

# THE DUKE FOREST LOG

A bulletin from the  
Office of the Duke Forest

**Fall 2023**



## The Enduring Value of Duke Forest

Duke University's environmental legacy arguably began in the 1930s when it established the Duke Forest Teaching and Research Laboratory, the Duke Marine Lab, and the School of Forestry, among other significant undertakings. In the past year, the university — leveraging these enduring successes — launched its ambitious Climate Commitment, an effort to marshal all of the university's teaching, research, operations, and engagement resources to address the climate challenge. The Duke Forest, a professionally staffed, 7,100-acre outdoor classroom and living laboratory provides capacity in each of these areas.

As a unique venue for encountering and studying the effects of past and present human influence on the environment and as a primary stage for multi-disciplinary research, the Duke Forest plays a pivotal role in advancing the Climate Commitment across teaching and research. This forest is an intersection of sustainable management, rich cultural and scientific history, modern infrastructure and technology, and ongoing natural and human activity. From **Dr. Jim Clark** and his lab's work to understand changes in tree mast production and its cascading effects on the food web to **Dr. Nicki Cagle's** classes that involve 'reading the landscape' and surveying native wildlife, the Forest provides a microcosm for understanding, studying, experiencing, and educating about the environmental challenges facing the world at large.



*Community science volunteers investigating a coverboard in the Herpetofauna of the Duke Forest program.*

Given the Forest's multifaceted position as a Duke and community resource, it has been essential for our Office to build capacity in cultivating community relationships and organizational partnerships, both of which have been part of our strategic vision for over five years. Our staff now host a community science program that engages the public in research on herpetofauna in a changing environment, and we work with community volunteers through the Forest Stewards program to help care for the land base and grow a culture of stewardship amongst Forest visitors. We also partner regionally with dozens of organizations in projects with impacts extending beyond our boundaries, such as the Triangle Connectivity Collaborative and the New Hope Creek Stream Restoration Projects (*see pages 5 and 6*).

As models improve, we see ongoing opportunities to quantify the many ecosystem services — like clean air, clean water, and carbon sequestration — that the Forest provides to the region and thus how Duke can better account for positive environmental impact. The Forest is a crucial natural resource, protecting threatened habitats and protecting plants, wildlife, and the often forgotten yet critically important microorganisms. Even without data and statistical significance, we know that the Duke Forest is a vital refuge for nature and people — a green oasis for health and wellness and a beloved sanctuary space in an increasingly urban North Carolina.



*Clark Lab Manager Jordan Luongo (left) and PhD student Renata Poulton Kamakura introducing Research Tour participants to their studies on tree biodiversity and climate change.*

**The Duke Forest Teaching and Research Laboratory** 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 Duke Forest is to facilitate research that addresses fundamental and applied questions across a variety of disciplines and to aid in the instruction of all students in their pursuit of knowledge, especially regarding the stewardship of our natural resources.

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**Zach Carnegie**  
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Graduate Dean for Trinity College of Arts & Sciences; Professor of Biology

Forest Greeting  
From the Executive Director's Desk

Change is a constant theme in our lives, in the Duke Forest, and in this brief note I write every year in the LOG. In many ways, change is challenging and uncomfortable, and discerning if, when, and how to respond requires a skillful dance informed by enduring values. I am so fortunate to work with a team and within an institution of leaders committed to working together with honesty and integrity as we navigate our complex and ever-changing world.

As the front-page article describes, the reporting structure for the Office of the Duke Forest (ODF) has changed, and we now sit under the Office of Climate and Sustainability (OCS). This new office, like those it is bringing together under its umbrella (ODF, Sustainable Duke, Sarah P. Duke Gardens, Duke Campus Farm, and Nicholas Institute for Energy, Environment, and Sustainability), uniquely straddles the academic, operational, and engagement sides of Duke. While this change and its cascading effects will evolve and take shape over years to come, I know it will amplify Duke's progress and impact on its Climate Commitment.

