

INFORM

FALL 2023 NEWSLETTER



Department of
Forestry and Natural Resources

 **Martin-Gatton**
College of Agriculture,
Food and Environment



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A Letter from the Chair

On many fronts, 2023 has been a significant year for our department. We are onboarding three new faculty who bring new energy and expertise, welcoming new staff, and engaging with a robust number of new students enrolled this fall. The college received the largest donation ever made to any agricultural school in the United States—\$100 million from the Gatton Foundation—and is now the Martin-Gatton College of Agriculture, Food and Environment. We celebrated the 100th year of Robinson Forest, starting September 8 with our annual fall picnic and concluding on September 9 with an alumni visit to Robinson Forest. We had 120 people in attendance at the picnic, and 50 alumni visited the forest. On behalf of the alumni, I want to thank the students for allowing us to win the forestry trivia contest this year (after they trounced us last year)! Please look for pictures of the festivities in this issue.

When asked to provide an “elevator” description of what our department does, I say that we work to identify

problems and provide solutions to the critical issues facing our forests and natural resources. When asked to elaborate, which occurs on occasion, I say that we provide solutions by teaching undergraduates and graduate students, by engaging in applied research, and by delivering science and technology to stakeholders to help them address these vital challenges. That third part of our mission is accomplished through our award-winning Extension program. This issue of inFORM offers insight into how we are providing solutions to support forest health, wildlife conservation, and forest growth and development.

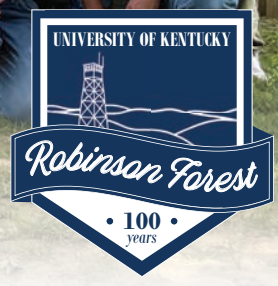
Thanks for taking time to look over this issue, and as always, we appreciate your support of the Department of Forestry and Natural Resources.

*-Dr. Jeff Stringer,
 Department
 Chair*





UK Forestry alumni at the Robinson Forest 100th anniversary celebration.



One Weekend. Two Great Alumni Events!



2023 Fall Picnic. Photo by Matt Barton



Tour of the Wood Utilization Center led by Chad Niman for the Robinson Forest 100th anniversary celebration.



2023 Fall Picnic. Photo by Matt Barton



Research tour led by Dr. Chris Barton at the Robinson Forest 100th anniversary celebration.



Forest Health

DR. ELLEN CROCKER ASSISTANT PROFESSOR OF FOREST HEALTH EXTENSION



What's wrong with my tree? Many different insects and pathogens can cause damage to trees, from minor problems to serious threats. In addition, other factors can hurt the health of our forests, such as invasive plants that outcompete desirable native species. UK's Forest Health Extension Program, led by Dr. Ellen Crocker, uses a mix of outreach, education, and applied research to improve forest health. On the Extension side, Dr. Crocker works with many different audiences, raising awareness about new issues, educating the public about options, and teaching new technology to professionals. From hosting conferences and writing factsheets to regular trainings and presentations, Dr. Crocker's work provides key forest health information across Kentucky and beyond.

In addition, her lab conducts research that helps us better understand these threats and inform how to manage them. Dr. Crocker's lab is working on the new invasive disease, laurel wilt, that is killing sassafras. Several projects include monitoring plots to assess the impact of laurel wilt disease, testing fungicide options to protect trees, and looking for trees with potential resistance to laurel wilt for future breeding. Another focus is working toward developing a biological control for bush honeysuckle, one of the worst invasive plants in our area; a native fungus that causes disease in honeysuckle is being tested to see if it might present a management option in the future.

With so many forest health threats already impacting our woods (and more on the horizon) it is easy to get discouraged. However, landowners and managers can play a huge role in promoting the health of their woods, and Dr. Crocker and her group are excited to be working toward a bright future.

NEW FOREST HEALTH COURSE

Dr. Ellen Crocker is developing a new course that updates the Department's forest health curriculum. This class, which will fit into students' schedules in their sophomore year, will provide a strong foundation on forest health, major threats, and management options, expanding the class from one credit to three credits. Another recent forest health offering, an invasive plant management class where students get hands-on practice with different techniques and plant species, will also be expanded.



