



# 2022

## ANNUAL REPORT



SCHOOL OF  
NATURAL RESOURCES



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# Message from School Director

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Thank you for your support of the University of Tennessee Department of Forestry, Wildlife and Fisheries, which became the School of Natural Resources on January 1, 2023. This report reviews many activities of the final year of the department before the change.

Natural resources contribute significantly to Tennessee's economy. Forestry and the forest products industry generate more than \$24 billion in output annually, accounting for 3.5 percent of the state's economy and employing more than 98,000 Tennesseans. Wildlife and fisheries-based recreation contributes an additional \$6 billion annually. Estimates of the statewide tourism sector dependent on natural resources have exceeded \$16 billion, including \$1.8 billion of economic impact by Tennessee's state parks. At a minimum, natural resources account for close to 10 percent of our economy. A more complete accounting, incorporating values such as the added value of real estate from wildlife habitat and community livability, would likely result in a much larger impact.

In addition to their economic impact, natural resources are a fundamental component of the state's culture. To many Tennesseans, the outdoors represents a fundamental part of not only their livelihood but also the quality of their life. In every community across the state, Tennesseans rely on the outdoors for recreation, mental and physical health, food, social bonding, and other benefits. While comprehensive data does not exist to tell the story about how important natural resources are to Tennesseans' quality of life, what data does exist is compelling. Almost 2 million Tennesseans report wildlife-watching activities, 850,000 report fishing, and 375,000 report hunting. Tennessee State Parks host almost 8.5 million visitors every year. Almost half of all Tennesseans go boating each year, and



the state ranks in the top ten in the country for boating. Several corporations have also noted the variety of outdoor recreational opportunities and quality of life experiences the state offers in their decision to locate in Tennessee.

Consequently, the work of our faculty and staff is vitally important to the citizens of Tennessee and those who visit or conduct business in the state related to our natural resources. It was an extremely productive year for all three mission areas of the Department - Extension, Research, and Teaching.

Some of the 2022 highlights contained in this report include 75 degrees awarded; more than \$8.5 million awarded in grants and contracts; more than 84,000 direct contacts through our Extension programs; 2 research grants totaling more than \$32 million; and multiple faculty, staff, and student awards including two Fulbright awards, SAF National Quiz Bowl, and numerous university and professional society awards.

Thank you for reading, and I look forward to sharing our future accomplishments as a School.

Don Hodges  
School of Natural Resources Director

# Our Mission

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The mission of the **School of Natural Resources** is to advance the science and sustainable management of natural resources to promote their health, utilization and appreciation in Tennessee, the region and beyond through programs in research, teaching and Extension.



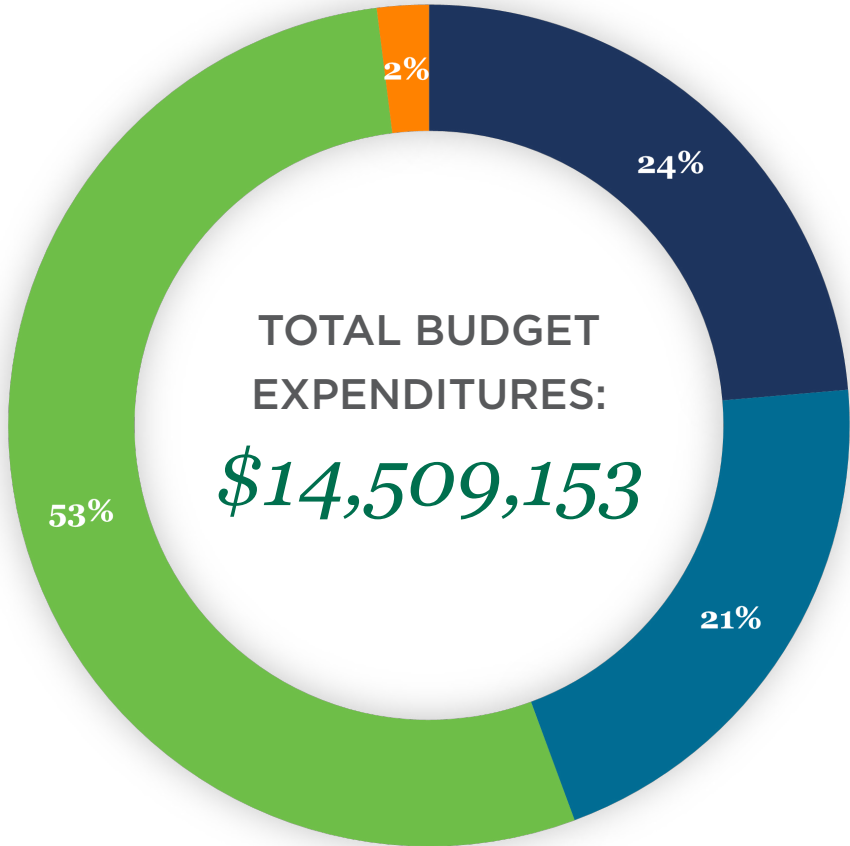
## ***School Facts:***

- 363 students enrolled in 2022: 316 undergraduates and 47 graduate students
- 75 total degrees awarded from spring 2021-fall 2022 including: 67 undergraduate, 4 master's and 4 doctoral degrees
- 30 faculty members
- 79 staff members
- 3 regional fisheries Extension agents

# Fiscal Summary

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The 2022 School of Natural Resources budget expenditures total about \$14.5 million. It includes federal and state funds along with grants and contracts made through research, Extension and donations. The chart includes budgetary expenditures from the Center for Renewable Carbon.



