THE DUKE FOREST



A bulletin from the Office of the Duke Forest *Fall 2021*



Director's Message: The Future is Collaborative

Throughout this special 90th anniversary year, we have been looking back and celebrating the Forest's rich history and enduring legacy—a sample of which we share in this year's *The LOG*. With a deep appreciation for those that shaped and stewarded this land before us, our team boldly presses forward in new ways across all aspects of our mission—teaching and research, management and stewardship, and community engagement.



Dr. Clarence Korstian (foreground, left), speaking to Forestry students on Duke Forest, circa 1949.

Often times, the future is associated with advancing technologies. We're sure that our first director, Dr. Clarence Korstian, would be fascinated by our geospatial and modeling capabilities that we not only leverage to efficiently manage this resource but also to stimulate teaching and research around the globe. While these and other advances are critical to the future of the Duke Forest, even more important is the greater understanding of and appreciation for the dynamic role Duke Forest plays in academic discovery and our overall well-being.

The increasing recognition of the Forest's irreplaceable value offers us opportunity to engage, partner, and collaborate in new ways and with new audiences in the protection of this resource and the advancement of its mission. Although the shape and structure of the Office of the Duke Forest has evolved over time, the engagement and education

Our team boldly presses forward in new ways across all aspects of our mission.

of students remains a core priority. While we are often approached directly by faculty and students to initiate research or teaching activities, we also actively promote and solicit partnerships with faculty and students interested in studying topics that advance our strategic objectives.

I specifically want to highlight some remarkable new teaching and research partnerships that are helping move this incredible 90-year old forest forward. In the past year, we worked with an undergraduate Code+ team through the Bass Connections initiative; two Ph.D. students jointly funded by the Provost Experiential Fellowship program and the Duke Forest; and a group of graduate students, staff, and faculty across campus that began as a Franklin Humanities Interdisciplinary Working Group and then received a Provost-funded Reckoning with Race, Racism, and the History of the American South grant.



Professors Nicolette Cagle (center) and Daniel Richter (right) touring the Robson mill site with Unearthing Duke Forest group members.

The Code+ team consisted of Duke Forest staff and researchers as well as Duke Office of Information Technology staff, but the primary **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 Suite A142 Box 90332 Durham, NC 27708

Phone: 919-613-8013

E-mail: dukeforest@duke.edu



dukeforest.duke.edu/newsletter



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instagram.com/thedukeforest

DUKE FOREST STAFF:

Sara Childs, Director
Tom Craven, Forest Supervisor
Blake Tedder, Assistant Director of
Engagement
Beverly Burgess, Administrative
Assistant

Craig Hughes, Maintenance Tech

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 and Policy and Associate Dean of Diversity, Equity, and Inclusion, 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

William Tricomi

Associate General University Counsel

Edward Balleisen

Professor of History and Vice Provost for Interdisciplinary Studies

Justin Wright

Associate Professor, Biology Department (Continued from front page)

engine of ingenuity, creativity, and hard work was an incredible team of undergraduates: Morgan Feist, Adan Hernandez, Madeleine Jones, Niam Kothari, Leila Nelson, and Gene Yang. Together, they produced a Duke Forest Data Portal that gives current and prospective teachers and researchers never before, easy access to Duke Forest geospatial data. The portal represents a desperately needed tech upgrade for facilitating teaching and research, and it consists of an interactive map and a data download feature. We hope to make it live soon.



Data portal prototype

The Provost Experiential Fellowship program began in response to the pandemic's impacts on Ph.D. students' summer research experiences. The program offers students funding to work through the summer on fellowships with partner organizations. The Office of the Duke Forest has been a partner for the last two summers, and we have greatly benefitted from the highly skilled and focused efforts of Ph.D. students to advance our efforts on regional, collaborative landscape conservation. This past summer, we worked with two Nicholas School of the Environment Ph.D. students.

As we move toward the centennial, I expect that collaboration locally and abroad will play an increasingly larger role in the Forest's mission and management.