White Fringeless Orchid

TARA LITTLEFIELD AND MEGAN BULAND
FNRS PH.D. STUDENTS



Forests are often managed to enhance the quality of timber, wildlife habitat, or ecosystem services. However, in some cases, forest management is focused on improving the understory. This is the case with a long-term research project involving FNR, the Kentucky Office of Nature Preserves, and the U.S. Forest Service. The project aims to restore habitat for a rare orchid species, the white fringeless orchid (*Platanthera integrilabia*), in southeastern Kentucky.

Many forests of the eastern United States were historically maintained as woodlands through fire and foraging of megafauna. The woodlands contained canopy openings that allowed grasses, wildflowers, and other herbaceous and shrubby vegetation to thrive. With fire suppression and loss of key wildlife foragers, many woodlands have succeeded to closed-canopy forests at the expense of the herbaceous understory community.

Forest and Natural Resource Sciences doctoral students Tara Littlefield and Megan Buland are performing research to help bring back the white fringeless orchid (WFO) at several wetland sites in the Daniel Boone National Forest. Littlefield serves multiple roles with the project, from project coordinator to student. For over 15 years, as the state botanist and federally listed plant recovery lead for Kentucky, Littlefield has worked on status assessments and coordinated recovery efforts for the orchid.

“In my coordination role, I network with partners across the orchid’s range and coordinate monitoring, management, research, and restoration efforts. My research focuses on WFO population response to climatic variation, disturbances, and restoration management activities,” said Littlefield.

Buland’s research focuses on isolation and molecular detection of the WFO fungal symbiont.

“Orchids have close symbiotic relationships with mycorrhizal fungi, which are critical for successful development and growth of orchid populations. To ensure successful restoration of WFO, testing to determine the presence of this fungus at restoration sites is critical,” said Buland.

By better understanding the ecology of the orchid mycorrhizal fungi, Buland’s work will help guide the long-term conservation and restoration of this native orchid species.

Together, the research efforts have direct implications for evaluating the success of management actions with the goal of developing best management practices for restoring this federally threatened orchid and its wetland habitat across the southeastern United States.

White Oak Release Project

DR. JOHN LHOTKA PROFESSOR OF SILVICULTURE

In Kentucky and its surrounding states, much concern exists about the long-term sustainability of white oak-dominated forests. While many research studies in the region have evaluated methods for regenerating oak forests, few efforts have tested forestry practices for enhancing oak-sapling competitiveness in regenerated stands undergoing initial phases of stand development. A common issue in recently regenerated stands is that oak trees, while present, have been drastically outgrown by more aggressive non-oak competitors.

In direct response to this critical oak management issue and the lack of existing research, a team of UK FNR faculty members has initiated a research project to study the growth and physiologic response of white oak saplings to pre-commercial thinning practices designed to promote the recruitment of oak trees into competitive, overstory crown positions. The project was established in collaboration with Berea College Forest and its research

efforts synergistically blend the expertise of three FNR faculty: Dr. John Lhotka (silviculture), Dr. Lance Vickers (forest management and stand dynamics), and Dr. Sybil Gotsch (forest ecophysiology).

The project has already served as a platform to support undergraduate research experiences. For example, Nick Harpe, a UK forestry senior, worked on the sites collecting research data throughout the summer of 2023. Beyond its research impacts, the project's sites and data will be integrated into educational activities associated with the department's forestry curriculum and silviculture Extension programming. Ultimately, this long-term project will expand our understanding of how white oak trees respond to early release treatments, the physiologic mechanisms behind white oak's growth responses, and how best to implement silvicultural practices to promote successful oak recruitment.



FOR 480: INTEGRATED FOREST RESOURCE MANAGEMENT



In their last spring semester before graduation, our forestry seniors take FOR 480: Integrated Forest Resource Management. This course represents the capstone experience of our forestry degree: Students follow the management planning process from understanding landowners' objectives through the presentation of a forest resource management plan. In FOR 480, students are divided into teams

of four to six people and are assigned a forested area of approximately 100 acres. The course meets all day on Tuesdays, and students spend the first half of the semester in the field conducting their forest resource inventories. The second half of the semester focuses on summarizing inventory data, developing stand prescriptions, and writing a comprehensive management plan for their project property. The semester

culminates in a forum at the W.T. Young Library auditorium, where student groups present their plans to departmental faculty and staff, invited stakeholders, and their friends and family. The FOR 480 capstone experience provides students a glimpse of the management complexities facing foresters in today's world and helps them gain experience and confidence in their abilities before they embark upon professional careers following graduation.