- Grants, Contracts
- State Funds
- Federal Funds
- Other

*Find a breakdown of School Research & Extension expenditures in the Grant Awards section on page 34.*

# Extension Summary

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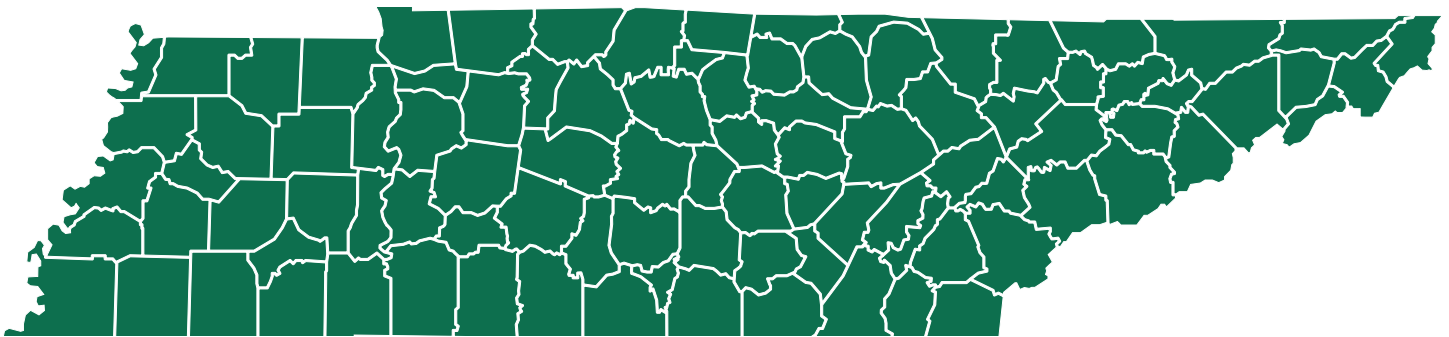
**84,109**  
contacts reached

**611**  
activities

**7,720**  
hours

Includes:

- Public meetings
- Facebook lives
- Field days
- Trainings
- Educational videos
- On-site visits
- Phone calls and emails



## **SAMPLE OF 2022 EXTENSION PROGRAMS**

Wildlife Health in Tennessee, Dan Grove

4-H Wildlife Judging, Craig Harper

Quality Deer Management, Craig Harper

Back Porch Forestry, David Mercker

Welcome to Your Woods, David Mercker

Tennessee Healthy Hardwoods, David Mercker

Tennessee Tree Day, David Mercker

Aquatic Vegetation Control, Regional Extension Agents

Commercial Aquaculture Inquiries, Regional Extension Agents

## EXTENSION FACULTY

Wayne Clatterbuck

Chris Graves

Dan Grove

Craig Harper

Sharon Jean-Philippe

Pat Keyser

David Mercker

Stephen Peairs

Ryan Sharp

Adam Taylor

## REGIONAL FISHERIES EXTENSION AGENTS

Creig Kimbro  
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# Publications, Presentations & Highlights

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## PUBLICATIONS

*alphabetical order by author*

Adhikari, R.K., **N.C. Poudyal**, and A. Shrestha. 2022. The effect of foreign remittance on timber imports in Nepal: A vector error correction model. *Journal of Forestry Research*, 27(5): 323-333.

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Butler, R.A., R.T. Trout Fryxell, **A.E. Houston**, L.B. Coons, E.K. Bowers, J. Baxter, D.J. Paulsen, and M.L. Kennedy. 2022. No relationship observed between habitat type and *Rickettsia* presence in ectoparasites collected from rodents in southwestern Tennessee. *The Southwestern Naturalist*, 66(3): 233-239.

Camfield, E., A. Bowman, J. Choi, K.D. Gwinn, B.H. Ownley, **N. Labbé**, N. Moustaid-Moussa, and D.H. D'Souza. 2022. Switchgrass extractives to mitigate *Escherichia coli* O157:H7 and *Salmonella enterica* serovar Typhimurium contamination of romaine lettuce at pre- and postharvest. *Journal of Food Science*, 87(8): 3620-3631.

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Chapagain, B.P., **N.C. Poudyal**, and C. Watkins. A travel cost analysis of elk-

# Highlight: First Global Amphibian and Reptile Disease Conference



More than 250 scientists from 25 countries gathered in Knoxville from August 4-10 for the inaugural Global Amphibian and Reptile Disease Conference. Knoxville was selected as the host city because of amphibian disease research conducted through the University of Tennessee Center for Wildlife Health. Center researchers Matt Gray, Mark Wilber, Deb Miller, Wesley Sheley, and Davis Carter all contributed in important ways to the event's success, as did Alyssa Merka of the UT Department of Forestry, Wildlife and Fisheries.

The conference included seven workshops and 149 scientific presentations. Topics ranged from herpetofauna and One Health to mathematical modeling of amphibian and reptile diseases to the importance of diversity, equity and inclusion in science, which Craig Pickett Jr., director of the UTIA Office of Diversity, Equity and Inclusion, led.

Conference participants included students,

scientists, veterinarians and natural resource practitioners, as well as policy makers and other stakeholders. Individuals at the event used the conference as a springboard to find solutions to emerging infectious diseases that are plaguing global amphibian and reptile populations.

Prominent among the conference's 21 sponsors were the National Science Foundation, Deutsche Gesellschaft für Herpetologie und Terrarienkunde, Environment, and Climate Change Canada, Morris Animal Foundation, Wildlife Disease Association, Amphibian Survival Alliance, U.S. Geological Survey and the Association of Zoos and Aquariums.

Gray and other organizers successfully raised more than \$85,000 to increase diversity, equity and inclusion at the conference. In total, organizers were able to provide 44 travel grants to participants from nine countries and 13 U.S. states.

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Frakes, A., O. Joshi, and **N.C. Poudyal**. 2022. Understanding regional economic impacts of

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Garcia-Negron, V., S.C. Chmely, J. Ilavsky, D.J. Keffer, and **D.P. Harper**. 2022. Development of Nanocrystalline Graphite from Lignin Sources. *ACS Sustainable Chemistry & Engineering*, 10(5): 1786-1794.

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**Harper, C.A.** 2022. Considerations with warm-season food plots (Episode 39) [Audio podcast]. *Deer University*.

