boundaries well marked?
- What is the growth rate?
- What is the current timber market price trend?
- What is the timber volume and by which log rule?
- What is the fair market value of my timber?
- Are the trees financially mature?
- Who and where are the appropriate timber buyers?
- What sale method should I use?
- How will the income be taxed?
- How should I re-forest harvested areas?
- How can I get advice from a professional?

Futures Report Charts Changes for Southern Forests

The **Southern Forest Futures Project** started in 2008 with a series of public meetings across the South to gather perceptions and input about the future of the region's forests. Project leaders then used expert analysis and models to forecast and interpret changes in southern forests under multiple scenarios over the next several decades.

The project's goal is to provide forecasts and background information that decision and policy makers, planners, landowners, forest managers, and others can use to make informed decisions.

High elevation forest in the Southern Appalachian Mountains. Photo by Zoe Hoyle.

Early this year, the U.S. Forest Service and the Southern Group of State Foresters published the **Southern Forest Futures Project Summary Report**, which condenses findings from a comprehensive 17-chapter Technical Report to be published later this summer.

The participants in the public meetings, held throughout the 13 southern states in 2008, helped identify the topics to be addressed in the project. A team of more than 50 scientists, researchers, foresters and other experts with the Forest Service, state forestry agencies and universities also took part in the project.

(Continued on page 30)

The Summary Report addresses the following 10 key findings:

1. The interaction of **population growth**, **climate change**, **timber markets**, and **invasive species** will define the South's future forests.
2. **Urbanization** is forecasted to result in forest losses, increased carbon emissions, and stress to other forest resources.
3. Southern forests could sustain higher **timber production** levels, but demand is the limiting factor and demand growth is uncertain
4. A strong market for **biomass energy** could bring wood demands that are large enough to trigger changes in forest conditions, management, and markets.
5. A combination of factors has the potential to decrease **water availability** and degrade quality; forest conservation and management can help mitigate these effects.
6. **Invasive species** create a great but uncertain potential for ecological changes and economic losses.
7. An **extended fire season** combined with obstacles to prescribed burning would increase wildland fire-related hazards.
8. Private landowners continue to control the future of forests in the South, but **ownership patterns** could change and modify the future.
9. **Threats to species** of conservation concern are widespread but are especially concentrated in the Coastal Plan and the Appalachian-Cumberland sub regions.
10. **Increasing populations** would increase demand for forest-based recreation while the availability of land to meet these needs is forecasted to decline.

Cypress trees in bottomland forests of lower Coastal Plain. Photo by Bill Lea.

Later this year, the Forest Service will release separate reports that detail the findings and implications for forest management and conservation issues for the following five sub-regions of the South: Piedmont, Coastal Plain, Appalachian/Cumberland, Mississippi Alluvial Valley and Mid-South.

For more information, email John Greis at jgreis@fs.fed.us or Dave Wear at dwear@fs.fed.us

Access the latest publications by SRS scientists.

NCFS: Wet-weather logging advisory for North Carolina

Take extra measures to conserve soil and protect streams

RALEIGH – The recent over-abundance of rainfall in North Carolina has helped to minimize wildfire risks, but it also has made logging much more difficult.

The N.C. Forest Service is reminding loggers, timber buyers and forest owners to take extra precautions to prevent sediment or soil from washing into creeks, to prevent excessive rutting or compacting of saturated soil, and to keep ground disturbance to a minimum when logging.

"The Forest Service has been busy inspecting logging sites around the state, and foresters and rangers have seen more problems lately, especially in areas with steeply sloped lands and soils that are prone to erosion," said Agriculture Commissioner Steve Troxler.

Problems are mainly related to:

- Inadequate control of rainfall runoff from skid trails and logging roads;
- Poorly established or improperly maintained stream crossings and skid trails;
- Ineffective soil stabilization and site rehabilitation.

