

THE DUKE FOREST LOG

A bulletin from the
Office of the Duke Forest

Fall 2020



Management Spotlight: Recreation Impacts

Duke Forest staff are unmistakably outdoors people. Spending time in nature is both a professional interest and something we do in our free time. This spring, when the COVID-19 pandemic roared into our lives and stay-at-home orders were mandated, staff understood that people would need time in nature more than ever. With the support of Duke administrators, we managed to keep the Forest open to recreational visitors, even when much of the rest of our world shut its doors. Not surprisingly, outdoor spaces like Duke Forest quickly became important resources for our communities' mental health and well-being. Many visitors shared their appreciation, including Duke Health employee Ann Taylor:

"We have spent many years enjoying the Forest and raising our children to appreciate it. As the pandemic hit, our two grown children who work in NYC, came to Durham to 'shelter in place' as NYC became a hotbed of the virus. Duke Forest provides a calming, restorative place for all of us, and we appreciate it daily. Thanks to Duke for maintaining it and realizing its importance for all!"

Judging by the number of cars parked near the gates and along the roads, the Forest experienced well above average use during this challenging time. While staff remained committed to keeping the Forest open, this decision was not without consequences for our Teaching and Research Laboratory. In August 2020, we released a Recreational Impact Statement [dukeforest.duke.edu/recreationimpact2020] that documented the dramatic scope of unauthorized recreational activities observed during the pandemic. These included: accessing restricted research areas; use of foot trails by bike traffic; use of herbicide and motorized tools to create unauthorized trails; building structures in the forest; and tampering with research projects, among other concerning activities.

In response, Duke Forest staff began a comprehensive assessment of recreation use. Over the summer, we mapped all unauthorized trails;

inventoried signage; monitored use via social media and GPS-based apps; re-marked all authorized trails; designed and installed new trailhead signage; revamped the recreation page on our website; and began plans to update our recreation maps.

It is a common misperception that Duke Forest is a park, but since 1931, its purpose has been as an outdoor classroom and living laboratory. It remains an incredible academic asset for Duke University and now, a destination for researchers from all over the world. Recreation has always been an ancillary benefit of the Forest's existence, allowed when it does not conflict with the teaching and research mission or the stewardship of the Forest's natural resources.

As more recreational visitors come to Duke Forest, the need for cooperation and compliance with rules and signage is paramount. Duke Forest staff will continue to do our part, but we ask every visitor to contribute to its stewardship by respecting the *Regulations and Safety Considerations* and complying with all signage. As a small staff with a big responsibility, we rely on the cooperation of our Forest neighbors and local community members to help protect the Forest's primary mission and ensure it can remain open for nature-based recreation.

We recognize and sincerely appreciate the majority of visitors who are kind and conscientious – who help us take care of the Forest. To amplify your positive impact, consider becoming a *Friend of the Duke Forest* today (see *Support spread*).



New recreation signs posted at every authorized trailhead.

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 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.






dukeforest.duke.edu

CONTACT INFORMATION:

Office of the Duke Forest
Duke University
Levine Science Research Center
Ste A142
Box 90332
Durham, NC 27708

Phone: 919-613-8013
E-mail: dukeforest@duke.edu

 dukeforest.duke.edu/newsletter
 facebook.com/dukeforest
 instagram.com/thedukeforest

DUKE FOREST STAFF:

Sara Childs, *Director*
Jenna Schreiber, *Assistant Director*
Tom Craven, *Supervisor*
Beverly Burgess, *Administrative Assistant*
Craig Hughes, *Maintenance Tech*
Blake Tedder, *Communications and Engagement Coordinator*

ADVISORY COMMITTEE:

Toddi Steelman
 Dean of the Nicholas School of the Environment, Chair

Norm Christensen
 Professor Emeritus and Founding Dean of the Nicholas School

Dan Richter
 Professor of Soils and Forest Ecology, Nicholas School of the Environment

Pat Halpin
 Professor of Marine Geospatial Ecology, Nicholas School of the Environment

Nicolette Cagle
 Lecturer in Environmental Science & Policy, Nicholas School of the Environment

Sari Palmroth
 Associate Research Professor, Nicholas School of the Environment

Neal Flanagan
 Assistant Professor, Duke Wetland Center, Nicholas School of the Environment

Bill LeFevre
 Executive Director, Sarah P. Duke Gardens

David Singleton
 Associate University Counsel

Edward Balleisen
 Professor of History and Vice Provost for Interdisciplinary Studies

Justin Wright
 Associate Professor, Biology Department

Forest Greeting

From the Director's Desk

As I sit down to write this, I'm struck by the enormity of the challenges we're all facing, while at the same time marveling at the incredible work we have to report in this year's LOG. First, I must thank our team. Bev, Blake, Craig, Jenna, and Tom, I am forever grateful and indebted to you for your camaraderie, commitment, and perseverance. The Forest and I – and I daresay Duke University – are better for it.

