



# Duke Forest

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## Annual Gathering

November 7, 2019



FOREST HISTORY  
*Society*

*By understanding our past, we shape our future*



# THE DUKE FOREST LOG

A bulletin from the  
Office of the Duke Forest  
Fall 2019



## Management Spotlight: Forest Inventory

Every ten years, Duke Forest performs a forest inventory to better understand the condition of the Forest and to ensure that we are managing the resource over time. The data collected to estimate tree volume, growth, and regeneration, and to assess factors that affect the Forest such as invasive species, are used to inform management decisions.

This allows Nicholas School students to use Duke Forest data to learn about forest growth and yield and to generate a Duke Forest-specific forest inventory which is updated and refined during collection periods.

## E-Newsletter

Thank you for your interest in the teaching and research mission of Duke Forest! To stay up-to-date on the latest happenings in our backyard laboratory, please follow this link and complete the form. Subscribers to this list will receive a digital copy of the annual newsletter *The LOG*, but if you prefer, you may [request a hard copy](#) mailed to you. Be sure to indicate if you have additional interests in attending events (e.g. tours, the Annual Gathering) and/or volunteering (e.g. trail building, invasive plant removal, event support).

[Newsletter Archive](#)

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Forest data that address a variety of disciplines and to aid in the instruction of all students in their pursuit of knowledge, especially regarding the stewardship



# Agenda

- Introductions
- Presentations
  - *Duke Forest's Year in Review*
  - *The Big Picture: Conservation and Collaboration Across the Landscape*
- Clarence Korstian Award
- Closing Remarks



