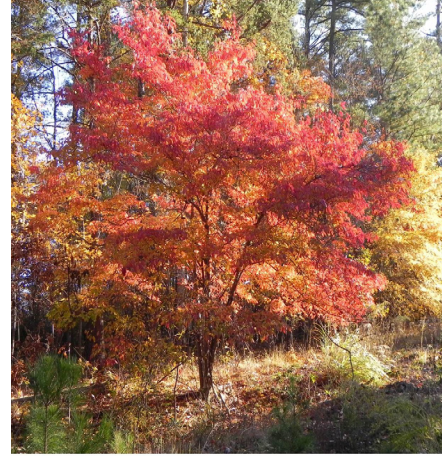


THE DUKE FOREST

LOG

A bulletin from the
Office of the Duke Forest

Fall/Winter 2011 - 2012



Exploring the Wild Side of Duke Forest

Creature Feature: Eastern Box Turtle

We all know the Duke Forest as a wonderful resource for teaching, research, and recreation, but for a variety of wildlife, it is also home. For many animals, habitat in the Duke Forest provides a critical source of food, water, and shelter - a role that is increasingly important as more people move into the area. One animal that benefits from the habitat in the Duke Forest is North Carolina's State Reptile, the **Eastern Box Turtle** (*Terrapene carolina carolina*). Its upper shell, or carapace, is characteristically dome shaped and often brightly colored; while the lower shell, or plastron, is hinged, allowing the animal to completely "box itself in" when facing danger. Eastern Box Turtles are long-lived with an average lifespan in the wild between 30 and 60 years, but since they are late to mature, they do not produce many offspring. Not very picky about what they eat, these turtles often feast on any fruit, mushroom, or insect they happen across. They also are not very selective about where they live and occupy a variety of habitats from wooded swamps to fields; although, they prefer moist forested areas. While Eastern Box Turtles remain relatively common, they are a **priority species for conservation** across the state because of concerns over habitat loss and road mortality (NC Wildlife Action Plan). As we see from the story below, the perils of crossing the road are all too familiar for one of Duke Forest's resident turtles. But fortunately, they are resilient - especially when there are some helpful humans around!



The rescued and rehabilitated Eastern Box Turtle on her release day - note the healed shell above her left rear leg. Photo courtesy of Marissa Lee.



The lower shell, or plastron, of an Eastern Box Turtle is hinged so it has the ability to completely seal its shell. Photo courtesy of Jeff Pippen.

A Survival Story

Marissa Lee and I were on our way back to the lab (Justin Wright's community ecology lab) after collecting soil cores at a nearby Duke Forest gate when we saw this Eastern Box Turtle in the middle of Highway 751. I made Marissa stop the truck, and I ran out into traffic to get the turtle, which had been recently hit by a car and had a major break in her shell above her left rear leg. The shell was bleeding and little pieces of it seemed like they could easily puncture her soft tissue, which luckily had not been damaged by the car. Marissa and I took her to the Triangle Wildlife Rehabilitation Clinic (www.trianglewildlife.org), a nonprofit clinic for injured wildlife. After nearly three months of rehabilitation she was ready to go home. When I picked her up at the clinic I saw that her shell had healed together beautifully (see photo) and she looked very healthy. Early the next morning, Marissa and I released her exactly where she was headed - into the Duke Forest. *By Bonnie McGill*

Life of the Forest

Jeff Pippen, an instructor with the Nicholas School of the Environment, is teaching a new course entitled Terrestrial Wildlife Surveys. This course aims to introduce students to a variety of survey skills that can be used to detect and identify various animals - many of which they will find in the Duke Forest. In preparation for the course, Jeff, with the help of his friend Jeff Beane, the Collections Manager for Amphibians and Reptiles at the NC Museum of Natural Sciences, developed the first ever amphibian and reptile species list for the Duke Forest. With the release of this list, Jeff plans to track sightings of animals reported to him by the public and other users of the Forest. By helping the Duke Forest better understand its life on the wild side, Jeff's efforts contribute to the Forest's wildlife management goal - to maintain diverse and healthy populations of animals native to the North Carolina Piedmont. *To download a copy of the Duke Forest Amphibian and Reptile List, visit: www.dukeforest.duke.edu/forest/wildlife.htm*

THE DUKE FOREST comprises over 7,000 acres of land in Durham, Orange, and Alamance counties and has been managed for research and teaching purposes since 1931. The mission of the Forest is to facilitate research that addresses fundamental and applied questions concerning forested and aquatic ecosystems and to aid in the instruction of students so that they will be informed citizens and effective stewards of our natural resources. In addition to supporting education at local universities, the Forest also participates in community outreach through tours and other events.