It feels like an eternity has passed since I returned from having my second baby girl, but in fact, it was only the beginning of our 2020 fiscal year. In July 2019, I was immediately swept into a land use planning process that could have negatively impacted our Blackwood Division, where the research legacy is strong and the ongoing innovations are cutting-edge. As you'll read, we were able to successfully purchase the adjacent land slated for development, and in doing so, protected our research mission and secured the integrity of important wetland habitats that had long been recognized by the NC Natural Heritage Program.

As we recently showcased in a collaboratively developed landscape analysis, these habitats are also critical for maintaining a connected landscape for wildlife (see 2019 LOG). Leveraging the momentum of that effort, we worked with the Eno River Association, Triangle Land Conservancy, NC Botanical Garden, NC Wildlife Resources Commission, Durham County Open Space and Real Estate Division, and ecologist Julie Tuttle, Ph.D., to win a grant from the Network for Landscape Conservation. These funds will support further collaboration to achieve landscape-level conservation in our region.

Of course, as the front story suggests, the pandemic has been a challenging time for everyone and on all fronts. The Duke Forest, as a much needed place for respite, remained open, but with increased demand for recreation, we saw an increase in harmful activities and behaviors. We addressed those in a Recreational Impact Statement released in August and initiated measures to ensure the Forest remains a premiere destination for teaching and research, while continuing to offer nature-based recreation.

As we demonstrate throughout this LOG, we continue to make great progress on our 2017 – 2022 strategic plan, and we are grateful to all of the colleagues, partners, and supporters that help make it happen. We're also fast approaching an important milestone - the Duke Forest's 90th year! Stay tuned for opportunities to celebrate the many gifts the Forest offers.



New Hope Creek in the Korstian Division

With appreciation,

Sara DiBacco Childs
 Duke Forest Director

Land Acknowledgement

Dr. Nicki Cagle produced a land acknowledgement statement for the Duke Forest to recognize the long history of people that have come before us on this land base. We hope you check it out and stay tuned for more ways we are working to better understand and reveal the stories of all the people that have shaped the Duke Forest.

dukeforest.duke.edu/landacknowledgement

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.



Forest Supervisor Tom Craven demonstrates tree planting for a Nicholas School silviculture class (January 2020).

2019 - 2020 AT A GLANCE



Research

Number of research projects <i>(12 new)</i>	47
Number of primary investigators	33
Number of institutional affiliations	14
Total research dollars <i>(20 of 47 reporting)</i>	\$4,473,400

Teaching

Number of teaching activities	26
Number of educators	19
Number of class visits	92
Number of participating students	1329

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 NEPCon to Forest Stewardship Council® guidelines, a strict set of environmental, social, and economic standards.



After 37 years of service, we retired our Massey Ferguson model 135 tractor and purchased a model 2606H, which made Tom and Craig (L>R) very happy (December 2019).



Harvests	91 acres
<i>Thinning</i>	91

Disturbance	4 acres
<i>Wildfire</i>	2
<i>Beetle kill</i>	2

Stand Improvements	121 acres
<i>Pre-commercial thinning</i>	88
<i>Research maintenance</i>	28
<i>Invasive control</i>	5

Road & Trail Maintenance	130 miles
<i>Road mowing</i>	107
<i>Road grading & repair</i>	2
<i>Trail hazard mitigation</i>	11
<i>Trail trimming</i>	11

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.



Alpha Phi Omega, Duke's service fraternity, helped us with multiple projects this year including a sprucing up of the Shepherd Nature Trail (September 2019).



Outreach Activities

Number of tours and activities	19
Number of participants	972
Total outreach hours	38

Volunteer Activities

Stewardship Projects	
<i>Number of events</i>	5
<i>Number of volunteers</i>	42
<i>Total volunteer event hours</i>	17

Citizen Science	
<i>Number of volunteers</i>	69
<i>Total number of data collection visits</i>	99

Photography Corps	
<i>Number of volunteers</i>	25
<i>Number of photographs submitted</i>	1017

Meadow Flats Natural Heritage Area Expands



Forest Director Sara Childs looks for Four-toed salamanders (top). Four-toed salamander with eggs (bottom).