Spotted Salamander, *Ambystoma maculatum*



## Office of the Duke Forest

### *The Team*

*(pictured from left to right)*

Beverly Burgess: Administrative Assistant

Blake Tedder: Communications & Engagement  
Coordinator

Sara DiBacco Childs: Director

Jenna Schreiber: Assistant Director

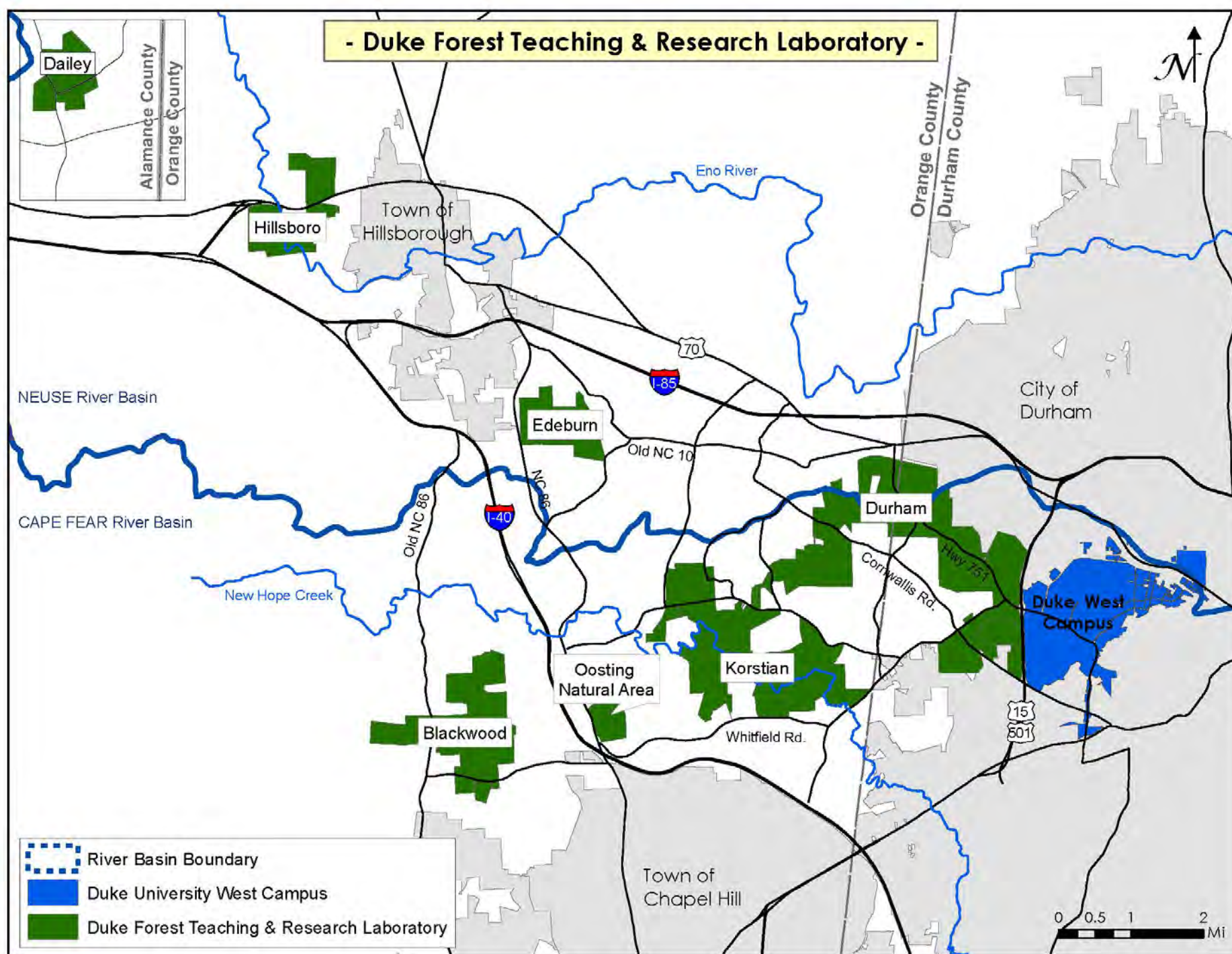
Tom Craven: Supervisor

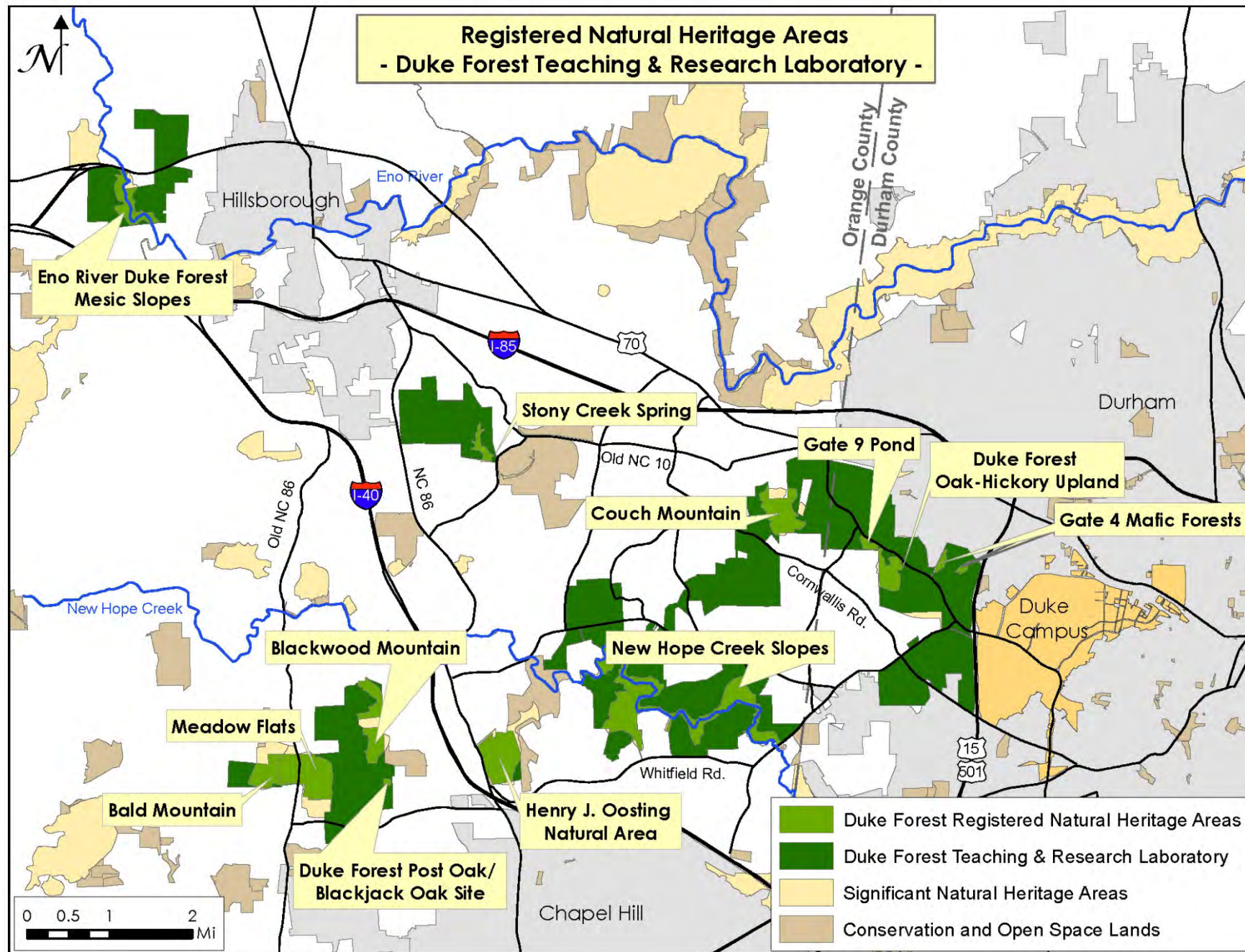
Craig Hughes: Maintenance Technician



# Duke Forest **ADVISORY COMMITTEE**

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- **Toddi Steelman**, Dean of the Nicholas School of the Environment, Chair
  - **Norm Christensen**, Professor Emeritus and Founding Dean of the Nicholas School of the Environment
  - **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, 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
  - **Eliza Mathew**, Senior Program Coordinator, Office of Durham and Regional Affairs





# Duke Forest **MISSION**



- Facilitate research that addresses fundamental and applied questions across a variety of disciplines
- Aid in the instruction of all students in their pursuit of knowledge, especially regarding the stewardship of our natural resources

# Duke Forest **MANAGEMENT**

- Promoting the teaching and research mission