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www.dukeforest.duke.edu

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From the Resource Manager

Greetings to all, and best wishes for the New Year. Busy, busy, busy has been our norm for the past year on the Duke Forest. A dedicated staff, able student assistants, eager volunteers, and generous donors have made it all happen and continue to provide good stewardship for such an important resource. I want to express my sincere appreciation to all who have put in countless hours over the year.

Midyear, our former Program Director, Marissa Hartzler, left us to move to New Jersey with her family and accept a position with the Schiff Natural Lands Trust. Marissa accomplished a lot during her time with our office, and we wish her well. In August, Sara Childs joined the team as our new Program Director and hit the ground running. Sara, a 2008 graduate of the Nicholas School, came to us after 3 years as a conservation planner with the North Carolina Sandhills Conservation Partnership in Southern Pines. She brings a great set of skills, energy, and enthusiasm. Sara was immediately immersed in preparations for our Forest Stewardship Council™ (FSC®) audit and quickly demonstrated her abilities.

Forestry Technician, Mike Burke, celebrated his 35th year at Duke University this year. After several years in the Duke Electric Shop, Mike came to us in 1985 and shepherds many of the forest management projects including harvesting, prescribed burning, timber stand improvement projects, and boundary line maintenance.

One of our major accomplishments, and the reason for much of our busyness, was the successful completion of the FSC reassessment audit. Though annual audits are required, a major reassessment involving evaluation of Forest operations against the entire standard is done every 5 years. This audit also involved a newly revised

FSC standard, which required revisiting our management plan and operational procedures for a fairly extensive update. Preparations and revisions began in early 2011, and by the time the audit happened in October, we had successfully put our house in order (see story on page 6).

We also completed field work for our forest-wide inventory this past year. The data collected enables us to plan forest management activities for the next 10 years and satisfies a certification requirement. As I mentioned this time last year, Hayward Community College grad, Johnny Manuel, performed much of the field work, and we are now in the process of data analysis. Erin Fulton, who will graduate from the Nicholas School this spring, and Sara are crunching the numbers.

On subsequent pages of this issue of the LOG, research, teaching, community outreach, management activities, and special projects are summarized. We are especially pleased that over 20 institutions are affiliated with more than 60 individual research projects on the Forest and that over 900 students have been able to participate in a wide variety of field trips and class projects. Our tours and presentations reached out to 800 members of the public, and we hope that each participant enjoyed and learned from their experiences.

Be sure to check our website for announcements about field trips, volunteer opportunities, and special programs. Our annual Spring Flora and Fauna Tour is coming up, and don't forget the third annual Pine Cone Pacer, which will be held on Saturday, April 21st. As always, please do not hesitate to contact us with any questions, suggestions, or comments you might have about management of the Duke Forest.

Thanks for your continued interest and support.

Judd Edeburn*Resource Manager*

Duke Forest Program Director, Sara Childs (right), leads a group of women scientists on a tour of Duke Forest.



Management

Every year, the Duke Forest Staff manages hundreds of acres to support its teaching and research mission, to protect and enhance wildlife populations, to provide recreation opportunities for the public, and to generate revenue for operations. In the past fiscal year, over 300 acres were included in management activities such as thinning of overstocked stands, removal of invasive species, and various types of harvests that maintain structural diversity in the forest ecosystem. By promoting forest health, management operations ensure that Duke Forest remains a vital and healthy resource for years to come.



AT A GLANCE

2010 - 2011

Harvesting	129 acres
Clearcut	47
Commercial thinning	2
Salvage harvest	2
Seed tree harvest	61
Selection harvest	17
Hardwood Control (Herbicide Application)	97 acres
Invasive Control (Herbicide Application and Manual Removal)	31 acres
Pre-commercial thinning	22 acres
Prescribed burning	27 acres
Planting	17 acres



A prescribed fire conducted in a Longleaf Pine stand to maintain an open understory.