Ruben Palacio donned his waders for a project entitled *Field Evaluation of Road Underpasses* for *Wildlife Habitat Connectivity*. Under the hot summer sun, Ruben spent many hours photographing and collecting data to assess potential for wildlife passage at critical road-habitat junctures. Keqi He investigated and modeled available social and economic data to perform *A Socioeconomic Analysis of Landscape Habitat Connectivity*, which has begun to reveal the characteristics of the human populations within the local network of wildlife habitat. Both efforts represent major contributions to the work of the Eno-New Hope Landscape Conservation Group, a collaborative of which the Duke Forest is a founding member.

The Franklin Humanities and now the Provost-funded *Reckoning with Race* group—led by Duke Biology Professor Dr. Kathleen Donohue—brings together a large group of students, staff, and faculty researchers in *Unearthing the Duke Forest*. Leveraging the preserved evidence of past human interactions on the lands now known as the Duke Forest, the group is exploring settler colonialism, plantation agriculture, slavery, and segregation with the aim of revealing how these histories have shaped ninety years of academic scholarship at Duke's biggest laboratory.

While the 90th anniversary has been a great time to reflect on the Duke Forest's incredible past and present, we find it has also given us lots of reason to be excited for its future. As we move toward the centennial, I expect that collaboration locally and abroad will play an increasingly larger role in the Forest's mission and management.

I encourage all of you reading *The LOG* to follow our work, to partner with us by becoming a Friend of the Duke Forest, and most importantly, to remember all the reasons you love the Forest at 90. Together, let's take care of this Forest so we can keep celebrating its gifts at 100 and beyond.

Sara DiBacco Childs Duke Forest Director

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.



Ph.D. student researchers in Emily Bernhardt's Lab (L>R) Jonny Behrens, Jasmine Parham, and Tyler Edwards study aquatic insects on New Hope Creek as a control site for Durham's Ellerbe Creek.

(11.)

2020 - 2021 AT A GLANCE *Reported numbers reflect impact of COVID-19 Pandemic

Research

Number of research projects	41
Number of primary investigators	30
Number of institutional affiliations	9
Total research dollars (19 of 41 reporting)	\$1,350,700

Teaching

Number of teaching activities	14
Number of educators	11
Number of class visits	101
Number of participating students	1,059

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.



Director Sara Childs searching the New Hope Creek floodplain for a new invasive plant, Fig Buttercup (Lesser celandine), in April. Thanks to Julie Tuttle for first documenting this species.



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Harvests	137 acres
Regeneration	27
Seed tree removal	110
Disturbance	2,760 acres
Emerald Ash Borer kill	2,760
Stand Improvements	112 acres
Pre-commercial thinning	33
Research maintenance	72
Invasive control	7
Road & Trail Maintenance	136 miles
Road mowing	62
Road grading & repair	10
Ditch clearing	31
Trail work	33



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.





Outreach Activities

Number of tours and activities	10
Number of participants	346
Total outreach hours	13

Volunteer Activities

Stewardship Projects	
Number of events	1
Number of volunteers	1
Total volunteer event hours	15

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Number of volunteers	18
Number of photographs submitted	994

Project Updates

2021 FSC® Leadership Award

In October 2021, just as we went to print with this newsletter, we received news that the Duke Forest Teaching and Research Laboratory at Duke University received a 2021 FSC Leadership Award from the Forest Stewardship Council. It recognizes "uncommon excellence that advances responsible forest management and forest conservation." Award recipients range from builders and architects to forest owners and paper mills demonstrating that every player in the forest products chain can contribute to responsible sourcing and forest management.

The Duke Forest has been audited to the strict set of FSC standards every year since 2001. We are honored that this award recognizes our team's (past and present) hard work and dedication to managing a productive, dynamic land base over the last 20 years. Implementing responsible forest management and connecting the community with the wide variety of benefits it provides—especially the opportunity to showcase sustainable timber management—is an important part of our strategic plan, which can be read here: dukeforest.duke.edu/strategicplan.



Duke Forest Teaching and Research Laboratory Duke University

Forest Team Transitions

In March, we said farewell to our dear friend and colleague Jenna Schreiber who served the Duke Forest and our team for almost 7 years. Jenna is now settled into her new position with The Conservation Fund in Chapel Hill.