- Sustainably managing resources for timber, water quality, and wildlife
- Protecting rare species, unique ecosystems, and historic features
- Providing education and outreach opportunities
- Offering recreational and aesthetic amenities



# Duke Forest STRATEGY



- Stewardship for Long-term Sustainability
  - Stewarding the natural, financial, and human resources
- Research and Teaching
  - Contributing to scientific knowledge and interpretation
- Community Engagement
  - Engaging communities to connect with and better understand our natural world

Duke Forest

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**Year in Review**

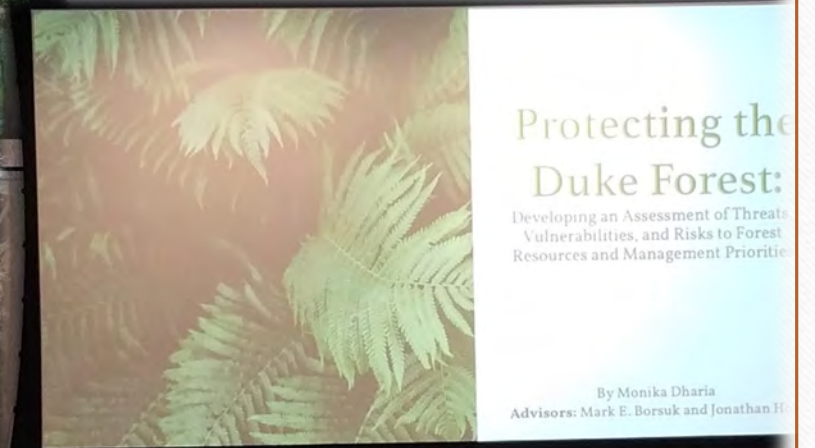
2018 - 2019



Painted Buckeye (*Aesculus sylvatica*)

# Duke Forest **RESEARCH**

- 49 projects
- 42 researchers
- 16 institutions
- \$1.1 million



# Casey Dukes Research Biologist

NC Wildlife Resources Commission

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- Wood duck banding for assessing flyway-wide and long-term changes in populations
- Data also used to establish annual wood duck bag limits for hunting
- Using a beaver pond in the Edeburn Division - Stony Creek Registered Natural Heritage Natural Area