Research and Teaching

Between 2010 and 2011, the Duke Forest continued to serve as an important hub for teaching and research on a wide variety of topics related to natural resources. While some major experimental treatments ended, such as the Free-Air Carbon Enrichment, other novel and exciting work began. Professor Kathleen Donohue and her lab (Duke Biology Department) began experiments to understand how climate change might affect important plant traits like germination and flowering time. Once again, hundreds of students and educators from across the region took advantage of the Duke Forest as an outside classroom. They considered topics from soils to wildlife and learned skills such as planning and leadership. The Office of the Duke Forest prioritizes efforts to facilitate teaching and research on the Forest and recently revised its guidelines and registration procedures to improve the support it can offer. *Check them out under the Research or Education links on the website: www.dukeforest.duke.edu.*



AT A GLANCE

2010 - 2011

Number of research projects	60
Number of research affiliations	20
Total research dollars	\$5,003,881
Number of teaching activities	30
Number of educators	19
Number of visits	79
Number of students	926



The colorful Arabidopsis thaliana plots used by Dr. Donohue's lab to investigate how plants respond to environmental changes.

Year in Review

July 2010 - June 2011

Community Outreach

The general public and Duke Alumni are just a sample of the community served by outreach events hosted by the Duke Forest during the past fiscal year. Activities ranged from specialized programs created to teach high schools students about ecosystem change and succession to the regularly scheduled, annually offered tours about flora and fauna, history, research, and management.



Volunteers

Again this year, an army of volunteers supported projects throughout the Forest, many of which were focused on improving recreational access while also diminishing recreational impacts on the ecosystem. Durham Academy students made significant contributions to marking and cleaning up the trail system during their four visits to the Forest. Graduate students from Duke University helped to construct a bridge along the New Hope Creek bypass trail, and many members of the general public donated time to work on other trail issues throughout the Korstian Division.



As a member of the community, the Office of the Duke Forest looks forward to offering more events in the coming year. To receive notifications about upcoming activities, **sign-up for the list serve** at: www.dukeforest.duke.edu/events/index.html.



AT A GLANCE

2010 - 2011 Outreach

Number of tours and activities	37
Number of participants	802
Total outreach hours	82



The Office of the Duke Forest continues to rely on volunteer efforts to get important work accomplished; look for more opportunities to participate on the website, or **submit a volunteer interest form** at: www.dukeforest.duke.edu/volunteer/info.htm



AT A GLANCE

2010 - 2011 Volunteers

Number of projects	10
Number of participants	114
Total volunteer hours	30

Forest Hosts Annual Gathering of Stakeholders

November 2011

The Duke Forest held its 2011 Annual Gathering on November 10th. Members of the University, as well as Durham and Orange County community members were in attendance to hear about current teaching, research, and management activities on the Duke Forest. The audience also listened to an in-depth presentation on the Forest's sustainable management certification. Everyone enjoyed great food, drink, and discussion, and the Office of the Duke Forest appreciated the enthusiasm demonstrated by the wide range of stakeholders present.

In keeping with the annual tradition, the Clarence Korstian Award for exemplary support of Duke Forest was given out by Judd Edeburn, the Duke Forest Resource Manager. This



year's recipient was **Fred White**. Fred received his Master of Forestry degree from Duke in 1953 and after a short time away working for forest industry, came back to Duke. He is regarded by the students he taught for many years as the finest instructor ever at the School of Forestry. Fred served as Director of the Duke Forest prior to

the hire of Judd Edeburn whom he also taught. Judd considers him one of his most important mentors. Fred still walks the Forest often and over the years, has introduced countless visitors to its beauty.

Many thanks to Fred and all of the past recipients for everything they have given to the Forest!