ANNA ACKERMAN

Forest Ecophysiology Lab with Dr. Sybil Gotsch
Robinson Forest, KY

Anna Ackerman is a sophomore majoring in Forestry with a minor in Environmental and Sustainability Studies. Anna was selected as a Sustainability Summer Research Fellow by the UK Office of Undergraduate Research. This summer she worked at Robinson Forest with Dr. Sybil Gotsch's Forest Ecophysiology Lab. The research Anna conducted involved increased droughts in Central Appalachia and its harm to tree health and productivity. The project determined to what extent fog could offset the stress of drought in trees as they have been found to intercept fog to use as a water source (i.e., foliar water uptake).

Undergrad Summer Jobs



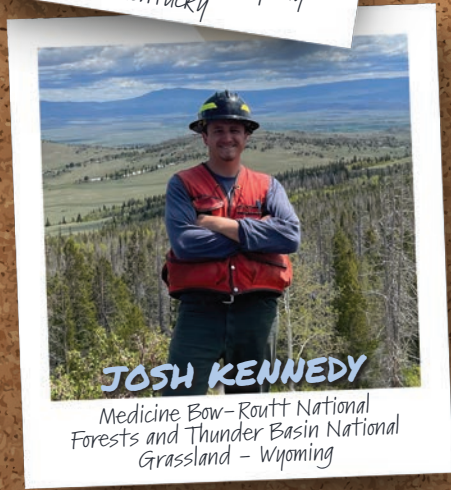
MAKASLYN DUNHAM
Independent Stave Company
Kentucky



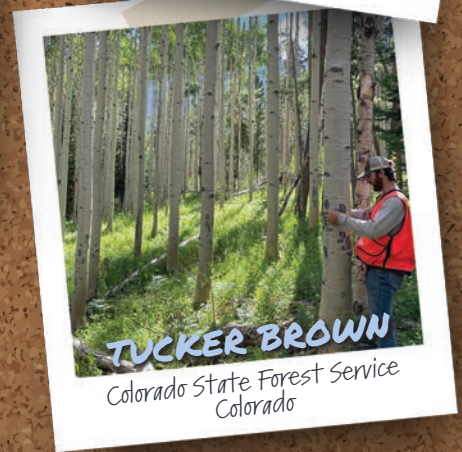
ERIN MAINES
Mt. Baker-Snoqualmie National
Forest - Washington



JOE SLADE
Independent Stave Company
Kentucky



JOSH KENNEDY
Medicine Bow-Routt National
Forests and Thunder Basin National
Grassland - Wyoming



TUCKER BROWN
Colorado State Forest Service
Colorado

Field Semester Video



Watch here!

Scan the QR code to watch a
17 minute video of the 2023
Spring Field Semester.





Wildlife Species

DR. JOHN COX ASSOCIATE PROFESSOR OF WILDLIFE AND CONSERVATION BIOLOGY

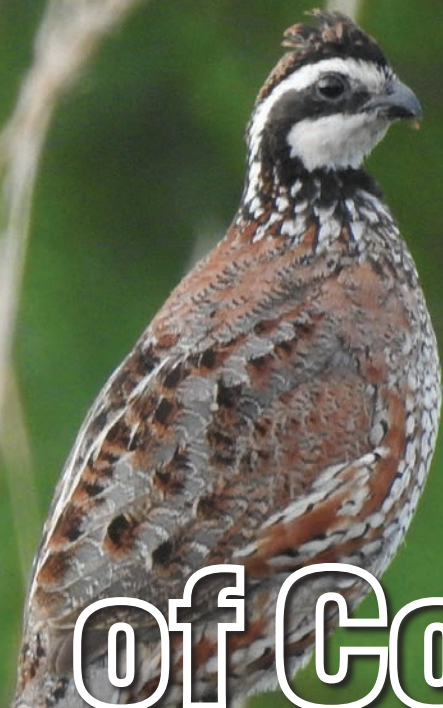
Some of the world's fastest human population growth rates occur in sub-Saharan Africa. Consequently, in recent decades these areas have experienced rapid urbanization, increased agriculture, and road construction, all of which have led to accelerated habitat loss and fragmentation as well as the overexploitation of wildlife species.