In the logging industry, the measures and actions used to conserve soil and protect water quality are known as Best Management Practices. "The fundamental science behind forestry BMPs has been researched, field-tested and refined by forest scientists and industry experts for more than 75 years, and research is continuing," Troxler said.

The Forest Service has a comprehensive user's guide to assist loggers and other forestry professionals with identifying and installing BMPs. The North Carolina Forestry BMP Manual and its corresponding Field Guide are available from Forest Service offices and online at http:\\ncforestservice.gov.

During prolonged or extreme wet weather like North Carolina has been experiencing, loggers are encouraged to use all applicable forestry BMPs. The Forest Service offers the following tips:

- Do not install new equipment crossings over a stream or creek. Access timber from the other side if possible.
- Retain wider, undisturbed buffer zones of trees and vegetation alongside streams.
- Apply leftover tree tops, limbs, branches and woody debris to skid trails to cover bare soil throughout the duration of the logging work. This can prevent soil damage and reduce the risk of sediment washing down the slope and into a stream.
- Immediately apply groundcover stabilization on sloping sections of skid trails, on top of roads and next to stream crossings when finished. Prepare for heavy, prolonged rains.

County rangers with the Forest Service can provide free BMP advice and pre-harvest planning assistance to support logging work. Interested individuals also should review the extensive library of BMP recommendations available on the agency's website, including the latest BMP newsletter highlighting skid trail problems.

A new tool against illegal logging: tree DNA technology goes mainstream

By: Tanya Dimitrova

The role of tree DNA tracking is increasing in the fight against illegal logging as evidenced by prosecution cases in USA and Germany.

Logging truck carrying timber out of the Malaysian rainforest.
Photo by: Rhett A. Butler.

Modern DNA technology offers a unique opportunity: you could pinpoint the origin of your table at home and track down if the trees it was made from were illegally obtained. Each wooden piece of furniture comes with a hidden natural barcode that can tell its story from a sapling in a forest all the way to your living room.

"CSI rely on use of genetic info for catching criminals. Exactly the same type of analysis is used for illegal logging," explains Andrew Lowe, a professor in plant conservation biology in University of Adelaide, Australia and Chief Scientific Officer with Double Helix, a company leading in the development of the tree DNA tracking.

This technology is crucial in tracking down illegally-logged timber. More traditional source-of-origin paper certificates can be misplaced or falsified by corrupt officials and businessmen. "But you can't falsify DNA," Lowe says.

Professor Lowe's breakthrough in genetic analysis of tree tissue came when he managed to extract DNA from timber in a 500-year old shipwreck. Obtaining genetic code from processed wood is like putting a jigsaw puzzle together without having a picture to guide you. "It is a non-trivial exercise," he says.

Another challenge is building up a database of DNA fingerprints for each tree species from every region of the world. Without this baseline information, the DNA sample from commercially available timber may not be used to identify the tree species or where it was logged.

"It takes time, energy and money," Lowe says.

International research teams have already collected data for many high value timber species such as Spanish cedar, mahogany, teak, merbau and ebony. They have compiled DNA maps of Indonesia, Malaysia, Costa Rica, Mexico,

(Continued on page 33)

Guatemala, French Guyana, Brazil, Cameroon, Nigeria, and Gabon and are currently focusing their efforts in 8 more African countries from the Congo basin.

Using DNA technology, commercially available timber can be definitively certified as 'sustainably sourced.' The cost is less than 1% of the value of the timber—a relatively small premium for consumers who want to ensure that their new home furniture was not a reason for cutting down rainforest.

Some socially responsible companies—mostly outside the U.S.—already sell wood with a DNA certification stamp. However, the American Hardwood Export Counsel is now considering offering DNA verification for their supply chains as well.

Regulators in many countries have also taken advantage of the DNA tracking technology. It is easy and not so expensive to do spot checks for timber stocked in warehouses or sawmills. A single test can cost less than $400 and take just a week: with a dice-size wood sample the inspector can find out the exact tree species and its country of origin.