Past recipients of the Korstian Award

2010 David Southern	2006 Jeffrey S. Pippen
2009 Sue Whitfield	2005 Gail Boyarsky Dr. Norman L. Christensen, Jr. Dr. Barbara Newborg
2008 John Kent	2004 Dr. Marcia A. Angle Stephen H. Halkiotis Becky M. Heron Barry M. Jacobs Jeffrey Masten B.B. Olive
2007 Bobbie Reeves Durham Academy - Student Volunteer Program	

Honor Roll of Donors

The Office of the Duke Forest would like to recognize the following donors who generously contributed to the Duke Forest Improvement Fund in the 2010 - 2011 fiscal year:

*David and Sue Ellen Biswell
Richard Cowperthwait
Walter Fowler and Gail Boyarsky
GoodSearch
Billy and Helen Olive
Daniel and Susan Richter
Reuben Goetzl
Travis Cork
Mike Duckwall
George and Kimberly Hutcherson
Ramon Bell
Thomas and Jane Patterson
Timothy Faircloth
Robert and Treeby Brown
Sarah and Michael Burdick
Frank and Reita Masten
Michael Walter
Bryan Nixon
Patrick and Mary O'Donnell
Miles Pfeifer*

Forest Improvements

Gifts to the Duke Forest Improvement Fund have supported a variety of projects over the past year, including:

- trail maintenance, including the materials required for installing water bars and bridges in the Korstian Division
- removal of danger trees along roads and trail throughout the Forest
- an expanded tour series for the community
- educational programs for local schools, all free of charge
- the Duke Forest web site and publications, including the LOG

Future contributions to the Duke Forest Improvement Fund will help support the goals of the Strategic Plan, including continued trail maintenance, increasing public outreach, and providing educational programming for the Duke University community and beyond.



If you enjoy the Forest and would like to help improve its wooded paths, environmental education opportunities, and other special programs, we invite you to make a donation by visiting www.dukeforest.edu/giving. Secure donation boxes are also available at Gate 3 in the Durham Division and Gate 25 in the Korstian Division.

Thank you for your support!

Sustainable Forest Management on the Duke Forest

By Betsy Cook, Office of the Duke Forest Education and Outreach Student Assistant

Since 1931, the Duke Forest has attracted members of both Duke and the local community for the variety of resources it has to offer. With over 7,000 acres of land and 87 miles of trails right in our backyard, there are countless opportunities for research, education, and recreation. You may be less aware however, that the Forest is actively managed and holds a certification for sustainable forest management.

Through participation in a research project in 2001, Duke Forest first obtained a Forest Management Certification based upon Forest Stewardship Council™ (FSC®) guidelines. FSC was initially established as a response to global deforestation. Since then, it has become widely regarded as one of the most important initiatives for promoting responsible management practices. To obtain a FSC Forest Management Certification, a forest must be managed according to a set of strict environmental, social, and economic standards. These standards ensure that managers not only consider financial benefits from timber harvests but also account for a variety of ecological and societal factors.

True to FSC principles, Duke Forest has expanded its focus on conserving environmentally sensitive areas. It currently identifies twelve sites that contain important natural habitats as High Conservation Value Forests. These areas, totaling over 1200 acres and growing, are excluded from timber management operations. Additionally, the Forest is committed to the protection of unique cultural sites, preserving buffer areas around remnants of our past – old home sites, mills, and cemeteries – when conducting forest management activities. By taking

a holistic approach to forest management, the Forest demonstrates its commitment to the FSC mission.

In the beginning of October, Duke Forest completed an audit necessary to maintain its FSC certification. This audit was especially notable in that it was both a five-year reassessment, as opposed to the less intensive one year audits, and was the first audit since FSC's 2010 update of the Forest Management Certification Standards. The evaluation was completed on the ground by a representative from the Rainforest Alliance, an accredited FSC certifying organization.

As part of the reassessment, Duke Forest was also evaluated on their FSC Chain-of-Custody (CoC) procedures. A stamp of approval on Duke Forest's CoC practices ensures that timber products from the Forest have the potential to be sold under the FSC requirements. To maintain the integrity of this brand, the trademark is only allowed on products that have been handled through FSC CoC.

The FSC trademark is similar to an organic food label in the grocery store; it allows consumers to purchase products they know came from a responsibly managed forest, controlled sources, and/or verified recycled sources. Ideally, as more FSC certified products are bought, more forest managers will recognize the benefit of certifying their forest and support for sustainable forest management will grow. By acquiring this voluntary certification, Duke Forest reinforces its own commitment to sustainable forest management and helps encourage responsible practices worldwide.

(This article was adapted from the original content published in the October 26, 2011 online newsletter of the Duke Office of Sustainability.)