To adapt to this change and others affecting our management of the Duke Forest, our team is growing. This year — as we said a tearful and grateful goodbye to long-time administrative assistant **Beverly Burgess** — we also welcomed **Tim Barco** as our operations coordinator and **Zach Carnegie** as our forest technician. These new team members provide a significant boost to our capacity in the office and in the field. With commitment and support from OCS and Duke leadership, we are currently hiring two additional positions that will enhance our work in teaching and research and in our stewardship of the Duke Forest land base.



Tom, Blake, Craig, Sara, Tim, Zach, and Maggie

While in the short term these changes require extra effort and stretching of our existing capacity, they represent the successful culmination of a decade-long strategy to bolster the ODF team, its mission, and its role at Duke. So yes, while the times, they are 'a-changin', we have so much reason to be hopeful about the future, and we remain steadfast in our commitment to our team, our forest, and our collective mission.

*Sara*  
Sara DiBacco Childs | Executive Director

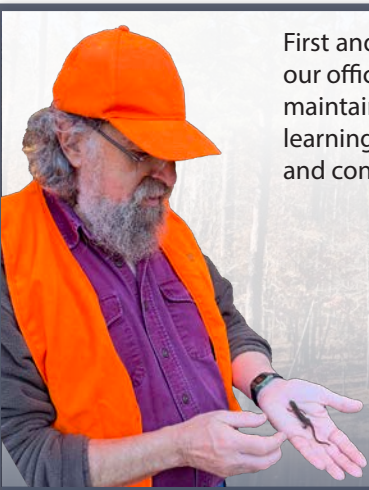
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As we venture into a complex and uncertain environmental future, we are proud that the Forest has been contributing to the Duke Climate Commitment, long before it was conceived. It is one of Duke's most tangible and enduring assets, and it is primed for this moment by a rich history and a vibrant present. What we can learn, discover, and share from this land is limited only by our creativity, diligence, and determination to steward this great forest.

We are thrilled to be part of Duke's ambitious effort to help create a climate-resilient future, and we are excited to announce that our team has joined Sarah P. Duke Gardens, Sustainable Duke, the Duke Campus Farm, and the Nicholas Institute for Energy, Environment, and Sustainability under the newly created Office of Climate and Sustainability led by Vice President and Vice Provost **Toddi Steelman**. In this new stage in the Forest's journey, we have so much to look forward to.



Teaching & Research



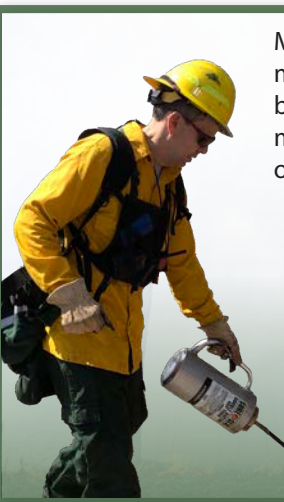
First and foremost, the Duke Forest is an outdoor classroom and living laboratory, and it is the mission of our office to facilitate this use through our daily operations and strategic initiatives. We help establish and maintain dozens of research projects every year; we assist faculty and teachers in creating high impact learning experiences for students of all ages; and we work directly with students interested in designing and conducting projects focused on any aspect of the Duke Forest.

Research Activities	
Research projects	65
Primary investigators	41
Institutional affiliations	13
Total research dollars	\$5,753,595 <small>(39 of 65 reporting)</small>

Teaching Activities	
Teaching activities	44
Educators	25
Class visits	302
Participating students	1,032

Duke Biology Professor emeritus Dr. Ron Grunwald has visited the Forest with hundreds of students, introducing them to herpetofauna.

Management & Stewardship



Management of the Duke Forest is guided by a comprehensive plan that promotes the Forest's academic mission while ensuring the protection of its natural resources. Our holistic approach sustains a wide variety of benefits that are available to Duke University, as well as the broader academic and public communities. This management system is certified by Preferred by Nature to Forest Stewardship Council® guidelines, a strict set of environmental, social, and economic standards.