The martial eagle is an important top predator of sub-Saharan Africa with a wingspan of nearly 8 feet. This "leopard of the sky" has the ability to capture prey weighing dozens of pounds. As human communities have switched to more agrarian lifestyles, they have come into increasing conflict with martial eagles that may prey on livestock. Once fairly abundant, the martial eagle has declined to the point it is listed as globally endangered.

Former UK Department of Forestry and Natural Resources graduate student Stratton Hatfield began working with martial eagles in the Maasai Mara region of Kenya in 2016 under the tutelage of Dr. John Cox and raptor researchers abroad. A combination of solar-powered GPS units fitted to backpacks were placed on eagles to track their movement. These data were transmitted to researchers and have provided an incredibly detailed picture of eagle survival, nesting, diet, behavior, and general habitat needs, including the amount of time eagles spend in or near livestock. Our work was shared with local communities, environmental organizations, and wildlife officials to help identify habitat needs and reduce human-eagle conflict. Stratton has expanded this work with partners to include other raptors as he continues his graduate studies at Wageningen University.

DR. DJ MCNEIL ASSISTANT PROFESSOR WILDLIFE ECOLOGY AND MANAGEMENT

New to UK as of Fall 2022, the McNeil Lab has a variety of exciting projects involving rare and declining wildlife species—primarily birds (game birds and non-game birds) and pollinators (bees, butterflies, etc.). One large effort is aimed at informing the conservation of northern bobwhites, Kentucky's only quail species, across pine forests across the eastern United States. This effort has involved banding and radio-tagging hundreds of bobwhite chicks and adults and monitoring survival rates, breeding productivity, and movement patterns. Beyond game birds, we also have initiated a new study to examine the movement patterns of eastern forest birds—especially the eastern whip-poor-will and scarlet tanager—to better understand how forest management (especially timber harvest) affects these birds' movement patterns. Do whip-poor-wills and scarlet tanagers shift their movement patterns in the



of Concern

presence of timber management? And do these birds' movements suggest that habitat is enhanced by timber management? Stay tuned for more. Finally, we have initiated efforts to study pollinator responses to conservation, including a small study in Central Kentucky to assess how floral resources (i.e., densities of flowers) change over the growing season as well as the resources provided by those flowers (i.e., nectar flow). Currently in the Lab, Dr. McNeil mentors two graduate students and one undergraduate on their research. These research projects collaborate directly with state agencies (e.g., PA Game Commission, NC Wildlife Resources Commission) and federal agencies (e.g., NRCS) to directly inform conservation of wildlife across all of eastern North America (Kentucky and beyond) on private and public lands. We are looking forward to providing updates on these and other projects in the coming months.

DR. STEVEN PRICE PROFESSOR OF STREAM AND RIPARIAN ECOLOGY

The Mississippi Embayment in Western Kentucky contains the highest concentration of wetlands in the state. However, much of Kentucky's historic wetland loss has occurred in this region due to the conversion of wetlands to agricultural land. Ephemeral wetlands (i.e., those that dry during the late summer and fall) have been disproportionately lost in the Mississippi Embayment, but these wetlands represent critical habitat for many amphibian species of state conservation concern. These amphibians include mole salamander (*Ambystoma talpoideum*), lesser siren (*Siren intermedia*), and crawfish frog (*Lithobates areolatus*), a species considered near threatened by the International Union for Conservation of Nature. Over the last eight years, the Price Lab has partnered with the Kentucky Department of Fish and Wildlife Resources, Kentucky Research Consortium for Energy and Environment, Department of Energy,

and Marshall County High School to examine whether manmade (i.e., created) wetlands that mimic the hydrology of ephemeral wetlands can support amphibian populations. Dr. Price, UK students, and Marshall County High School students survey amphibians every spring within wetlands on the West Kentucky Wildlife Management Area. Students capture, identify, and count amphibians. Within the 30 wetlands regularly sampled, 13 amphibian species were observed, including three species of conservation concern. Furthermore, the research has shown that crawfish frogs are more abundant in created wetlands than naturally occurring wetlands on the site. These findings suggest that created, ephemeral wetlands support a wide variety of amphibians and function to augment local populations of amphibian species of conservation concern dependent on ephemeral wetlands in Western Kentucky.