At the end of 2019, we announced the purchase of 27 acres of land adjacent to the Blackwood Division of the Duke Forest, which is critical to our research mission. The Blackwood Division has long been an important national and international destination for studies related to climate change, atmospheric chemistry, ecosystem health, and more. The addition of these lands helps preserve the integrity and viability of ongoing and future research and enhances our commitment to natural resource protection. In particular, this property includes unique wetland habitats called upland depression swamps or vernal pools (pictured in background), which are vital for amphibians like the Four-toed Salamander - a *Species of Greatest Conservation Need* identified in the 2015 NC Wildlife Action Plan. Much of the acquired land had been previously delineated as part of the Meadow Flats Natural Heritage Natural Area by the NC Natural Heritage Program. Duke already owned most of the downstream portion of this heritage area, and with this property now in hand, the Duke Forest will manage the entire unit for its important conservation values. This land also contains physical remnants of historical and cultural connections to the nearby community, which we intend to better understand so that we can help share these stories.

Project Updates

Forest Inventory Progresses

Last year's *LOG* feature story described the installation and data collection process for a new continuous forest inventory (CFI) system. Since then, staff and a stellar team of interns completed all of the data collection necessary to generate volume and growth estimates for different stand types. They surveyed 145 permanent CFI plots, as well as 67 temporary plots used to boost the amount of data available for certain stands. As the CFI progresses, 20% of the permanent plots will be re-sampled every year with the help of Nicholas School students and summer interns. Since the CFI system represents a change in Duke Forest's inventory method, Forest Supervisor Tom Craven is completing two separate data analyses. The first uses the previous inventory methods and formulas in order to make basic comparisons to prior inventories. The second analysis uses the Forest Vegetation Simulator (FVS), a forest growth simulation model produced and maintained by the U.S. Forest Service. As we resample plots each year, this latter approach allows us to build and refine a model of volume and growth specific to the Duke Forest. It also facilitates use of the Duke Forest inventory data by Nicholas School students in Professor Sari Palmroth's Silviculture course. We are excited to be working with two research projects already taking advantage of the new inventory data – a Nicholas School Master's Project by MF/MBA candidate Hunter Bowman to evaluate ways to optimize our timber management program, and a project by The Conservation Fund to use the data collected by the International Space Station to better characterize forest structure.



Numbered trees in a CFI plot



Catalyst Grant Received for Collaboration

The Office of the Duke Forest along with its steering committee partners from the Eno-New Hope Landscape Conservation Group are thrilled to announce the reception of a 2020 Catalyst Fund Grant of \$25,000. Submitted on behalf of the group by the Eno River Association, the Catalyst Fund Grant offered by the Network for Landscape Conservation is a highly-competitive nationwide award given this year to only 13 of the 100 collaborative partnerships that applied. The award will be used to support and strengthen the collaborative effort necessary to achieve landscape conservation in the region by hiring a coordinator and solidifying the group's partnership structure. The funding will also enable the development of a strategic action plan to guide implementation of the landscape conservation plan the group released in December 2019. Among other results, this report demonstrates crucial opportunities to maintain connections between important yet increasingly isolated natural areas like the Duke Forest. These areas provide critical wildlife habitat and ecosystem services (e.g. clean air, clean water, carbon sequestration) that are necessary to maintain resilience in the face of climate change.

Read more at dukeforest.duke.edu/catalyst-fund



Duke Forest Researchers Answer Your Questions

While working from home this past spring, we looked for opportunities to keep people connected to the incredible and important science happening in the Duke Forest. We learned that the next best thing to following a scientist around in the woods is to pepper them with crowd-sourced questions about their work. The result: our *Ask a Scientist* video series where we take your questions and interview Duke Forest researchers. This has proven to be a great way to translate complex research into meaningful insights for curious, yet non-scientist audiences.

In our fourth video, we spoke with Imari Walker (right), a doctoral candidate in the Pratt School of Engineering's Civil and Environmental Engineering program. She is an expert in plastic and microplastic pollution in water. Imari's current experiments began in the Duke Forest at the CEINT Mesocosm Facility and are now finishing up in the lab. After watching this *Ask a Scientist* episode, you will never think of plastic in the same way.