Hightower, J.A., **D.A. Buehler**, et al. 2022. Change in climatically suitable breeding distributions reduces hybridization potential between *Vermivora* warblers. *Diversity and*

Distributions, 29(2): 254-271.

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**Jean-Philippe, S.R.**, N.R. Bumgarner, L. Rumble, S. Adams, N. Vercler, and R. Fowler. April 2022. Pests: What's Bugging Your Trees This Spring? Tree News You Can Use. University of Tennessee e-Newsletter.

**Jean-Philippe, S.R.**, N.R. Bumgarner, L. Rumble, S. Adams, N. Vercler, and R. Fowler. March 2022. Plant Health Care. Tree News You Can Use. University of Tennessee e-Newsletter.

**Jean-Philippe, S.R.**, N.R. Bumgarner, L. Rumble, S. Adams, N. Vercler, and R. Fowler. May 2022. Planting Depths: When is Low to Low? Tree News You Can Use. University of Tennessee e-Newsletter.

**Jean-Philippe, S.R.**, N.R. Bumgarner, L. Rumble, S. Adams, N. Vercler, and R. Fowler. Aug. 2022. Trees and Turfgrass. Tree News You Can Use. University of Tennessee e-Newsletter.

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# Highlight: 63rd Southern Forestry Clubs Conclave Hosted by University of Tennessee Forestry Students

The University of Tennessee Forestry Club hosted the 63rd Association of Southern Forestry Clubs (ASFC) Conclave from March 17-20 after the COVID-19 pandemic forced a two-year postponement.

One hundred and fifty students, 18 faculty advisors, and several sponsors, friends and family attended the Conclave at the Clyde York 4-H Center near Crossville, TN.

The UT team and many others were in a building phase after two years of limited face to face activities and travel. Despite a somewhat smaller crowd, there was no lack of team spirit, good-natured rivalry, and teams willing to cheer each other on. Terry Baker, CEO of the Society of American Foresters, and David Arnold, Tennessee State Forester, were on hand to welcome everyone, and there

were multiple opportunities for students to network with forestry professionals, faculty, and peers.

Forestry Club officers Carson Parham, Kayla Stuart, Kyle Hanners, Quinn Forney and advisor David Buckley made the most of a small UT team in terms of scheduling people to set up events, serve food in the dining hall, and supply the items required for each event.

Although they did not have a full-size team, the UT students competed in as many events as possible and won the Outstanding Sportsmanship Award.

Stephen F. Austin State University took first place overall, NC State placed second, and Clemson placed third. Louisiana Tech hosted the 64th ASFC Conclave in 2023.



## PUBLICATIONS CONTINUED

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Kandhola, G., A. Djioleu, K. Rajan, J. Batta-Mpouma, **N. Labbé**, J. Sakon, B.A. Babst, A. Ghosh, D.J. Carrier, and J.W. Kim. Impact of species-based wood feedstock variability on physicochemical properties of cellulose nanocrystals. *Cellulose*, 29, 8213-8228.

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2016. *Journal of Economic Entomology*, 115(1): 371-380.

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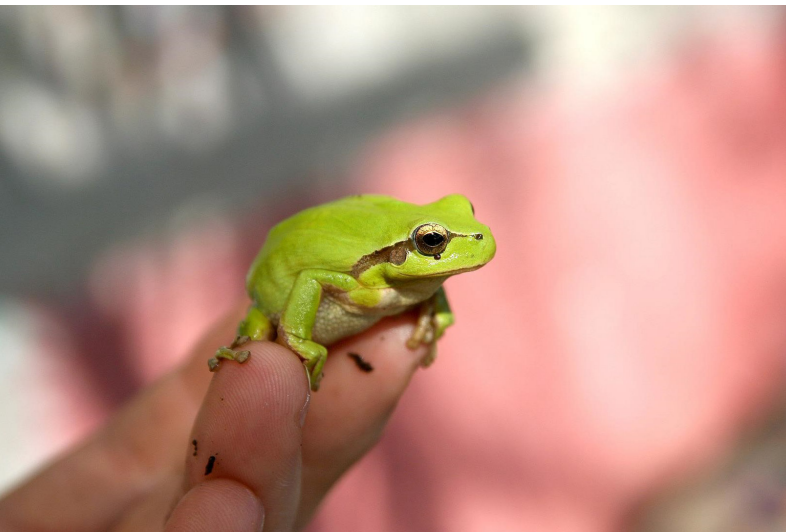
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# Highlight: UT Researchers Receive \$2.75 Million Grant to Investigate Amphibian Pathogens in Wildlife Trade Networks



The evolution, emergence and spread of novel pathogens has been widely discussed even before the first case of COVID-19 was reported in 2019. A team of researchers at the University of Tennessee, Knoxville, received a \$2.75 million grant to identify disease mitigation strategies that will minimize the risk of amphibian pathogens spreading from captive pet populations to wild populations and negatively impacting biodiversity.

The project, “Socioeconomic and Epidemiological Drivers of Pathogen Dynamics in Wildlife Trade Networks,” is being funded by the Ecology and Evolution of Infectious Diseases Program, a joint program of the National Science Foundation, National Institutes of Health and the U.S. Department of Agriculture. The work is overseen by Principal Investigator Matt Gray, professor in the UTIA School of Natural Resources and associate director of the UTIA Center for Wildlife Health. The project’s two UT co-principal investigators are Neelam Poudyal, also a professor in the School; and Nina

Fefferman, director of the National Institute for Mathematical and Biological Synthesis, professor in Ecology and Evolutionary Biology and an associate director of the UT One Health Initiative.

For the next five years, the team will determine what aspects of the trade influence pathogen occurrence. With more than 2.5 million amphibians imported in the U.S. each year for pet amphibian trade and more than 600 million animals moving through more than 180 nations per year, the need for advanced pathogen mitigation is critical. This is the first study to investigate the bidirectional coupling between socioeconomic factors and pathogen dynamics across a tractable wildlife trade network.