# Duke Forest **TEACHING**

- 32 activities
- 21 educators
- 96 visits
- 948 students

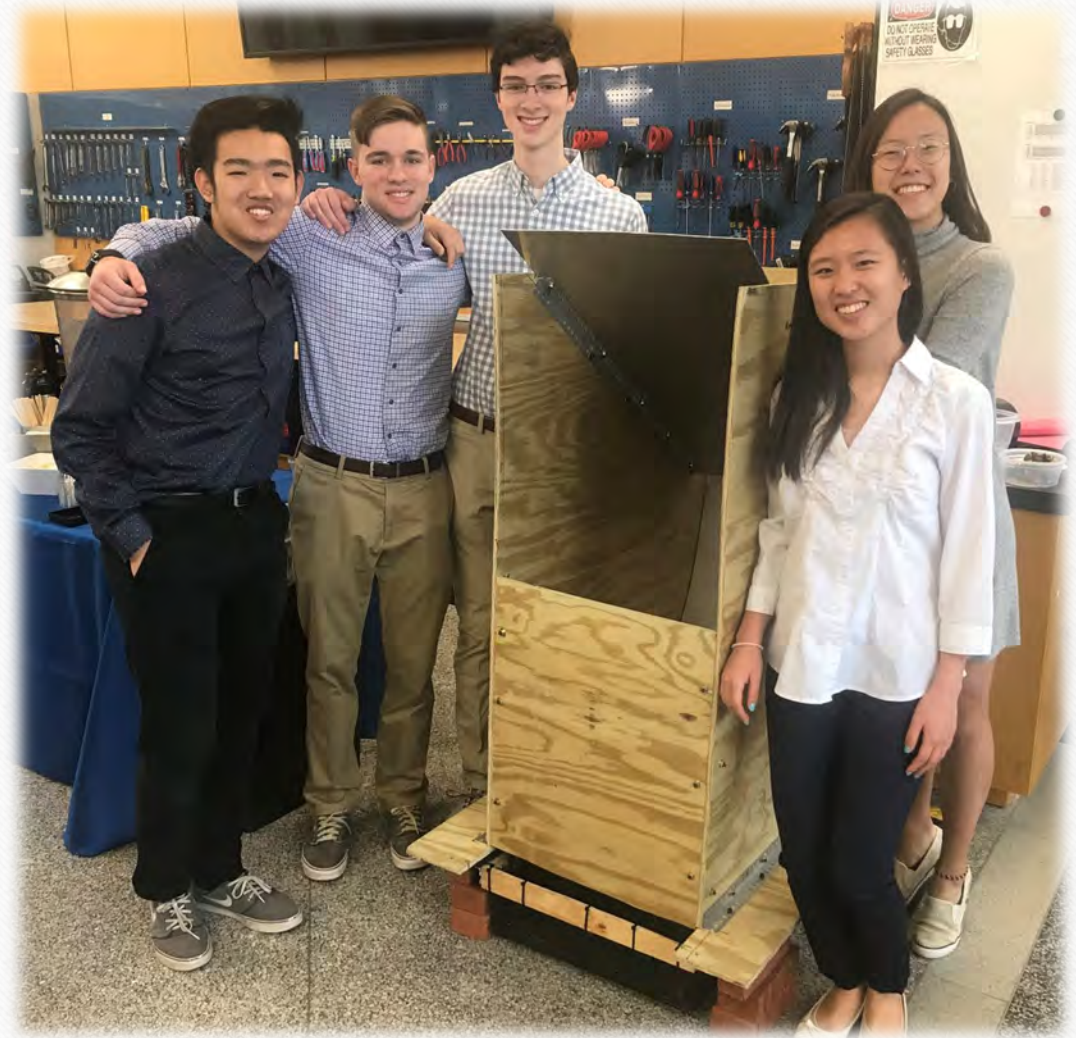


# *First Year Design*

## *Pratt School of Engineering*

Dr. Ann Saterbak, Biomedical Engineering

- An undergraduate course required for all first-year engineering students
- Introduces students to problem-solving and design-based engineering
- Duke Forest served as client and proposed development of a mast collector



# Duke Forest MANAGEMENT

 AT A GLANCE	<b>2018 - 2019</b>	
	.....	
	<b>Harvests</b>	<b>46 acres</b>
	<i>Thinning</i>	46
	<b>Stand Improvements</b>	<b>30 acres</b>
 www.fsc.org FSC® C008350  The mark of responsible forestry	<i>Mechanical - Invasive control</i>	18
	<i>Herbicide - Invasive control</i>	1
	<i>Herbicide - Research</i>	2
	<i>Prescribed burning</i>	9
	<b>Road &amp; Trail Maintenance</b>	<b>97 miles</b>
	<i>Road grading &amp; repair</i>	23
	<i>Road mowing</i>	52
	<i>Trail hazard mitigation</i>	11
	<i>Trail trimming</i>	11



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# Invasive Plant Management

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Edeburn Division  
Stony Creek  
Natural Heritage  
Natural Area

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Non-native,  
invasive Bamboo  
species

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A coordinated  
effort



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# Storm Restoration

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Hurricanes  
Florence & Michael  
Fall 2018

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Durham and  
Korstian Divisions