See all of our videos at dukeforest.duke.edu/ask

Left: Dr. Rebecca Rimbach, Duke University, Dept. of Biology; Dr. Steve Cummer, Duke University, Pratt School of Engineering; Dr. Charles Mitchell, University of North Carolina, Dept. of Biology



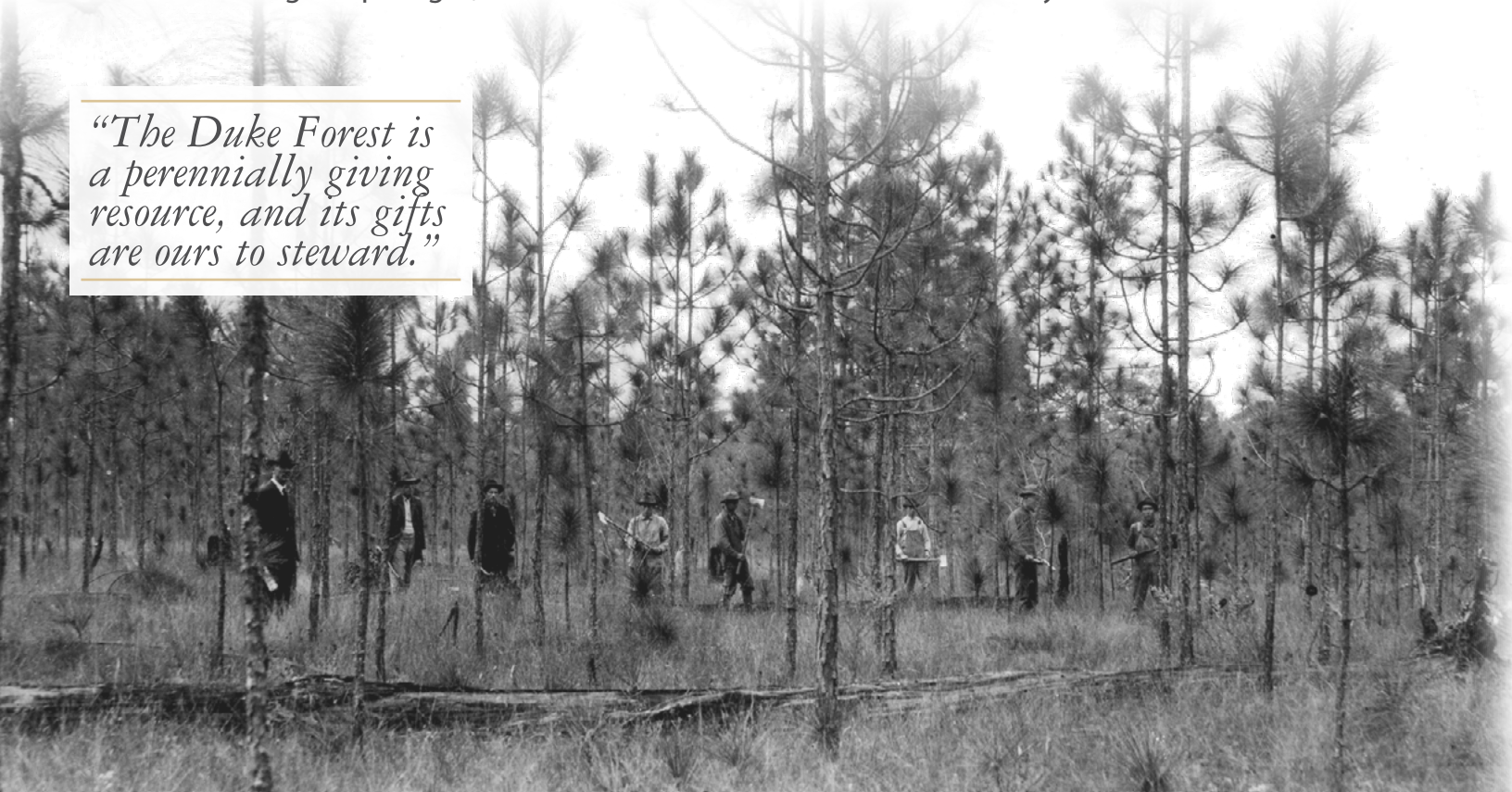
Duke Forest to Celebrate 90 Years

Nearly as old as the university itself and the birthplace of the first graduate school of forestry in the south, the Duke Forest Teaching and Research Laboratory is an integral part of the Duke DNA. Next year, in 2021, we will celebrate its 90th anniversary. Through stories, photos, archives, events, and more, we will explore the Duke Forest's past, present, and future.

Today, the Duke Forest remains a dynamic space for exploration and learning. The graduate students studying water use and mast production in Dr. Jim Clark's forest plots are the climate leaders of tomorrow. The local high school students finding macroinvertebrates in New Hope Creek during Dr. Nicki Cagle's Environmental Science Summer Program will follow behind them. Discoveries made and knowledge gained through teaching and research in the Duke Forest pass from generation to generation. Like the mighty Oaks grown from acorns long ago, students too grow from their experiences at the Duke Forest and emerge as leaders who will shape our future.