Lowe explains that at the moment there are two ongoing criminal investigations in the U.S. and Germany where prosecutors are using genetic analysis to substantiate claims of legality by timber suppliers. This approach sets an important legal precedent in the fight against illegal logging. The shipments have been seized by regulatory authorities and sent off for DNA testing. The cases are still under investigation and the parties involved have not been publicly announced, however, if the illegal origin of the timber is proven, hefty fines will be imposed on the suppliers.

And rightly so, according to Jonathan Geach, Executive Director of Double Helix. "Do you think it's legal to sell something in your country which was stolen in another?" he asks. With laws such as the Lacey Act in the U.S. and the EU Timber Regulation, requiring companies to prove that the trees for their wooden and paper products were legally sourced, this company's services will become more and more popular.

But consumers have a large role to play in this process, according to Geach. "When they hear stories about large areas of deforestation, they throw their hands and say 'Ah, what can we do? This is terrible!' Well, actually there's loads that you can do! Just stop buying illegal timber!"

Geach suggests that next time you go into a Lowe's or IKEA, just ask: "'What is it? Where is it coming from?' And if people say 'Oh, it comes from a sustainable source,' ask them how do they know that. IKEA can find out where that stuff is coming from; it's just a matter of will."

CITATION: Lowe AJ, Cross HB (2011) The Application of DNA to Timber Tracking and Origin Verification. Journal of the International Association of Wood Anatomists 32(2): 251-262.

Biological Diversity

Are Black Cohosh Harvests Sustainable?

Volunteer citizen scientist harvests black cohosh root to measure above- and below-ground biomass for development of a model to predict root biomass. Photo by U.S. Forest Service.

New tool helps managers estimate black cohosh in forest stands

In Southern Appalachians forests, harvests of non-timber forest products—plants used for culinary, floral, medicinal and other purposes—just keep increasing. Though overharvesting seems to be a major cause for population declines in plants such as American ginseng, black cohosh, and other medicinal plants, forest managers have lacked methods that would allow them to measure the extent of plant populations and to accurately assess the effects of harvest.

In an article published in the April issue of *Forest Ecology and Management*, U.S. Forest Service research **Jim Chamberlain** and university co-authors present a tool that estimates the below-ground biomass of black cohosh (*Actaea racemosa*) based on measurements of above-ground vegetation. "The model we developed provides a practical, efficient, and simple approach to guide forest managers in the sustainable use of black cohosh," says Chamberlain. "It should also serve as a template for developing inventory and management plans for other non-timber forest products."

Black cohosh, a forest herb native to the Appalachian Mountains region, spreads by sending out rhizomes, underground stems that spread horizontally and produce roots and shoots. Before European settlement, Native Americans harvested the rhizomes of black cohosh to treat female conditions and a variety of other ailments. The use of the herb expanded when European settlers adopted Native American treatments and started using it to treat smallpox and cholera.

"Today, rhizomes of black cohosh are harvested primarily to support demand for herbal treatments of menopausal symptoms, with over 2 million pounds harvested from the forests of the eastern United States from 1997 to 2005 alone," says Chamberlain. "The American Herbal Product Association estimates that more black cohosh was harvested during that period than any other herb it tracks, with little effort to manage the plant as a natural resource."

Though foresters have a long history of developing accurate measurement of timber and tree growth, there are few such measures for black cohosh and other non-timber forest products. "No methods have existed to estimate the extent of rhizomes below the ground based on above-ground vegetation," says Chamberlain. "Because of this there's been no way to find out how much rhizome biomass accrues or decreases in a year, or how much volume is available for harvest in a given year."

The researchers set out to develop their model using data from long-term study sites established in 2005 in Virginia

(Continued on page 35)

(Continued from page 34)

to examine sustainable harvest. In 2011, they extended the study to three more sites in Virginia to validate the accuracy of the model developed from the 2005 sites. In the course of the study, the researchers dug up and measured 1164 rhizomes and associated vegetation to make the calculations for the model and to validate its accuracy.