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- 2 Culverts
- 1 Bridge



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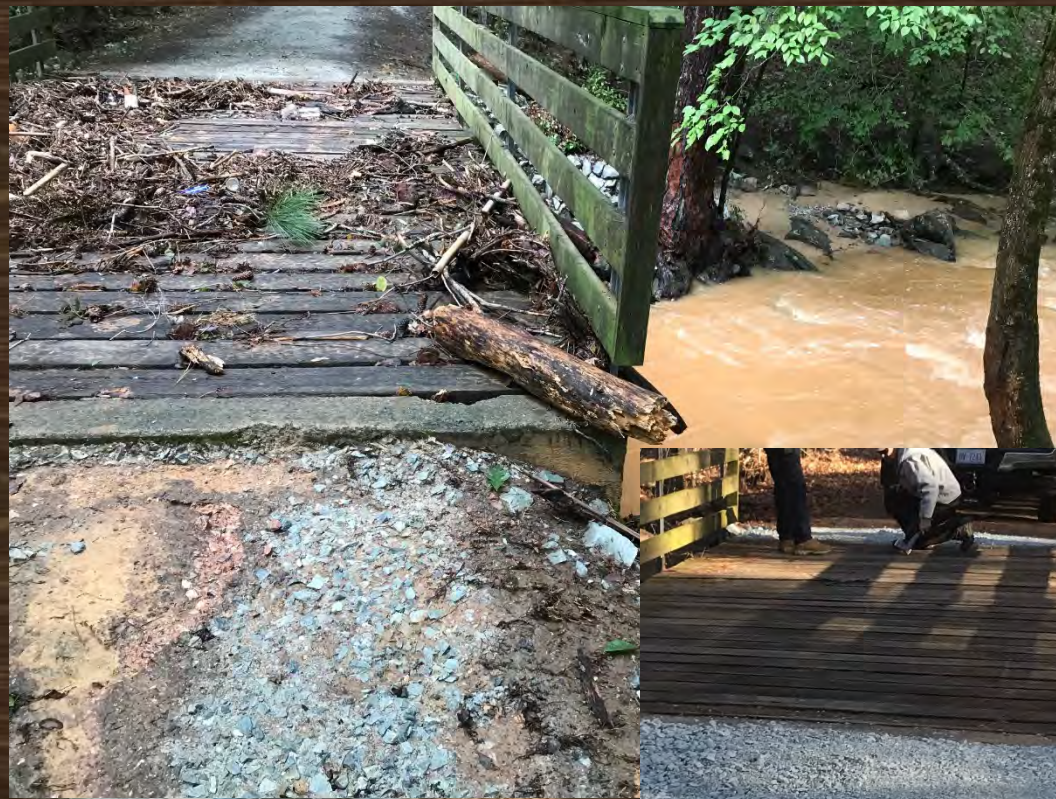
Hurricanes  
Florence & Michael  
Fall 2018

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Durham and  
Korstian Divisions

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- 2 Culverts
- 1 Bridge



# Duke Forest ENGAGEMENT & OUTREACH

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- 31 activities
- 1,621 people
- 69 hours



# Duke Forest VOLUNTEERS

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- Stewardship

- 4 events
- 23 event participants
- 13 event hours

- Photography Corps

- 14 photographers
- 350+ photographs

- Citizen Science

- Tree Phenology
  - 36 citizen scientists
  - 139 data collection visits
- Herpetofauna Monitoring
  - 68 citizen scientists
  - 90 data collection visits

# STEWARDS



# Field Notes from the Forest



# PHOTOGRAPHERS

# CITIZEN



# SCIENTISTS

# Duke Forest

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## Project and Forest Health Updates



Little Heartleaf (*Hexastylis minor*)

# Duke Forest Five-Year Strategic Plan:

## Stewardship for Long-Term Sustainability

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Steward the natural, financial, and human resources of the Duke Forest to ensure its long-term sustainability as a major University asset for research, teaching, and community outreach.