Since Jenna's departure, we have worked to reorganize our small team to make good use of the awesome talent we already have and to create some new positions to bring in more. It is our great pleasure to announce that both Blake Tedder and Tom Craven have been promoted to reflect their leadership roles on the administrative and forest management side of our operations, respectively. Tom's title will remain Forest Supervisor, and Blake's title is now Assistant Director of Engagement.

We also quickly filled the 2021 Management Internship to provide much needed field capacity (thank you, Haley James!). To complete our new team, we will soon hire a program coordinator to dedicate effort to our administrative, outreach, and engagement projects.



Research Tower Repairs

On Christmas Day 2020, a tree fell across one of the guy wires supporting our 40-year old, 140-ft. tall research tower. It snapped nearly in half and the top part became suspended in the surrounding tree canopy; sensitive research equipment from the EPA and the phenology camera hung along with it. What makes the "Hardwood Tower" so unique is that it climbs through and extends above the top of a mature stand of hardwood trees, allowing research to be done at many different levels of the forest. This woodsy location also makes the tower extremely cumbersome to repair. In early January, a massive crane was brought down a narrow forest road deep in the Blackwood Division. A team of skilled climbers and crane operators safely brought the tower down. Weeks later, after safety inspections and the purchase of new tower sections, the crane was brought back in to reassemble the tower. Thankfully, no research instruments were damaged and the tower is once again fully operational.



View of the Hardwood Tower this summer after reconstruction.



Dr. Robert Peet in May 2021 delivering data from his 40+ years studying the Duke Forest to the Duke Forest Archive at Duke University Libraries.

Peet Delivers Data to the Archive

Renowned biologist Robert Peet retired in 2018 after 43 years of teaching and research at UNC. In the past year, he delivered large volumes of paper and electronic data collected from Duke Forest to our archive at Duke University Libraries. Among many accomplishments, Peet was a leading scientist in the creation of the U.S. National Vegetation Classification, providing a common language for the effective management and conservation of plant communities across the country. In the 1970s, Dr. Peet and Dr. Norman Christensen (founding Dean of the Nicholas School) rediscovered the plots first established by the first Duke Forest Director, Clarence Korstian. They resampled these Permanent Sample Plots (PSPs) and established 230 larger Compositional Survey Plots (CSPs). Their expanded plot design captured a wider variety of ecosystem types found across the Duke Forest, and with their innovative surveys, data from these plots have been critical in understanding the mechanisms of forest change. We are grateful for Bob's immeasurable influence on the teaching and research laboratory we know today and wish him well in retirement.

Volunteer Photographers Persist

With so many distinct areas, special species, interesting research, and natural and cultural sites of significance, it can be a challenge to communicate the unique beauty and value of the Duke Forest. Three years ago, we enlisted the help of keen-eyed photographers to document this dynamic land base through the seasons. The results have been astonishing! From an average of 16 volunteers—even throughout the pandemic—we receive approximately 200 curated, high quality photographs from our Volunteer Photography Corps (VPC) each quarter. We feature some of those photos here, in our e-News, and on social media.

Pat French and husband Calvin Powers are two of our most active volunteers. The duo dove into the VPC when the COVID-19 pandemic and Calvin's retirement afforded them more time outside. They often can be found together snapping photos by New Hope Creek or in the Hillsboro Division. While Pat has an eye for composition, Calvin loves to identify wildflowers and leaves in his photos using the popular nature app, iNaturalist. Calvin says, "Learning to keep my eyes open for shots and using iNat forces me to slow down and leave my troubles in the car." While the program meaningfully engages our volunteers, we also reap tremendous benefit from seeing the Forest through their eyes and sharing it with a wide audience.

Visit the gallery here: dukeforest.duke.edu/gallery

Right: Photo Corps Volunteers Pat French and Calvin Powers, and Pat's photo of the Hillsboro Division's Snake F.T. (one of the couple's favorite areas to explore).