	Acre
<b>Harvests</b>	<b>43</b>
Regeneration	42
Thinning	1
<b>Stand Improvements</b>	<b>132</b>
Pre-commercial thinning	90
Prescribed burn	9
Pine Release	33
<b>Planting</b>	<b>60</b>

	Miles
<b>Road &amp; Trail Maintenance</b>	<b>96</b>
Trail work	13
Road mowing	39
Ditch Clearing	39
Side mount mowing	5
<b>Boundary Line Maintenance</b>	<b>13</b>



Forest Supervisor Tom Craven ignites a prescribed burn in a Longleaf Pine demonstration plot, originally planted in 1935.

Engagement & Outreach



The Duke Forest engages a large audience, including the Duke University community, local K-12 schools, and the general public. Through engagement and outreach, we leverage the Forest's resources to connect people with science, to educate about natural resources conservation and forest management, and to empower the public with information about issues affecting the environment. We rely on a critical core of volunteers to help us accomplish teaching, research, and management goals.

Volunteer Activities			
<b>Stewardship Projects</b>		<b>Forest Stewards</b>	
Events	5	Volunteers	49
Volunteers	46	Route visits	277
Volunteer hours	482	Volunteer hours	796
<b>Community Science</b>		<b>Photography Corps</b>	
Volunteers	55	Volunteers	9
Data collection visits	194	Projects	12
Volunteer hours	704		

Outreach Activities	
Tours and activities	21
Participants	442
Outreach hours	45

Duke undergraduates and high school students in the Health and Environment Scholars @Duke Program headed to the Forest to learn about our herpetofauna transects.



# Project Updates



The new property includes the only large perennial pond in the Duke Forest, and it has already become a site for several teaching and research projects, including herpetofauna transects for experiential learning.

## Visioning for a New Property

In 2021, Duke University acquired a 27-acre parcel of land within the Durham Division, an inholding in the Duke Forest since the acquisition of the original lands in the 1920s and 30s. This tract is not only home to a large pond and a cabin with modern amenities, but it is also surrounded by several long-term research sites and interesting forest stands, such as the biennially-burned Longleaf Pine planted in the 1930s. Soon after the acquisition, our staff began to evaluate the property's potential to support and expand our teaching and research mission. We quickly understood that gathering input from a wide group of faculty and staff at Duke would be essential to the visioning process.

Over the course of six months in 2022, Executive Director **Sara Childs** and Senior Program Coordinator **Maggie Heraty** engaged twenty-six colleagues from across Duke, including the entire Duke Forest Advisory Committee, and synthesized their wide-ranging ideas. With many proposed uses for this unique, wooded property close to campus, Duke Forest staff and the Advisory Committee began refining and then ranking the ideas presented in the synthesis. Excitingly, we found clear alignment on using the multifaceted property as a venue for teaching and research facilitation that over time can develop into an official hub and demonstration area for Duke Forest based exploration and discovery.

Duke faculty, students, and researchers are already on the ground, including members of **Dr. Ryan Emanuel's** lab and collaborators from the University of Georgia and University of Idaho. Their team is studying water storage and transportation in trees. In the years to come, our staff looks forward to further integrating this property into our mission and strategic goals.



A Duke Forest crew member installing the first closure signs in fall 2008. These important signs let people know that the forest is closed for public recreation on weekdays during the deer management season to ensure a safe and effective hunt.

## 15 Years of Deer Management

Since 2008, the Duke Forest has partnered with the North Carolina Wildlife Resources Commission (NCWRC) and a highly skilled bowhunter organization to protect forest habitats and promote a healthy White-Tailed Deer population. Besides reducing the number of does in the local population, NCWRC District Biologist **Joe Folta** notes, "On a state level, [programs like Duke Forest's] allow us to collect the samples we need to monitor for diseases such as chronic wasting disease that we may not be able to obtain otherwise." Each February, our staff and Nicholas School of the Environment students also perform spotlight surveys to assess the abundance and distribution of deer in the Duke Forest.