A major part of the audit process involves visiting the locations of recent management activities. In this picture, Duke Forest Staff are showing the audit team a Streamside Management Zone (SMZ). SMZs are areas surrounding water courses that are set aside during a harvest to protect water quality and stream habitat. Duke Forest Forestry Technician, Michael Burke, routinely identifies such areas when developing harvest maps and protocols.



Maintaining roads and culverts in excellent condition to protect forest health and facilitate timber management activities is part of the daily routine of Duke Forest Grounds and Maintenance Supervisor, George Pendergraft. It is also a requirement for FSC certification. This picture shows the audit team investigating a recently installed culvert.

Fourth Season of Deer Herd Reduction Program Ends

September 19 - December 16, 2011

The Office of the Duke Forest once again participated in the Deer Management Assistance Program (DMAP) offered by the North Carolina Wildlife Resources Commission. The purpose of the program is to minimize the negative impacts of an over abundant deer population on forest health. The Office expects the program will continue until the recommended level of 15 to 20 deer per square mile is reached.

Deer population surveys at the end of the 2010 season suggested that the Deer Herd Reduction Program had realized some success in reducing the herd. Based on this information, the Office of the Duke Forest shortened the 2011 season by one week and conducted the program between September 19th and December 16th. During this time, the Forest was closed for recreation Monday through Friday while a select group of hunters worked to decrease the population.

The hunters, working in the Durham, Korstian, and Blackwood Divisions, spent over 2,400 hours and harvested 81 deer. This number is a slight reduction from the 123 deer taken last year, and an explanation favored by hunters, is that the large acorn crop may have reduced deer interest in food piles. This year, hunters also noted more recreational users out in the Forest during the closure, which they cited as a setback to their efficacy.

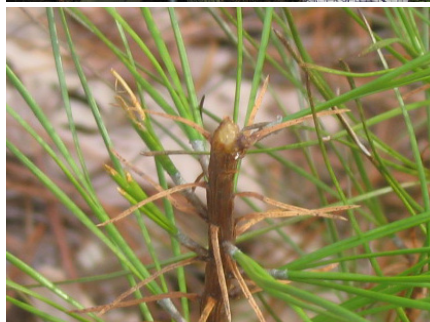
Out of the 81 deer, over 75% were does, which are the target of the program as they have the greatest impact on population numbers. More than 50% of the animals were harvested from the Durham Division, the Forest's largest. Surveys of the deer population are being planned for February and March of this year, and the results will be used to inform the design of the 2012 program. Until then, all divisions of the Forest are again open for recreational enjoyment from sunrise to sunset.



When too many deer live in the same area, a 'browse line' often becomes apparent. Much of the vegetation below the maximum height a deer can reach is gone, leaving the understory, or lower layer of the forest structure, mostly bare. This can impact how the forest grows, as well as the kind of habitat that is available for other wildlife. Photo courtesy of Metro Parks, Serving Summit County.



Overbrowsing by deer can also affect the results of experiments. Researchers are sometimes forced to install additional infrastructure at their sites to keep deer out. These structures are called 'exclosures'. It is often easy to see the difference between understory vegetation inside and outside of an exclosure.



Deer feed on both grassy and woody vegetation in the forest understory. The destruction of tree seedlings by deer can change how the forest regenerates, and in particular, what types of trees are able to grow into the forest canopy. This photo shows a terminal bud, or primary growth point, of a young loblolly pine that has been chewed off by a deer. It is likely that this tree's growth will be stunted for several years.

Some North Carolina Deer Facts

- In 1900, the deer population in North Carolina was estimated around 10,000 animals.
- The current estimate of deer in North Carolina is 1.1 million animals.
- Approximately 90% of the 20,000 or so animal related car accidents every year involve deer.
- The 2010 estimate of deer density in Durham and Orange County is 30 - 44 deer per square mile, which is at least 2x greater than the recommended level.

Sources - NC Wildlife Resources Commission and NC Department of Transportation



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UPCOMING EVENTS

Save the Date

Spring Flora and Fauna Tour
Saturday, April 7th



The beautiful bloom of the Eastern Redbud (*Cercis canadensis*) is a harbinger of spring.

Pine Cone Pacer
Saturday, April 21st



Runners, come find out who is the fastest pine cone pacer of all!

For more information and to register, please visit the Duke Forest website: www.dukeforest.duke.edu/events