The Edeburns Make Enduring Gift

BY GREG JENKINS

For a half century, Mary and Judd Edeburn M.F.'72 have worked, played, grown and dreamed in Duke Forest. They even built their home nearby. Now retired, they have more time to observe its ever-changing landscape and notice the increasing demands on it. The Edeburns love staying involved. Though they once circled the globe, they don't travel extensively now because they find so many fascinating things to see and helpful things to do right outside their door.

Judd was the resource manager of Duke Forest for 36 years. He knows the more than 7,000 acres as well as anyone —flora and fauna, nook and cranny. When the forest staff has a question about a past project, they know they can call on Judd. Now as adjunct professor with the Nicholas School of the Environment, Judd has moved from managing to being a user of Duke's oldest and largest classroom.

Through years of nature journaling and participating the forest's Volunteer Photography Program, Mary is in tune with Duke Forest's subtle details: the patterns of a butterfly's wing, the sheen of a bluebird's feathers, the velvety feel of a sycamore leaf. She's happiest when working with children to foster a love of nature and learning.

When the couple began work on their wills, making a lasting impact was important to them. Judd says, "Our thinking was, 'Let's do something that can help the forest continue its mission into the future." Inspired, Judd and Mary started a conversation with

the Duke Forest director and others. The result is a bequest that will provide a resource the director can target to important but harder to fund areas. That type of gift shows a deep understanding of the value of adaptability in managing a living asset serving many constituencies.

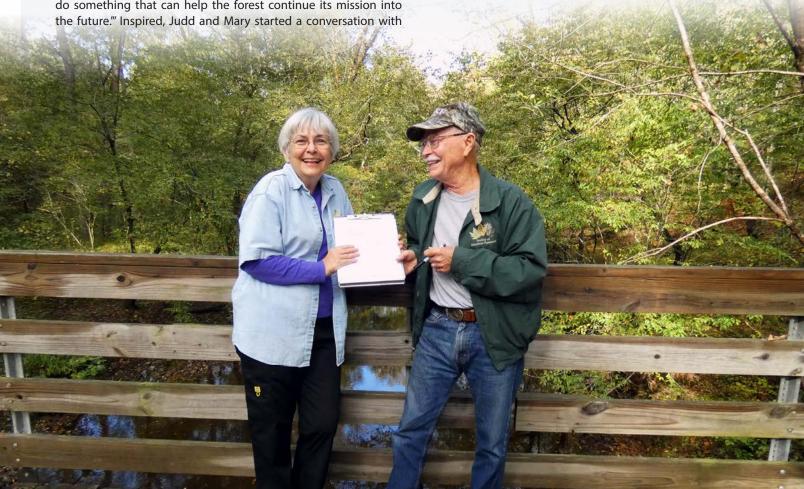


Former Resource Manager Judd Edeburn measuring a large Black Walnut in 1979.

"The forest is a resource that so measuring a large Black Walnut in 1979. many people have benefited from and continue to benefit from," Judd says, "The scientific community, the many students who have gained experience on the Duke Forest, the public that's gotten to use the Forest."

They love that their bequest will likely benefit that broad spectrum of individuals and areas—a multiplier effect, as they see it. That and the flexibility of a planned gift made it very appealing. The fact that the process was easy and no-pressure made a difference too.

"We wanted to plant a seed," Mary says. "The challenge we had was that we're people of relatively ordinary means. We thought, 'Given that, how can we have an impact?' When you look at the Forest, the bang for the buck is huge."



Donors Support Research Projects Old and New

Since we launched the Friends of Duke Forest program with our last edition of *The LOG*, donor support has helped make crucial connections between our mission and important but unbudgeted projects.

The NC Museum of Natural Sciences brought to our attention a collection of amphibian and reptile (aka *herpetofauna*) records collected between the 1960s and 1980s by Duke Zoology professor **Dr. Joseph Bailey**. This collection consisted of over 1,200 records handwritten on 3x5 note cards. For our ongoing *Herpetofauna of the Duke Forest* citizen science program—which we plan to resume in 2022—the Bailey collection offered opportunity to provide a more complete history of herps in the Duke Forest. With the help of donors, many of whom fondly remember Dr. Bailey, we supported the museum in directing 300 hours of staff time to georeferencing and digitizing this data. This information is now available for investigation by researchers, conservationists, and land managers.