Black cohosh rhizomes.

Photo by National Park Service.

Though wide variability in plant size and the tight interwoven nature of the rhizomes themselves precludes using the model to predict the below-ground mass for individual plants, the researchers found that the model gives a good assessment of the volume of black cohosh rhizomes available for harvest at the stand level. "To date, there's been no effective way to predict the total abundance of below-ground plant material in natural populations without destructive harvesting," says Chamberlain. "The ability to make stand-level predictions will be very useful to managers who are trying to determine sustainable harvest levels of black cohosh. Though focused on black cohosh, the protocols and model we developed is probably adaptable to other species harvested for their below-ground rhizomes such as goldenseal and wild yam."

Working with colleagues at Radford University, Chamberlain is expanding the study to include blue cohosh, bloodroot and wild yam, with the goal of establishing harvest and inventory protocols.

Access the full text of the article including the model**.**

Chamberlain's annotated bibliography on black cohosh**.**

For more information, email Jim Chamberlain at jchamberlain@fs.fed.us

Eucalyptus in the South

Special Journal Issue Addresses Environmental Concerns

Because it grows rapidly and can develop high wood density, there's increasing interest in the South for growing *Eucalyptus*commercially as a bioenergy feedstock. For the South, this means finding and testing Eucalyptus species that will grow in temperate areas as well as genetically modified hybrids bred to be frost tolerant. Growing well under a variety of conditions is part of *Eucalyptus'* attraction, but it also raises questions about its potential to become invasive. Other major concerns include potential fire risk and water use.

To address these questions and more, the U.S. Forest Service and partners held a conference in 2012 in Charleston, South Carolina, to review the history of *Eucalyptus* research and growing culture and to look more closely at potential environmental issues that might arise as the plant's introduction into the South expands. Sponsors of the conference

(Continued on page 36)

included the National Council for Air and Stream Improvement (NCASI), ArborGen, MeadWestvaco, and the Forest Service.

Papers from the conference form a special issue of the *International Journal of Forestry Research* edited by Forest Service Southern Research Station (SRS) senior scientist **John Stanturf** and colleagues, Eric D. Vance, Thomas R. Fox, and Matias Kirst. "Environmental issues addressed in these papers include invasiveness potential, fire risk, water use, and sustainability," says Stanturf. "The special issue also includes articles on *Eucalyptus* culture from other countries that can serve as a strong basis for hypotheses about environmental issues associated with growing this genus in the southern United States."

Eight year-old Eucalyptus stand in Florida.
Photo by Edward L. Barnard, courtesy of Bugwood.org.

SRS scientists were lead authors on articles about invasiveness and fire risk. For the article on the potential for invasiveness, **Mac Callaham**, research ecologist at the **SRS Center for Disturbance Science**, with co-authors Stanturf, SRS research ecologist **Joe O'Brien,** and others, evaluated invasiveness by analyzing seedlings found within or near established *Eucalyptus* plantations on 19 sites, three in South Carolina and 16 in Florida.

The researchers found that some *Eucalyptus* species naturalize—spontaneously reproduce in their range—but there was no evidence for invasion (defined as spreading over long distances in large numbers.) "The intensively managed land use around the sites we looked at seemed to militate against escape," says Callaham. "We found no seedlings in agricultural, suburban, or citrus orchard areas." Overall, the papers in the special issue showed limited potential for invasiveness for most *Eucalyptus* species under consideration for wider planting in the South, though the authors caution that this might change as the scale of plantings increases.

In an article on fire risk, **Scott Goodrick**, project leader of the **SRS Center for Forest Disturbance Science**, and co-author Stanturf sought to answer questions about the potential fire risk of widespread plantings of *Eucalyptus* in the southern Lower Coastal Plain and how fires in *Eucalyptus* stands might differ from those in pine plantations. "Based on fuels modeling, we found that fire behavior in *Eucalyptus* plantations is not much different from that in pine plantations," says Goodrick. "Stands managed on less than 10-year cycles will avoid the bark shedding that leads to fire problems. That said, fire risk will vary with the landscape *Eucalyptus* plantations are grown in. We recommend that future research focus on possible fire risk at the landscape level."