The collaborating institutions on this project are the University of Tennessee, Knoxville, including the UT Institute of Agriculture; Washington State University; Michigan State University; University of Massachusetts; and Rutgers University. The team is also collaborating with the amphibian trade industry through a partnership with the Pet Advocacy Network.

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## SELECTED PRESENTATIONS

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Adhikari, R.K., **N.C. Poudyal**, and C. Brandeis. 2022. Identifying optimal locations for hardwood CLT plants in Tennessee: Application of spatially explicit framework. Proceedings of the Society of American Foresters Annual Meeting, September 20-24, 2022, Baltimore, MD.

Adhikari, R.K., **N.C. Poudyal**, T. Ochudho, R. Parajuli, O. Joshi, S. Mehmood, and J. Munshell. 2022. Predictors of landowners intention to manage Emerald Ash Borer (EAB) in the central hardwood region. Proceedings of the Annual Conference of the International Society of Forest Resource Economics, May 23-25, 2022, Traverse City, Michigan.

Baker, E., R.W. Gerhold, **D.L. Miller**, and A. Jensen. 2022. Widespread Hepatozoon sp. infection in Southeastern coyotes. 70th International Wildlife Disease Association Conference, Madison, WI, July 23-29, 2022.

Berry, M.E., **E. Bisangwa**, **P.D. Keyser**, and R. Smith. 2022. Patch-burn and rotational grazing effects on performance of beef heifers and pasture productivity. American Forage and Grassland Council Annual Meeting, Wichita, KS, Jan. 9-12, 2022, Poster.

Berry, M.E., **P.D. Keyser**, C. Lituma, R. Smith, **E. Bisangwa**, T. Keene, and J. Morgan. 2022. Patch-burn and rotational grazing effects on beef heifers and pasture productivity. 12th Eastern Native Grass Symposium, Louisville, KY, Oct. 4-6, 2022.

**Bisangwa, E.**, J. Richwine, F.R. Walker, and **P.D. Keyser**. 2022. Switchgrass stand vigor under repeated harvests. 12th Eastern Native Grass Symposium. Louisville, KY, Oct. 4-6.

Blair, C.J., J. Braunstein, **J.D. Clark**, **L.I. Muller**, S. Norman, W. Stiver, and R. Williamson. 2022. Proximate responses of black bears to the Chimney Tops fire in Great Smoky Mountains National Park. Southern Blue Ridge Fire Learning Network and Consortium for Appalachian Fire Managers & Scientists.

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Bones, J.T., M.A. Turner, W.D. Gulsby, B.K. Strickland, and **C.A. Harper**. 2022. Evaluation of pine stands for deer forage quality. Annual Meeting of Southeast Deer Study Group.

Burt, M.A., A.S. Nelson, **C. Kwit**, and S.R. Whitehead. 2022. Warming up mutualisms: a case study of an ant-dispersed plant, *Sanguinaria canadensis*. Ecological Society of America Annual Meeting.

Cable, A.B., and **E.V. Willcox**. 2022. Roosting and foraging ecology of female tri-colored bats in Tennessee, USA. The Wildlife Society 29th Annual Conference.

Cable, A.B., and **E.V. Willcox**. 2022. Roosting and foraging ecology of female tri-colored bats in Tennessee, USA. 19th International Bat Research Conference, Bat Research News.

**Carter, E.D.**, **M.Q. Wilber**, **D.L. Miller**, W. Sheley, J. DeMarchi, and **M.J. Gray**. 2022. From the early stages of infection to the grave: How does *Batrachochytrium salamandrivorans* transmission probability shift throughout infection? Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

Cavasos, K., **N.C. Poudyal**, J.L. Brunner, A.R. Warwick, J. Jones, N. Moherman, M. George, J.D. Willard, Z.T. Brinks, and **M.J. Gray**. 2022. Pathogen transfer risk and business attitudes: an assessment of US businesses involved in amphibian trade. Annual Meeting of the Tennessee Chapter of The Wildlife Society.

**Clatterbuck, W.K.**, and C.J. Dugger. 2022. Developing Advance Reproduction of Intermediate Light-Tolerant Species Such as White Oak: A Focus on Midstory Removal, Foundational Silviculture with Emphasis on Reforestation and Early Stand Improvement, 2022 National Silviculture Workshop. July 12-14, Kellogg, ID. Proc. RMRS-P-80. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. p. 118-121.

Coronado, A.R., A.M. Tanner, E.P. Tanner, S. Rideout-Hanzak, and **C.A. Harper**. 2022. Assessing habitat suitability for the threatened Texas tortoise within an urban greenspace. Proceedings of the Annual Meeting – Texas Chapter of the Wildlife Society.

Cox, M., S. Kuschke, I. Dewi, S. Good, J. Wyneken, and **D.L. Miller**. 2022. The effects of climate change on immature sea turtles and associated bacteria. EUReKa, April 25, 2022, University of Tennessee.

Darmstadt, C., L. Benson, J. Knowlton, N. Lussier, and **C. Kwit**. 2022. How are bird communities and diet guilds impacted by a restoration habitat gradient? Association of Field Ornithologists annual meeting, Plymouth, MA.

Dee, M., A. Towe, B. Stevens, **M.J. Gray**, **D.L. Miller**, and W. Sheley. 2022. Fungus Among Us: The Impact of *Batrachochytrium salamandrivorans* on reproductive fitness. Annual Meeting of the Southeast Partners in





# Highlight: USDA awards \$30 Million Grant to Expand Climate-Smart Agriculture

UTIA received a \$30 million grant to help grassland farmers enter the emerging carbon economy while enhancing productivity and ecological benefits. It's one of 70 selected projects under the USDA's first pool of the Partnerships for Climate-Smart Commodities, for which \$2.8 billion has been allocated.

The project, "Climate-Smart Grasslands – the Root of Agricultural Carbon Markets," focuses on a nine-state region that represents the core of grassland agriculture for the eastern U.S.