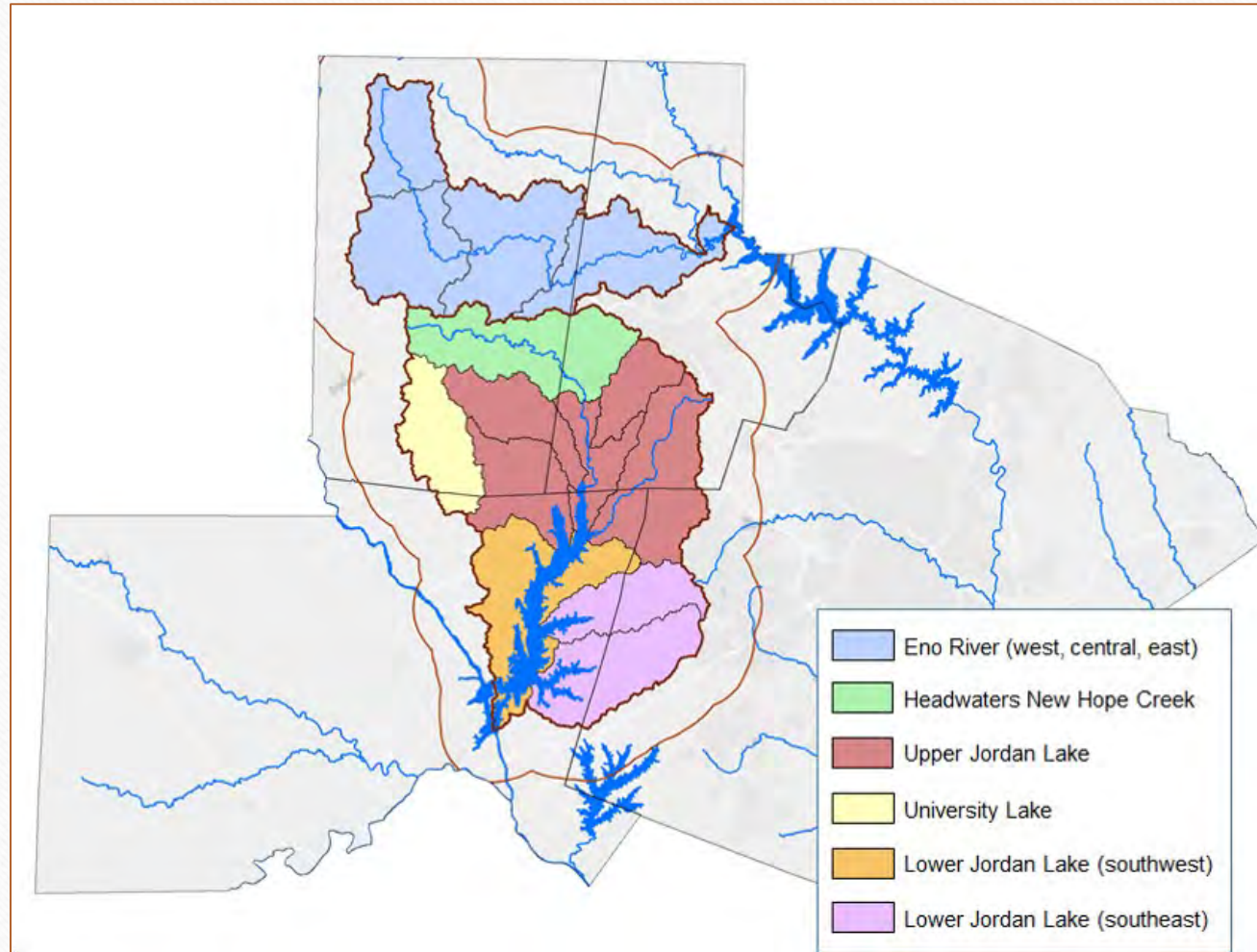
- Diversify revenue sources
- Conserve and restore resources
- Maintain stable land base



Mushroom

- Duke Development Strategic Initiative
- New approach to wildlife management
- Continued work on landscape connectivity project
- Interactions and communications to prevent additional fragmentation

# Landscape Conservation



A collaborative effort to identify high-priority landscape corridors that connect a network of critical wildlife habitats within the Jordan Lake watershed and across the “land bridge” between New Hope Creek (Cape Fear River Basin) and the Eno River (Neuse River Basin).