Through 15 years of collaboration and partnership, effective program management, and consistent data analysis, we are reaching our goals. Measures of the size and structure of the Forest's deer population demonstrate appropriate trends. Our data show that does — the target of our hunt — are younger in age overall with body weights remaining relatively stable over time, while bucks are trending older with increasing weights. Our spotlight results show that the total number of deer are staying consistently suppressed from the high counts documented around 2010. Importantly, Duke Forest staff and researchers continue to observe that deer put less browse pressure on understory vegetation, including tree seedlings, in both study and management areas. While this management program requires a huge effort from our staff and collaborators and sacrifice from recreational visitors, these 15-years of demonstrated success reward all of us through assuring the long-term health and resilience of the Duke Forest.

## Ongoing Connectivity Collaboration

The Eno-New Hope Landscape Conservation Group is now the Triangle Connectivity Collaborative (TCC) — a name that better represents the geographic scope of this ongoing effort. In early 2023, the Durham County Open Space Program finished a project that expanded and updated the original connectivity analysis to include additional watersheds in the Upper Neuse River Basin. These new spatial data are now available for download from the TCC website [connectedconservationnc.org], and they show habitat patches and corridors between them that underpin a connected, regional landscape, which are essential for biodiversity conservation.

This year also brings progress on implementing strategic actions identified in the 2022 Connectivity Conservation Strategic Action Plan. In October of this year, the Land Use Working Group — led by steering committee member and TCC coordinator **Brooke Massa** from NC Wildlife Resources Commission — hosted a workshop for city and county planners, elected officials, and others to learn about habitat connectivity, biodiversity conservation, the TCC, and how to use the patch and corridor spatial data in land use planning.

Additional information about this work and Duke Forest's role in it can be found in previous editions of the *The Duke Forest LOG*.



Peter Jeff Nicholls



Calvin Powers



Executive Director Sara Childs (second from left) with the Steering Committee of the Triangle Connectivity Collaborative.

## Decadal Recreation Survey Complete

To learn about and better manage recreational use of the Forest, we implement a recreation survey every 10 years. The survey involves both visitor counts and surveys of visitors' recreational habits and perceptions of Duke Forest. In June 2022, **Christine Martens**, an enterprising NSOE MEM/MF student led the deployment (with lots of help from DF staff) of a year-long recreation survey to meet the requirements of her master's project. She evaluated past surveys, designed a new visitor count method, analyzed the first half year of data, and trained fellow students in completing the project after her graduation. **Sam Nurmi**, our 2021-2022 Management Intern, faithfully repositioned count sensors according to Christine's rotation schedule, and **Andrea Kolarova**, our 2022-2023 Management Intern, sorted through mountains of data to perform and present the final analysis. Thank you all!

The results show a conservative estimate of 140,000 visits from pedestrians, cyclists, and equestrians through the Forest's 16 most popular gates. With them were over 30,000 dogs (about one for every four pedestrians)! We are pleased to report that, in general, people feel very safe in the Duke Forest; however, when visitors did report feeling unsafe, off-leash dogs were the primary concern. Since the last survey in 2013, smart phone apps like Google Maps and AllTrails (with 45 others identified!) have become indispensable for some visitors. This finding supports Duke Forest staff's significant concerns — shared over the last several years — about app usage and how "digital breadcrumbs" negatively impact the Forest.

Overall, our recreation surveys continuously demonstrate that the Forest remains a beloved resource for recreation, and they remind us that as managers of this invaluable teaching and research laboratory, we must always work to engage all visitors in its mission and stewardship.





## New Hope Creek Restoration

The New Hope Creek (NHC) Restoration Projects remain a major priority for the Duke Forest. Over the last year, we have advanced design plans and begun building the financing we need to remove and replace the Concrete Bridge (CB) and remove the partially breached Billy Erwin Dam (BED). These two human-made structures have caused significant ecological damage to this vital waterway, which is a primary tributary to Jordan Lake. Successful completion of these restoration projects will improve aquatic habitat, restore aquatic habitat connectivity, and stabilize stream banks along NHC, while also improving recreational access and vehicle passage during all flow conditions.