Patrick Keyser, director for the Center for Native Grasslands Management and School of Natural Resources professor is the project's lead. His team has built a partnership of 28 entities across the eastern U.S. to collaborate with 245 working farms. These farm partners will play a critical role by testing innovative grassland management strategies, providing an opportunity to validate the carbon and greenhouse gas benefits, and being the platform for aggressive outreach programs.

The team will also evaluate trade-offs for

producers, the beef sector and national agricultural policy with respect to climate-smart farming, soil health, biodiversity conservation and a productive beef sector.

The University of Tennessee is the lead project partner. Other partners include the University of Arkansas, Alabama Cooperative Extension, University of Kentucky, University of Missouri, Clemson University, North Carolina State University, Purdue University, Tennessee State University, Virginia State University, Virginia Tech, Tyson Foods, Inc., JBS Foods, Corteva, Farm Credit Mid-America, Ecosystem Services Marketing Consortium, American Forage and Grassland Council, National Grazing Lands Coalition, National Cattlemen's Beef Association, U.S. Roundtable for Sustainable Beef, multiple state cattle associations, American and Tennessee Farm Bureau Federations, The Nature Conservancy, American Bird Conservancy, Monarch Joint Venture, National Bobwhite Conservation Initiative, Tennessee Department of Agriculture, Missouri Department of Conservation and Virginia Department of Conservation and Recreation.

## SELECTED PRESENTATIONS CONTINUED

Amphibian and Reptile Conservation.

Demeny, K., B. Ward, K. Kuhn, H. Ellington, **C.A. Harper**, and M.A. Lashley. 2022. Species-specific oak masting phenology and subsequent behavioral responses by deer. Annual Meeting Southeast Deer Study Group.

Demers, T., **D.L. Miller**, and W. Sheley. 2022. Parasites in wild-caught *Notophthalmus viridescens* experimentally infected with *Batrachochytrium* salamandrivorans. Boehringer-Ingelheim National Veterinary Scholars Symposium, Aug. 2022.

Demers, T., **D.L. Miller**, and W. Sheley. 2022. Parasites in wild-caught *Notophthalmus viridescens* experimentally infected with *Batrachochytrium* salamandrivorans. CVM Research Day, Sept. 2022.

Denton, R., M. Velandia, J.N. Yenerall, C. Trejo-Pech, K.L. DeLong, X. Chen, **S.M. Schexnayder**, S. Tanaka, and K. Rignall. 2022. Evaluating Factors Influencing Tennessee and Kentucky Farmers' Willingness to Sell Produce Through Fresh Stop Markets. Selected Paper 2022 Agricultural & Applied Economics Association Annual Meeting, Anaheim, CA, July 31-Aug. 2, 2022.

**Franklin, J.A.** 2022. Overcoming arrested succession and invasive species on older reclaimed surface mines. American Society of Reclamation Sciences Annual Meeting, June 12-16, Duluth, MN.

**Franklin, J.A.** 2022. Using experiential learning in an upper-level forestry class to teach reclamation techniques. American Society of Reclamation Sciences Annual Meeting, June 12-15, Duluth, MN.

Gore, M., O. Joshi, B. Chapagain, **N.C. Poudyal**, and S. Fairbanks. 2022. Economic Significance of Wildlife Management Areas in Oklahoma. Proceedings of the Annual Conference of the International Society of Forest Resource Economics, May 23-25, 2022, Traverse City, MI.

**Gray, M.J., E.D. Carter**, J. Piovia-Scott, P.W. Cusaac, A. C. Peterson, R.D. Whetstone, A. Hertz, A. Munoz Torres, M.C. Bletz, D.C. Woodhams, W.B. Sutton, and **D.L. Miller**. 2022. Broad host susceptibility of North American amphibian species to *Batrachochytrium* salamandrivorans suggests high invasion potential and extinction risk. Global Amphibian and Reptile Disease Conference, Knoxville, TN, Aug. 4-10.

Grisnik, M., **M.J. Gray**, J. Piovia-Scott, **E.D. Carter**, and W.B. Sutton. Incorporating species susceptibilities and climate change into models of *Batrachochytrium* salamandrivorans risk in the United States. Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

Grunwald, P., M.G. Ruder, **L.I. Muller**, D.A. Osborn, K.O. Goode, and G.J. D'Angelo. 2022. Comparison of immobilization efficacy of nalbuphine-medetomidine-azaperone and butorphanol-azaperone-medetomidine in captive white-tailed deer. Southeast Deer Study Group Meeting, Virtual, 2022.

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Grunwald, P., M.G. Ruder, **L.I. Muller**, D.A. Osborn, K.O. Goode, and G.J. D'Angelo. 2022. Immobilization efficacy of a conducted electrical weapon in captive white-tailed deer. 30th Vertebrate Pest Conference, Reno Nevada, March 7-10, 2022.

Hamilton, C., K. Kim, J. Beason, J. McCord, R. Rousseau, T.G. Rials, and **N. Labbé**. 2022. Bark structural and compositional features differentially impact yield and disease tolerance in different hybrid poplar taxa. Frontiers in Biorefining Conference, Oct. 24-28, St. Simon's Island, Georgia, USA.

**Harper, C.A.** 2022. Fire effects on wildlife in the eastern US. Virginia Department of Wildlife Resources inservice training. Forest Recreation

Center, Forest, VA.