The Duke Forest is a perennially giving resource, and its gifts are ours to steward. Join us in taking care of the Forest for the next 90 years – reach out to learn more about our vision, make a high impact gift, or become a *Friend of the Duke Forest* today.

"The Duke Forest is a perennially giving resource, and its gifts are ours to steward."



Friends
of the Duke
Forest

Become a Friend of the Duke Forest!

In honor of our 90th anniversary, we have created an opportunity for a greater connection with the Duke Forest through our Friends program. Become a Friend of the Duke Forest to show your dedication and appreciation for this invaluable, irreplaceable resource **by donating \$50 or more** through the website below. You will receive a Friend of the Duke Forest car sticker and invitations to register early for tours and other activities (in-person, when it is safe to do so again).

More information can be found at dukeforest.duke.edu/friends.

Duke Forest Supporters 2019 - 2020

Susanna Bachmann and John Hampton

Sue Behringer

David and Sue Biswell

Gail Boyarsky and Walter Fowler

Karen Brian

Broadway Veterinary Hospital

Deborah and George Christie

Richard Cowperthwait

Anne Dayer

Duke School

Durham Garden Forum

David B. Eck

Judson and Mary Edeburn

Edwina M. Nelon Charitable Fund

Jason Elliott and Joshua Smith

Claire Fox and William Stroud

Jeffrey and Stacy Glass

Carrick and Richard Goldner

Carol and Bill Grant

Marie and Sam Hammond

Scott Herman-Giddens

Nan Jokerst and Martin Brooke

Ruth Jokerst

Tommy Kimball

Glenda Lee

William and Polly LeFevre

Stanley and Diana Levy

Candace Long

Elizabeth Mejia-Millan and David Nagel

Hope Miller

Ken Moore

Helen and Denny O'Neal

Kelly O'Malley Pattillo

Katharine and William Racine

Linda Raftery and Philip Spiro

Howard Rice

Jane and David Richardson

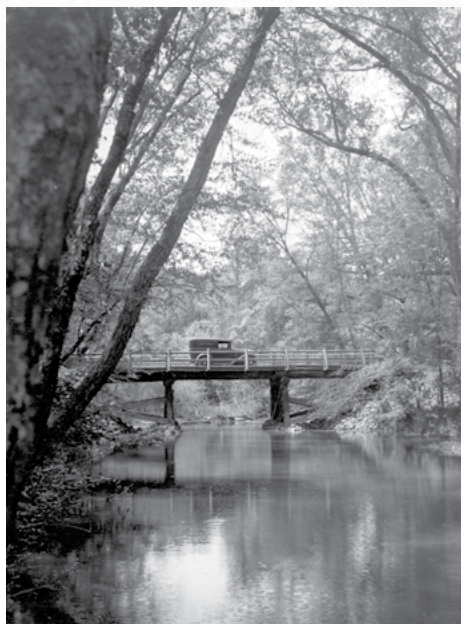
Daniel and Susan Richter

Tim and Lori Rowe Family Fund

Charles and Lucy Squires

Douglas and Roberta Tilden

Bradford Walters



High impact gifts to support the Duke Forest Teaching and Research Laboratory

Planned gifts - Include the Forest in your will, living trust, or as a named beneficiary of a retirement plan.

Endowments - Provide regular and guaranteed income with an endowment in your family's name.

With other major gifts - Make a gift to the Forest in combination with a gift to another area at Duke.

Payroll deduction - Support the Forest monthly as an employee of Duke.

Donation of assets - Donate stocks, land, or vehicles to support the Duke Forest.

Please contact blake.tedder@duke.edu if you have questions about giving to the Duke Forest.

dukeforest.duke.edu/give



DUKE FOREST
Teaching & Research Laboratory
ESTABLISHED 1931

Office of the Duke Forest • Duke University • Box 90332 • Durham, NC 27708-0332

NonProfit
Organization
U.S. Postage
PAID
Durham, N.C.
Permit No. 60

Stay Connected *with the* Duke Forest



Explore these Resources

LEARN • dukeforest.duke.edu

SUBSCRIBE • dukeforest.duke.edu/newsletter

READ • Our Strategic Plan • dukeforest.duke.edu/plan

CHECK OUT • Duke Stories Feature • dukeforest.duke.edu/story

Follow Us



@dukeforest



@thedukeforest