# Duke Forest Five-Year Strategic Plan:

## Research and Teaching

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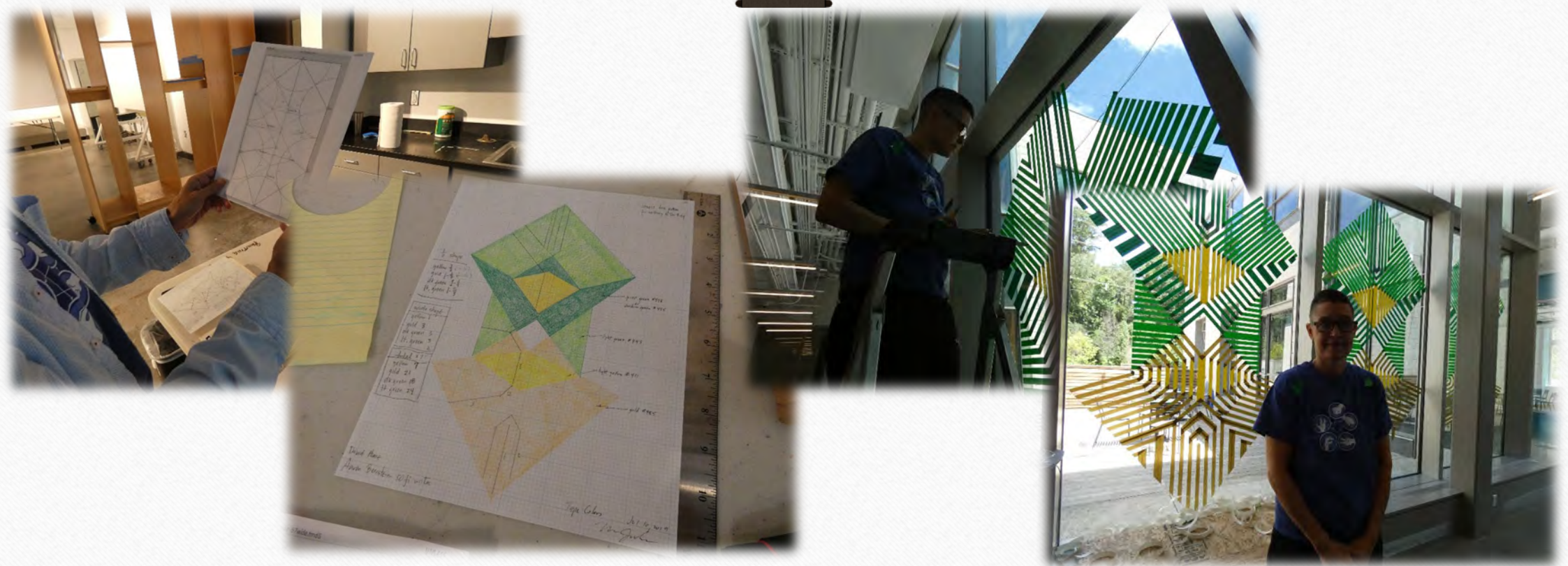
Stimulate contributions to scientific knowledge and interpretation through use of the forest in research and teaching, especially at the frontiers of our understanding and appreciation of the natural world.

- Promote across new disciplines, technologies, and audiences
- Develop capacity to centralize sharing and access to historic and current data



Lichen

- Bass Connections
- Drones
- Engineering Design
- Duke MAT program
- Duke Archives
- Duke Digital Repository



## *Durham artist Heather Gordon researches to create*

Durham artist Heather Gordon held residency at Duke University's Rubenstein Arts Center in August to work on a project called *The Forest for the Trees*. Heather turns data into large geometric paintings using principles from origami. For this project, she made a special request to sift through the massive Duke Forest archive Heather was particularly drawn to luminosity datasets (i.e. measures of the amount of light coming through the trees) from the 1930s.

# Duke Forest Five-Year Strategic Plan:

## Community Engagement

Engage with the University and public communities to expand the forest's role as a stage for academic exploration and to share vital insights about the interaction between humans and the environment, putting that knowledge in the service of society.

- Connect communities with science
- Engage recreational users as partners in stewardship



Bloodroot (*Sanguinaria canadensis*)

- Citizen science
- Good Leashes/Good Neighbors



# Forest Inventory



A forest wide data collection effort to:

*Estimate:*

- standing tree volumes
- tree growth rates
- tree regeneration

*Assess:*

- invasive plants
- deer browse

# Forest Inventory

Implemented a Continuous Forest Inventory to:

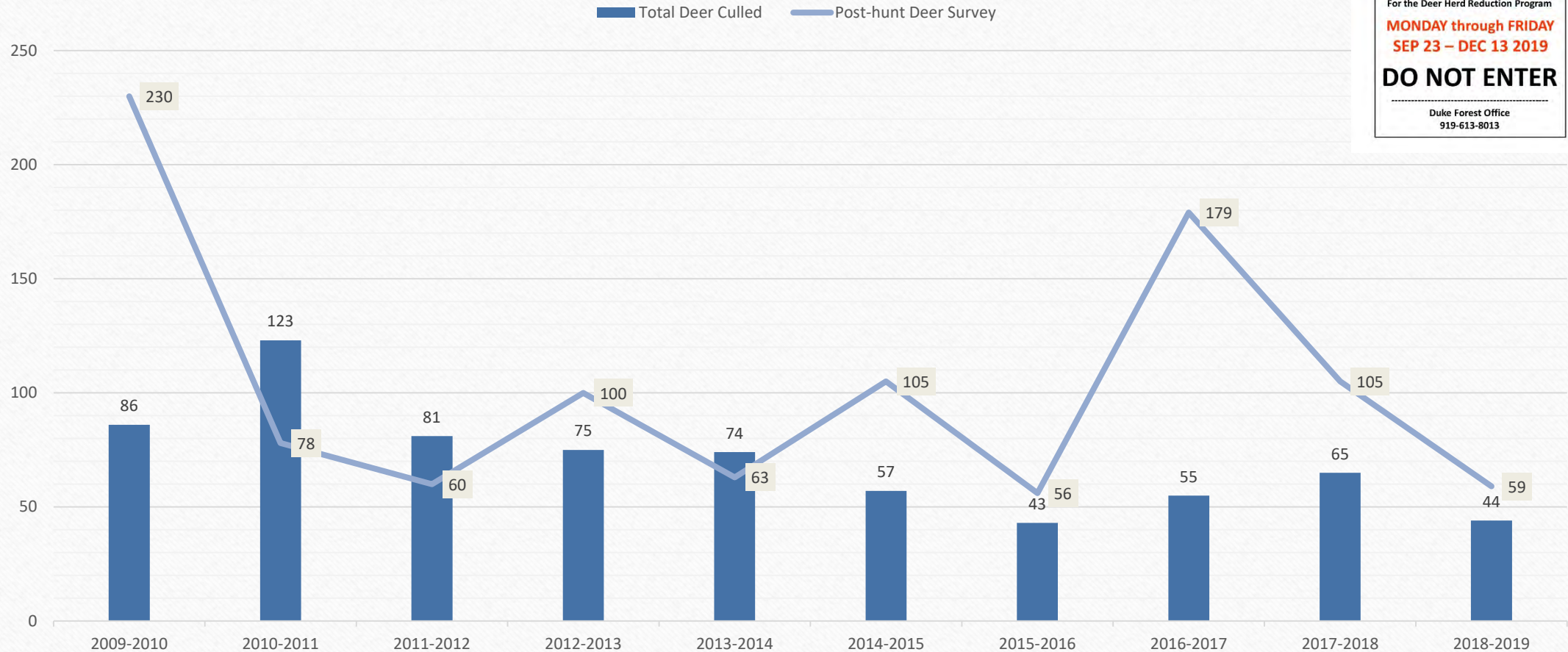
*Facilitate*

- data analysis and model use
- comparisons across periods
- evaluation of changes
- use for teaching
- use for remote-sensing



# Deer Management Program

## Harvest and Spotlight Data



**FOREST  
CLOSED**

For the Deer Herd Reduction Program

**MONDAY through FRIDAY  
SEP 23 – DEC 13 2019**

**DO NOT ENTER**

Duke Forest Office  
919-613-8013

# Emerald Ash Borer

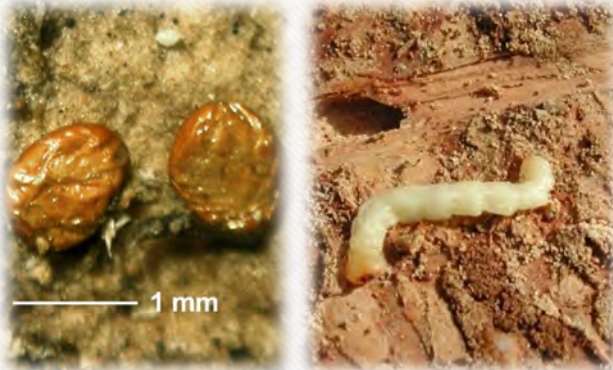


Adult female beetles lay eggs on the bark of Ash trees.



# Emerald Ash Borer

Eggs hatch in 1 – 2 weeks.  
Larvae bore through the bark into the cambium and phloem.



Larvae feed on phloem, making serpentine galleries that girdle and kill trees. Mature larvae tunnel into sapwood to pupate, and then adults emerge.



# Emerald Ash Borer



Jan 23, 2013

National inventory data show more than eight billion **ash trees** in **U.S.** forests and woodlands, with a **value** estimated at more than \$280 billion.

(<https://www.americanforests.org/magazine/article/will-we-kiss-our-ash-goodbye/>)



# Duke Forest UPCOMING EVENTS

- Research Tour
  - Friday, December 6th
- Citizen Science Orientation
  - TBD, February 2019
- Pine Cone Pacer 5K (11<sup>th</sup>)
  - Saturday, April 18, 2019



# QUESTIONS?

Subscribe to our newsletter:

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# The Big Picture:

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Conservation and Collaboration  
across the Landscape