**Harper, C.A.** 2022. Forest management: Considerations for wildlife. Virginia Department of Wildlife Resources inservice training. Forest Recreation Center, Forest, VA; invited presentation

**Harper, C.A.** 2022. Fire effects on wildlife in the eastern US. Virginia Department of Forestry inservice training. Mountain Lake Biological Station, Pembroke, VA; invited presentation

**Harper, C.A.** 2022. Forest management: Considerations for wildlife. Virginia Department of Forestry inservice training. Mountain Lake Biological Station, Pembroke, VA; 9/22 invited presentation

**Harper, C.A.** 2022. Forest management: Considerations for wildlife. TWRA Statewide Manager's Meeting. Fall Creek Falls State Park, Spencer, TN; invited presentation

**Harper, C.A.** 2022. Food plot mixtures, management, and strategy. Inservice training for Arkansas Game and Fish Commission. Little Rock, AR

**Harper, C.A.** 2022. Developing a food plot program for white-tailed deer. Deer Steward inservice training short course for Arkansas Game and Fish Commission. Little Rock, AR

**Harper, C.A.** 2022. Forest management for deer. Deer Steward inservice training short course for Arkansas Game and Fish Commission. Little Rock, AR

**Harper, C.A.** 2022. Implementing prescribed fire and assessing fire effects. Deer Steward inservice training short course for Arkansas Game and Fish Commission. Little Rock, AR

**Harper, C.A.** 2022. Early succession: Identification, importance, establishment, management. Deer Steward inservice training short course for Arkansas Game and Fish Commission. Little Rock, AR

**Harper, C.A.** 2022. Implementation of On-site Wildlife Management Practices in the Wildlife Habitat Education Program. UT Extension 4-H

agent inservice training. Jackson, Andersonville, and Gainesboro, TN

**Harper, C.A.** 2022. Overview of wildlife management practices used in the Wildlife Habitat Education Program. Western Region Extension 4-H agent inservice training. Jackson, Andersonville, and Gainesboro, TN

**Harper, C.A.** 2022. Concepts and terms used in the Wildlife Habitat Education Program. Western Region Extension 4-H agent inservice training. Jackson, Andersonville, and Gainesboro, TN

**Harper, C.A.** 2022. Perennial food plot management. National Deer Association Deer Steward II short course. Barneveld, WI and Pittsfield, IL

**Harper, C.A.** 2022. Implementing Forest Stand Improvement for white-tailed deer. National Deer Association Deer Steward II short course. Barneveld, WI and Pittsfield, IL

**Harper, C.A.** 2022. Considerations for managing early successional plant communities for white-tailed deer. National Deer Association Deer Steward II short course. Barneveld, WI and Pittsfield, IL

**Harper, C.A.** 2022. Ground-truthing a property for white-tailed deer management. National Deer Association Deer Steward II short course. Barneveld, WI and Pittsfield, IL

**Harper, C.A.** 2022. Property evaluation at the macro-scale. National Deer Association Deer Steward II short course. Barneveld, WI and Pittsfield, IL

**Harper, C.A.** 2022. Fire effects on wildlife and associated plant communities. National Deer Association Habitat Module. Dawson Springs, KY

**Harper, C.A.** 2022. Herbicides and applications for deer managers. National Deer Association Habitat Module. Dawson Springs, KY

**Harper, C.A.** 2022. Plant ID for deer managers. National Deer Association Habitat Module. Dawson Springs, KY

**Harper, C.A.** 2022. Habitat: terms, concepts, and considerations. National Deer Association Habitat Module. Dawson Springs, KY

**Harper, C.A.** 2022. Managing your property for better deer and better deer hunting. West Highland Rim Forestry Association Annual Meeting, Dickson, TN

**Harper, C.A.** and **D.C. Mercker.** 2022. Small woodlot management for timber and wildlife. UT Extension statewide conference. Chattanooga, TN

**Harper, C.A.** 2022. Forest stand improvement: Considerations for wildlife. UT Science Forum

**Harper, C.A.** 2022. Quail habitat: What is it, how do we get it, how do we keep it? 2022 Tennessee Quail Summit. Nashville, TN.

Hodges, J.L., and **P.D. Keyser.** 2022. Quail, cattle, and the bottom line. 12th Eastern Native Grass Symposium. Louisville, KY, Oct. 4-6.

Kern, J., A. Reeves, N. Szafranski, R.W. Gerhold, and **D.L. Miller.** 2022. Detection of *Cytauxzoon felis* in Wild Bobcat (*Lynx rufus*) and Ocelot (*Leopardus pardalis*) Populations in Southern Texas (Oral). National Conference of Undergraduate Research (NCUR), April 4, 2022.

**Keyser, P.D.,** C. Boyer, S. Cho, S. Jagadamma, **S.M. Schexnayder,** and F.R. Walker. 2022. Climate Smart Grasslands. 12th Eastern Native Grass Symposium. Louisville, KY, Oct. 4-6.

**Keyser, P.D.,** C. Boyer, S. Cho, S. Jagadamma, **S.M. Schexnayder,** and F.R. Walker. 2022. Native grasses: The keystone to climate-smart agriculture. 12th Eastern Native Grass Symposium (Oral), Oct. 3-6, Louisville, KY.

Kheam, R., T. Elder, **S. Wang, M Li.** 2022. Totally Chlorine-Free Peracetic Acid Pulping for Nanocellulose Isolation. American Chemical Society's (ACS) Spring Meeting, March 22, 2022, Advances in Renewable Materials Session.

Kuschke, S, **D.L. Miller,** and J. Wyneken. 2022. Are hatchlings emerging dehydrated? Preliminary packed cell volume and total solids

data in leatherback (*Dermochelys coriacea*) sea turtle hatchlings and post hatchlings and their relation to incubation temperature. Global Amphibian and Reptile Disease Conference, Knoxville, TN, Aug. 4-10.

Kuschke, S, **D.L. Miller,** and J. Wyneken. 2022. Finding normal in a warming world: baseline PCV and TS data and its relation to incubation temperature in leatherback sea turtle hatchlings and post hatchlings. 70th International Wildlife Disease Association Conference, Madison, WI, July 23-29, 2022.

Kuschke, S, J. Wyneken, and **D.L. Miller.** 2022. Serum Protein Electrophoresis in Leatherback Sea Turtle Hatchlings. Florida Keys Annual Sea Turtle Workshop, Aug. 2022.