To read an overview of other issues such as water use and sustainability, read the introductory article by Stanturf and fellow journal issue co-editors.

For more information, email John Stanturf at jstanturf@fs.fed.us

Access the special issue of the *International Journal of Forestry Research*.

Access the latest publications by SRS scientists.

Forest Service to limit wild ginseng harvests

Dramatic loss of plant cited as reason for rules

By Karen Chávez—Asheville Citizen Times

Four-prong ginseng plant with berries. Ginseng harvesting on the Pisgah and Nantahala national forests will be severely restricted this year due to declining wild plant populations. / Special to the Citizen-Times

ASHEVILLE — Poaching appears to be the culprit in the U.S. Forest Service decision Thursday to severely restrict wild ginseng harvesting in the state's largest national forests.

The amount of ginseng allowed to be harvested in Nantahala and Pisgah national forests this September will be reduced by 75 percent, and the season shortened to two weeks from four, said Kristin Bail, forest supervisor of the U.S. Forest Service in North Carolina. District rangers also will now be allowed to limit ginseng harvests to certain areas.

"Dramatic declines of wild ginseng populations over the past decade suggest previous harvest levels are no longer sustainable," Bail said in a statement. "It is in everyone's best interest to further limit the amount of the harvest to help ensure the plant's future sustainability is protected."

Visitors must obtain a permit to collect wild ginseng during the designated harvest season. The number allowed this year, which will be obtained through a lottery, is 136 permits divided across the six Forest Service districts.

"The 136 permits was based on a three-year average of permits issued, and 25 percent of that average," said Stevin

(Continued on page 38)

(Continued from page 37)

Westcott, Forest Service spokesman. "We lowered the number of permits by 75 percent and also reduced the harvest season by half." The season will now be Sept. 1-15, instead of the entire month of September. Westcott said the severe decline in wild ginseng plants is probably due to a variety of factors, the most prevalent being poaching, or stealing plants.

Removing any plant or its parts from national forest land without a permit or outside the legal harvest season is considered theft. Ginseng roots can fetch more than $500 a pound in East Asia, where they are prized for their medicinal properties.

On average, 12 people are cited each year for ginseng poaching in Nantahala and Pisgah national forests, Westcott said. The forests cover a million acres in Western North Carolina. Penalties for plant poaching may include a fine up to $5,000 or a six-month sentence in federal prison, or both.

The Forest Service plans to increase law enforcement efforts to reduce poaching.

Forest Service botanist Gary Kauffman said poaching occurs when people take more than their permit allows, take plants not allowed to be harvested, or harvest them outside the legal harvest season. Permits allow for harvesting of 1-3 wet pounds, at $40 per pound, of wild ginseng.

Kauffman said the Forest Service maintains ginseng plots to track the plants over time. A plot harvested in 2003 has still not regenerated, Kauffman said. "Harvesting can be done every year, and that's a potentially large impact over time," he said. "You really should be going to a plot only once every five years. Ginseng harvesters want the roots — that's why harvesting is so much more detrimental, because you're essentially killing the plant."

Permits state that only mature wild ginseng plants — those with three or more leaves — may be harvested, and permit holders must plant seeds from harvested plants near the site of removal.

"The older plants produce more berries. One reason the ginseng season starts on Sept. 1 in North Carolina, that is generally when the berries mature. There have been studies that show germination is much higher when berries are red as opposed to green," Kauffman said.

"If you plant berries in 1-2 inches in soil, you can improve the regeneration. People are taking ones they shouldn't, or they are not planting seeds, and harvest pressure has increased."

Kauffman said the severe restricting of the harvest season and limiting number of permits will reduce harvest pressure, and it is hoped that will give the plants time to regenerate.