Importantly, these projects will directly benefit freshwater mussels, the often overlooked but vital filter feeders that contribute to water quality and serve as indicators of ecosystem health. NHC is home to several imperiled mussel species, including the federally threatened Atlantic Pigtoe (*Fusconaia masoni*). By removing barriers to animal movement that also degrade habitat quality, we hope to bolster freshwater mussel populations in NHC, and specifically, to facilitate a greater range over which the Atlantic Pigtoe overlaps with its preferred host fish species, the Creek Chub (*Semotilus atromaculatus*) — a relationship essential to completing this mussel's life cycle.

In August, Duke Forest Executive Director **Sara Childs** and Intern **Andrea Kolarova** joined a team from the NC Wildlife Resources Commission and NC State University to survey mussel populations around the CB and BED. Donning wet suits and snorkels, they slowly floated upstream collecting mussels to then identify and tally at the end of each reach. These projects also engage the academic and local communities

through collaborations with professors and students at the Nicholas School of the Environment and through partnerships with Triangle Land Conservancy and the US Fish and Wildlife Service. We hope to provide more education and outreach on site as the projects move forward.

*These restoration projects embody Duke University's commitment to research, education, and environmental stewardship, and offer a remarkable opportunity for an individual or family to establish an enduring stewardship legacy in our region. If you are interested in supporting this project, please reach out at [restore-nhc@duke.edu](mailto:restore-nhc@duke.edu).*



*The survey team examining some of the mussels found during surveys of New Hope Creek in preparation for the stream restoration projects. The most common species found was the Eastern Elliptio (Elliptio complanata).*

## Making an Impact

### Philanthropy Creates New Possibilities

We are thrilled to announce that we are hiring a new and pivotal full-time position that represents a remarkable opportunity to further the teaching, research, and community engagement missions of Duke's oldest and largest laboratory. The Assistant Director of Teaching and Research will coordinate all scientific and academic uses of the Duke Forest and will be an ambassador for our mission. They will additionally promote experiential learning; advance initiatives centered on diversity, equity, inclusion, and justice; and expand our impact with strategic projects aligned with the university's Climate Commitment.

This position and its transformative impact on our team has been made possible in part by a generous gift from **Dr. Marcia Angle** and **Mark Trustin** in 2021. The first privately funded endowment for the Duke Forest Teaching and Research Laboratory, **The Angle Family Duke Forest Fund** champions the Forest's role as a vibrant hub for teaching, research, and community engagement.

*We encourage you to connect with our team to discuss how you can link your legacy to this wonderful land base and create new possibilities for our ever-important mission.*



*Your gifts make it possible for learners of all ages to discover the wonders of Duke Forest. These BOOST XL students sampled macroinvertebrates and learned to identify trees in summer 2022.*



### Supporting the Next Generation of Foresters

**Toney Lumber Company, Inc.** in Louisburg, NC supports the Duke Forest with donations to our summer intern program. This program provides experiential learning opportunities for the next generation of natural resource and forestry professionals and provides additional staff capacity during the busy summer months. This past summer, Nicholas School of the Environment Master of Forestry and Master of Environmental Management student, **Andrea Kolarova**, learned valuable lessons about the practical side of land management and forestry. Engaging in trail maintenance, recreation surveys (see page 5), wildlife surveys, and forest inventory projects, she applied her classroom knowledge in the Duke Forest. This immersive experience deepened her understanding of the Forest's biodiversity, further developed her forest measurement skills, and began to develop her own nuanced understanding and wisdom around managing forests. Andie is continuing to collaborate with us on her Master's Project research, which involves studying the impacts of the invasive pest, the Emerald Ash Borer, on the Duke Forest. You can learn more about Andie's journey from the newsfeed on our website.

## Friends of the Duke Forest

The **Friends of the Duke Forest** are our foundation of support. When you become a Friend of the Duke Forest, you are part of the network of neighbors, community members, and Duke faculty, staff, and students that make our work possible. Show your dedication and appreciation for this irreplaceable resource by **donating \$50 or more per year**. You will receive a Friends of the Duke Forest car decal and invitations to register early for our tours and other events.

[dukeforest.duke.edu/friends](https://dukeforest.duke.edu/friends)





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*Peter Jeff Nicholls*