Le Sage, M., J. McCartney, W. Sheley, R. Stilz, D.C. Woodhams, **D.L. Miller, M.J. Gray,** and L.A. Rollins-Smith. 2022. Enhanced survival in Eastern Newts after a second exposure to *Batrachochytrium salamandrivorans*. Global Amphibian and Reptile Disease Conference, Knoxville, TN, Aug. 4-10.

Le Sage, M., J. McCartney, W. Sheley, R. Stilz, D.C. Woodhams, **D.L. Miller, M.J. Gray,** and L.A. Rollins-Smith. 2022. Enhanced survival in Eastern Newts after a second exposure to *Batrachochytrium salamandrivorans*. North American Comparative Immunology Workshop, Banff, Canada, June.

**Li, M.** 2022. Development of nanocellulose-based antimicrobial packaging materials and functional composites. Huazhong Agricultural University, China, 3rd ICUAFW, Nov. 2022, virtual.

**Li, M.** 2022. Antimicrobial food packaging with cinnamaldehyde stabilized by ethyl lauroyl arginate and cellulose nanocrystals. Frontiers in Biorefining, Oct. 24-27, St. Simons Island, GA, USA.

Marshall, S.G., J.T. Bones, M.A. Lashley, W.D. Gulsby, B.K. Strickland, J.D. Clark, and **C.A. Harper.** 2022. Timing of fire influences deer use of pine stands. Annual Meeting Southeast Deer Study Group.

# Highlight: Celebration recognizes new School of Natural Resources



Students, faculty and staff celebrated the new School of Natural Resources designation in Jan. 2023 after it was approved in fall 2022.

About 363 students, including 316 undergraduates, are enrolled in the program. The field work and hands-on experiences offered by the school drew in many of its current students.

Don Hodges, School of Natural Resources director, says the name change puts the university on equal footing with other institutions while also reflecting the breadth of programs under the school.

“It’s a better descriptor of what we have in the department,” Hodges said. “We are continuing to do forestry, wildlife and fisheries work, but we have a number of natural resource-related fields that the former name doesn’t necessarily describe as well.”

The new school will continue to offer Bachelor of Science degrees and Master of Science degrees in forestry and wildlife and fisheries and a doctoral degree in natural resources. It also offers a master’s program in forest business. Hodges adds the school will assess the potential for adding an undergraduate program in outdoor recreation.

The new school will remain competitive for extramural research and Extension funding to assist in managing and protecting natural resources. During the last two fiscal years, the former department gained more than \$40 million in funding, including a \$30-million grant from the USDA National Institute of Food and Agriculture (NIFA) to help farmers enter the emerging carbon economy.

The change comes after the Department of Forestry was established in 1964 and later renamed to the Department of Forestry, Wildlife and Fisheries in 1977.

## SELECTED PRESENTATIONS CONTINUED

Metts, D.L., K.A. Kurth, E.M. Watson, B.F. Miller, **C. Kwit**, J.M. DeBruyn, V. Brown, and **L.I. Muller**. 2022. Modern methods for monitoring food habits and vocalizations of elk in Tennessee. Eastern Elk Workshop, Bemidji, MN; May 16-19, 2022.

Mitchell, D., and **P.D. Keyser**. 2022. Northern bobwhite resource selection in a mixed landscape of nwsgr and csg pastures and fields. American Forage and Grassland Council Annual Meeting, Wichita, KS, Jan. 9-12, 2022.

Osborn, D.A., P.J. Grunwald, M.G. Ruder, **L.I. Muller**, K.O. Goode, and G.J. D'Angelo. 2022. Efficacy and physiological effects of a less-regulated anesthetic for white-tailed deer: NalMed-A compared to BAM and other drug combinations. International Deer Biology Congress, Osijek, Croatia.

Panos, B., **D.A. Buehler**, and **C.A. Harper**. 2022. Evaluation of avian use of agricultural cover crops during winter, migration stopover, and the breeding season in Tennessee. Annual Meeting of The Wildlife Society.

Peace, A., M.M. Chowdhury, **E.D. Carter**, and **M.J. Gray**. 2022. Parameterizing a Multi-Stage Infection Model of the Emerging Fungal Pathogen *Batrachochytrium salamandrivorans* (Bsal). Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

Pearhill, R., J. Jones, **M.J. Gray**, and J.L. Brunner. 2022. Microbe surveillance in the amphibian pet trade: results from a pilot study. Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

**Phillips, L.M.**, M.A. Turner, and **C.A. Harper**. 2022. Effects of postemergence and preemergence herbicide applications to control sericea lespedeza for white-tailed deer forage management. Annual Meeting Southeast Deer Study Group.

**Phillips, L.M.**, M.A. Turner, B.L. Powell, and **C.A. Harper**. 2022. Effects of herbicide applications on white-tailed deer use of food plots. Annual

Meeting Southeast Deer Study Group.

**Phillips, L.M.**, V.M. Johnson, **D.A. Buehler**, **C.A. Harper**, J. O. Quehl, R. D. Shields, and R. D. Applegate. 2022. Reproductive parameters of eastern wild turkeys in south-central Tennessee. Annual Meeting of The Wildlife Society.

**Prigge, J.**, and **P.D. Keyser**. 2022. Animal performance and pasture productivity of weaned steers grazing native warm-season grass pastures with and without interseeded native forbs and legumes. 12th Eastern Native Grass Symposium. Louisville, KY, Oct. 4-6, Poster.

**Prigge, J.**, **E. Bisangwa**, and **P.D. Keyser**. 2022. Animal performance and pasture productivity of weaned steers grazing native warm-season grass pastures with and without interseeded native forbs and legumes. American Forage and Grassland Council Annual Meeting, Wichita, KS, Jan. 9-12, 2022, Poster.

**Quehl, J.O.**, **C.A. Harper**, and **D.A. Buehler**. 2022. Preliminary results of a delayed spring turkey hunting season on wild turkey reproduction in south-middle Tennessee Annual Meeting Tennessee Chapter - The Wildlife Society.