Dr. Joseph Bailey (right) with student Alexander "Sandy" Davison searching for Hellbender Salamanders in 1949.

Dr. Bailey was the curator of Duke's vertebrate collection and a preeminent scholar of snake classification, among other amazing accolades. Because of this project, we are pleased to have met many new friends, including his children, and to have ensured that Dr. Bailey's valuable legacy of research on the Duke Forest continues.



Alissa Brown, Ph.D. published her Duke Forest research with help from donors.

Donor support also made the publication of research from the Duke Forest possible. **Alissa Brown** recently earned her Ph.D. at UNC Biology guided by Drs. Peter White and Robert Peet, and she is now a post-doc researcher at Morton Arboretum in Chicago. After earning her Ph.D. on research involving detailed analyses of long-term Duke Forest plot data, she ran into a common roadblock for many young researchers: the cost of publishing.

With donor-supported funding, the Duke Forest assisted Brown in publishing her research on *conspecific negative density dependence* (CNDD). CNDD essentially describes how a parent tree influences the soil and other environmental conditions around it, which affects the growth of its seeds. Brown's findings influence our understanding of how different tree species affect forest diversity. They also give us a glimpse of what the Piedmont's forest canopies might look like in the next 90 years. This project exemplifies how long-term Duke Forest data provides a foundation for addressing today's research questions.

Thank you to all of our supporters and the Friends of the Duke Forest!

To learn more about being a Friend, visit dukeforest.duke.edu/friends.



A Moment 90 Years in the Making

In a time characterized by escalating environmental and social crises and when technology entices our attention away from the natural world, it has never been more important to have an entire land base intentionally set aside for deep inquiry and exploration.

Since 1931, the Duke Forest as a **living laboratory** and **outdoor classroom** has been an essential *destination* for discovery for students and researchers here at Duke and from around the world.

Its storied gifts are many. Hundreds of long-term research plots offer data more valuable with each passing year. Legacy experiments continue to provide foundations for today's critical research needs. Leading scientists in water resources, forest ecology,

and electrical engineering—to name only a few disciplines—are generating insights from the forest that address pressing problems.

With incredible forethought, Clarence F. Korstian, the first director of the Duke Forest, set in motion a series of events that have made this dynamic forest an indispensable living record of how our world has changed in nine decades and an invaluable resource for answering questions about our future.



The Duke Forest is a perennially giving resource, and its many gifts are ours to steward. Join us in taking care of this treasured forest.

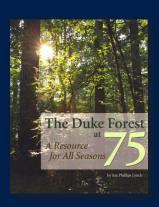
Make a gift today to show your family's support in this milestone year. Together, we can ensure that even as we navigate the uncertainties of our modern world, the Duke Forest will remain a vibrant and rich resource for discovery, exploration, and engagement.

Thank you from Duke and our Duke Forest team.



Free Commemorative Gift with your Donation!

For a limited time when you make a donation, you can receive a free gift to commemorate your connection with the Duke Forest. With a donation of \$200 or more, receive a vacuumsealed water bottle with the Duke Forest's 90th anniversary logo. With a donation of \$150 or more, receive a copy of The Duke Forest at 75: A Resource for All Seasons, a beautiful book about the history of the Duke Forest by Ida Phillips Lynch. Please use the links at dukeforest.duke.edu/give.





A different kind of Forest, a different kind of support.

An outdoor classroom and living laboratory inviting students and teachers of all ages, disciplines, and backgrounds.

A responsibly-managed working forest demonstrating renewable resource extraction and best management practices.

A bastion of diverse habitats protecting plants, wildlife, and ecosystem services.

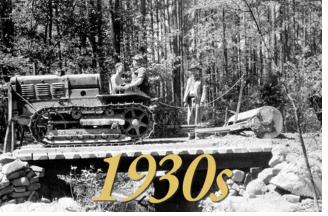
An environmental education and outreach tool offering opportunities to learn about natural resources and forest management.