Partnerships Make Our Work Possible

DR. JEFF STRINGER DEPARTMENT CHAIR

The success of our department relies heavily upon our partnerships. We are grateful for the relationships and trust we have developed over the years with our many partners, helping us to achieve our department's vision of *"being widely recognized for improving the lives of people and for improving the condition of human and biotic communities through learning, discovery, and outreach activities relating to forests and natural resources."* It simply would have been impossible for us to aspire to this vision without our partners, and we have a wealth of them. Listing all of them would be beyond the capacity of this writing, and trying to do so would not do justice to the partnerships. Suffice it to say that our partnerships are broad, encompassing state and federal agencies, NGOs, state and national associations and organizations, schools and universities, individual private industries and businesses, and our family forest owners. These owners hold a unique position, laying claim to the majority of forest land in the state. The forest resources they possess and utilize provide the foundation for much of the forests' economic and ecosystem-services contributions to Kentucky, along with the ability to offer extensive recreational opportunities for our citizens.

We have worked with many woodland owners in Kentucky who have contributed to the education of our undergraduate and graduate students, our research enterprise, and our Extension effort. These partnerships, again, are too numerous to list. One example is the Taylor Tree Farm, whose founder, Cliff Taylor, developed a highly sophisticated management strategy, utilized cutting-edge management techniques, and extended, with open arms, his woodlands and operations as a site for numerous educational programs. This engagement was critical in helping to foster far-reaching initiatives that have impacted woodlands throughout the state and region. His work lives on with his sons, Scott and Steve, and their families, who have embraced the woodlands and its management and have committed themselves to continuing and building on their farm's legacy. That commitment includes a continued partnership with our department, which is helping us to build strong working woodlands in the state as we address critical issues associated with our forest resources. We thank our family forest owners, and all of our partners, for the trust they put in us to help build a better future.



A Strategic Partnership to Sustain Kentucky's Forest Resources

Since our department's inception and continuing to this day, we have worked together with the Kentucky Division of Forestry and the Kentucky Forest Industries Association, counting them as our department's most long-standing relationships. Recently we had the opportunity to showcase our partnership with the Kentucky Division of Forestry, and we want to share some of the partnering statistics that were gathered. They show what good partnering can accomplish!



97K+

Kentuckians increased their knowledge on forest health, management and/or utilization

480+

businesses were impacted by forest health, management and utilizations programs

\$250M

Extension training and assistance affected 307,756 acres, resulting in \$259,515,709 dollars saved or earned

\$395K

\$395,476 were saved or earned by implementing forest health, management and utilizations programs

14K+

forest landowners and managers increased their knowledge of at least one exotic invasive species and its control

1,500+

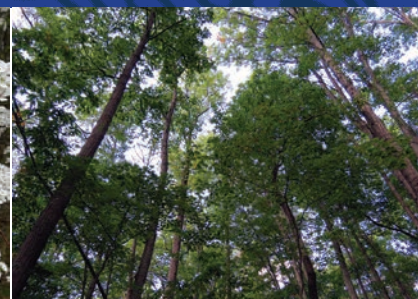
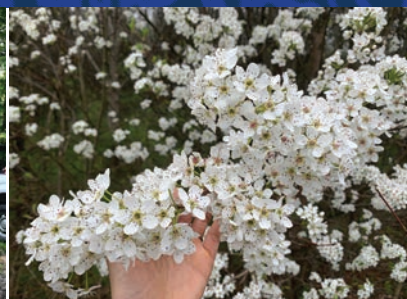
landowners implemented one or more forest health, management and/or utilization practices

970+

landowners, managers and public land users used programs to prevent or control invasive species



scan to read the full report





Research



Teaching



Extension