The Forest Service has seen poaching pressure increasing over the past decade. In 2008, the agency restricted the season from Sept. 1-30 (it previously had no end date) and increased the permit cost from $30 to $40. Those interested in purchasing a ginseng harvesting permit must submit names and addresses to one of six district offices by July 15. The number of permits issued by district includes: Cheoah Ranger District— 16 permits; Nantahala — 66; Tusquitee — 10; Appalachian – 29; Grandfather — seven; and Pisgah — eight. Requests by email will not be accepted. Names will be chosen in a lottery and the names drawn will be notified by Aug. 15.

For more information about harvesting ginseng in Nantahala and Pisgah National Forests or for a list of district offices, visit www.fs.usda.gov/nfsnc or call the supervisor's office in Asheville at 257-4200.

Climate

Sea Level Rise On South Carolina Shore Is Becoming More Evident

By BRUCE SMITH

GEORGETOWN, S.C. -- Living in a coastal town or city with seawalls and docks on the waterfront, it can be difficult to notice the sea level rise by increments each year. But effects of higher sea level are very clear down a winding dirt road in Georgetown County where acres of what was once a forested wetland have morphed into a salt marsh of dead trees jutting toward the sky.

"When you go into the field, you really see a lot of trees dying. That's the first thing that catches your eye," said Alex Chow, who teaches biosystems engineering at Clemson University's Baruch Institute of Coastal Ecology and Forest Science located at Hobcaw Barony, a 17,500-acre wildlife refuge northeast of Georgetown.

Chow and two other colleagues at the institute used aerial photos to map how the salt water has advanced into fresh-water Strawberry Swamp from nearby Winyah Bay.

Their study found that over the past six decades, the amount of salt marsh in the area has increased from about 4 acres to more than 16 acres. The study was published in December in "Wetland Science and Practice," the quarterly journal of the international Society of Wetland Scientists.

"Over long periods – and what we looked at is over 60 years – the maritime forest retreats at approximately the same rate sea level rises," said Tom Williams, a professor emeritus of forestry and natural resources who is a co-author.

He's not ready to say that all the change over six decades is the work of global warming.

"Sea level rises and falls based on earthquakes and changes in a great number of things. I'm not the expert to say how much sea level rise in the last 20 years is climate change and how much is other things," he said.

Bo Song, and assistant professor of forestry and natural resources also contributed to the study.

The study notes that along the state's north coast, the sea level rise has average 3 to 4 millimeters a year during the past century or so.

William Conner, a professor of forestry and natural resources at the institute, said that what is happening in Straw-berry Swamp is similar to what is happening throughout the Southeast where the shorelines tend to be flattened. The dead trees along the Cape Fear River in Wilmington are an example, he said. In areas where rivers are dredged for shipping, it also makes it easier for salt water to impinge on freshwater areas.

"It's been a little more dramatic in recent years," he said.

"Based on the calculations in this study, you can see it's happening much faster in the past two decades," Chow said.

In natural areas sea level rise will mean a lost habitat for animals and birds that inhabit freshwater swamps. Salt marshes are also an abundant area for various species. But it can take years for the salt marshes created out of other land to become productive as a spawning ground for shrimp and other creatures.

"I call it a degraded swamp," Chow said. "It will take some time for that to happen."

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Phone: _____

County where property is located:

_____

Tract Size: % Forested

Do you have a forest management plan? YES NO

Are you currently receiving technical assistance?

YES NO If yes, by whom - _____

Organization _____

I am specifically interested in

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- ☐ recreation
- ☐ soil
- ☐ non-game species
- ☐ wildlife
- ☐ timber
- ☐ water quality
- ☐ rare plants
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For more information on Forest Stewardship in North Carolina fill out the attached form and send to us or contact the N.C. Forest Service Stewardship Coordinator Les Hunter at (919) 857-4833 or via email at les.hunter@ncagr.gov.