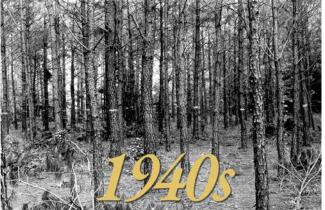
An aesthetic and recreational resource alleviating our collective nature deficit disorder.

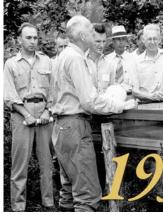
Special Thank You

Patricia Bailey
Robert Bailey
Karl and Suzanne Bates
Ashley Craver and Howard Rice, Jr.
Gail Boyarsky and Walter Fowler
Ann Brooks
Richard and Elizabeth Bruce
Mary and Judson Edeburn
Jeffrey and Stacy Glass
Richard and Linda Heintzelman

Anukriti and Alexander Hittle George Hugh and Ann Leininger Brian and Jeanne Murray Ram Oren and Sari Palmroth Philip Spiro and Linda Raftery Nadeem Ur Rahman Tim and Lori Rowe Toney Lumber Company, Inc. Lindsay White All the Friends of Duke Forest







A YEAR OF CELEBRATION

We have been celebrating the Duke Forest's 90th anniversary through our e-newsletter, social media, and with the help of our communication friends at the Nicholas School of the Environment and Duke University. Although we would have enjoyed hosting inperson events to gather the many people who love and have influenced the Duke Forest, we hope our virtual tributes have proved equally meaningful.

[Below L>R] (1) The Nicholas School produced a 15-minute mini-documentary on the legacy of the Duke Forest. (2) Duke University President Vincent Price released a touching video statement on July 1st, the actual birthday of the Forest. (3) We completed filming for a Duke Forest installment of the "Duke Origins" video series from University Communications. (4) We made a series of videos highlighting different aspects of our mission. (5) Duke Forest staff made a light-hearted happy birthday video for the Forest.

See these videos and more at: dukeforest.duke.edu/90th

















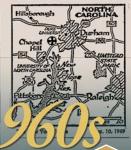


Carolina Plant Dropped; 2 Univ

HILLSBOROUGH, N. C., Aug. 9—A textile manufacturer has abandoned plans to build a \$100-million plant that would have dumped waste material into a forest and a creek used for research by both the University of North Carolina and Duke University.

The 450-acre site of the

The 450-acre site of the proposed polyester fiber plar-already purchased by the mufacturer, Fiber Indust Inc., lies between Chapel ill and Durham, not far om Duke Forest and New 1004



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Fiber Induplant had bee Board of Alc Hill and the Carrboro, by of Commerce by the Char Education an the Orange

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Through the Decades

In each of our monthly newsletters we featured one of the archival photos lining the top and bottom of these pages. Each represented a major event, person, or theme from that decade.

- **1930s** Many of the roads and bridges we use today were originally built by the Civilian Conservation Corps.
- **1940s** Director Clarence Korstian installed Permanent Sample Plots that formed the foundation of our long-term research.
- **1950s** Duke's School of Forestry grew to prominence as the first graduate school of Forestry in the South.
- **1960s** The first major threat to the Duke Forest, the construction of a textile plant upstream on New Hope Creek, was avoided.
- **1970s** Norm Christensen and Robert Peet's new vegetation plots ushered in a new era of long-term research.

- **1980s** The Forest housed the Southeast's primary research site for a national acid rain study.
- **1990s** Hurricane Fran left an indelible mark on the Forest that we still see today—25 years after the storm.
- **2000s** The FACTS-1-FACE experiment on the effects of elevated CO₂ was the largest and most well-funded experiment ever in DF.
- **2010s** Influential findings emerged from dedicated researchers with long-term sites in the Duke Forest (pictured L>R: Steven Cummer, Emily Bernhardt, James Clark).
- **2020s** The regional importance of the Duke Forest as an anchor for biodiversity and habitat connectivity grows stronger and yet more fragile.

What will the next 90 years hold for this dynamic forest?







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