**Quehl, J.O.**, **L.M. Phillips**, **D.A. Buehler**, **C.A. Harper**, and R.D. Shields. 2022. Does timing of the spring wild turkey hunting season affect reproduction? Annual Meeting of The Wildlife Society.

Rajan, K., K. Kim, D. D'Souza, J.M. Choi, A.K. Naskar, T.J. Elder, and **N. Labbé**. 2022. Strategy for a complete utilization of lignocellulosic feedstocks. Frontiers in Biorefining Conference, St. Simons Island, GA, Oct. 24-26, 2022.

Rajan, K., K. Kim, T. Elder, and **N. Labbé**. 2022. Ionic liquids-assisted fabrication and recycling of lignocellulosic thin films. American Chemical Society's (ACS) Spring Meeting, March 22, 2022, Advances in Renewable Materials Session.

Rich, K., R.H. Hardman, W. Sutton, and **D.L. Miller**. 2022. Gopher tortoise health assessment. CVM Research Day, September

2022.

Sheley, W.C., C. Cray, **M.Q. Wilber**, **E.D. Carter**, **M.J. Gray**, and **D.L. Miller**. 2022. Electrolyte imbalances and dehydration play a key role in *Batrachochytrium salamandrivorans* chytridiomycosis. Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

Swilling, K.J., **E. Bisangwa**, J. Mansfield, C. Bitler, and **P.D. Keyser**. 2022. Effects of thatch depth on native warm-season grass establishment. American Forage and Grassland Council Annual Meeting, Wichita, KS, Jan. 9-12, 2022.

Swilling, K.J., **P.D. Keyser**, C. Bitler, and J. Mansfield. 2022. Effects of thatch depth on native warm-season grass establishment. 12th Eastern Native Grass Symposium. Louisville, KY, Oct. 4-6.

Tompros, A., D. Malagon, **E.D. Carter**, A.D. Dean, **M.Q. Wilber**, A. Fenton, and **M.J. Gray**. 2022. Management strategies to reduce invasion potential of *Batrachochytrium salamandrivorans*. Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

Towe, A., **M.J. Gray**, E. Carter, **M.Q. Wilber**, R. Ossiboff, K. Ash, M. Bohanan, B. Bajo, and **D.L. Miller**. 2022. *Batrachochytrium salamandrivorans* in the Cuban treefrog (*Osteopilus septentrionalis*). International Association for Aquatic Animal Medicine Conference, Virtual, May 20.

Towe, A., R. H. Hardman, W. Sheley, J. DeMarchi, **E. Carter**, and **D. L. Miller**. 2022. Use of implants for terbinafine administration does not prevent chytridiomycosis in greater sirens. American Association of Zoo Veterinarians Conference, Houston, TX, Sept. 17-23.

Towe, A., R.H. Hardman, W. Sheley, J. DeMarchi, **E. Carter**, and **D.L. Miller**. 2022. Use of implants for terbinafine administration to prevent chytridiomycosis in greater sirens. 70th International Wildlife Disease Association Conference, Madison, WI, July 23-29, 2022; Global Amphibian and Reptile Disease Conference, Knoxville, TN, Aug. 4-10;

ExoticsCon, Denver, CO, Aug. 14-18.

Towe, A., R. Hardman, W. Sheley, J. DeMarchi, **E. D. Carter**, **M. J. Gray**, and **D. L. Miller**. 2022. Use of implants for terbinafine administration to prevent chytridiomycosis in greater sirens. Annual Meeting of the Southeast Partners in Amphibian and Reptile Conservation.

Towe, A., S. Rajeev, **D.L. Miller**, W. Sheley, **E.D. Carter**, J. DeMarchi, M. Bletz, D. Woodhams, and **M.J. Gray**. 2022. Risk of bacteremia associated with probiotic treatment of *Batrachochytrium salamandrivorans*. 70th International Wildlife Disease Association Conference, Madison, WI, July 23-29; ExoticsCon, Denver, CO, Aug. 14-18; American Association of Zoo Veterinarians Conference, Houston, TX, Sept. 17-23; Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10; Annual Meeting of the Southeast Partners in Amphibian and Reptile Conservation.

Turner, M.A., B.L. Powell, and **C.A. Harper**. 2022. Deer forage nutrients: What's the lowest hole in the bucket? Annual Meeting Southeast Deer Study Group.

Turner, M.A., B.L. Powell, and **C.A. Harper**. 2022. Efficacy of postemergence herbicide applications followed by a preemergence application to control sericea lespedeza (*Lespedeza cuneata*) in areas managed for northern bobwhite. National Quail Symposium.

Turner, M.A., B.L. Powell, and **C.A. Harper**. 2022. Exploring nutritional relationships among deer forage classes. Annual Meeting Tennessee Chapter - The Wildlife Society.

Urban, M.P., C.T. Merolle, **E.D. Carter**, M.E. Wilson, A. Tompros, and **M.J. Gray**. 2022. Estimating the efficacy of plant-derived fungicides at inactivating *Batrachochytrium salamandrivorans* in pond water. Global Amphibian Reptile and Disease Conference, Knoxville, TN, Aug. 4-10.

Vail, K. M., **A.M. Taylor**, P. O'Neal, K. Adesso, J. Oliver, W.E. Klingeman, E.C. Bernard, and C. Ranger. 2022. A non-ALBOW infesting seasoned wood. 2022 Joint ESA, ESC, ESBC Annual Meeting, Vancouver, BC, Canada.

**Wang, S.** 2022. How to convert cellulose and hemicellulose of biomass into nanomaterials. *Frontiers in Biorefining*, Oct. 24-27, St. Simons Island, GA, USA.

**Willcox, A.S.,** D.R. Ader, M. Cordan, B. Dell, K. Fagan, H. Shapiro, M.J. Souza, M. Tate, M. Verant, and **E.V. Willcox.** 2022. Predicting Conservation Behaviors Towards Bats in the USA, Belize, Cambodia, and Uganda: the Importance of Local Context. 19th International Bat Research Conference, Austin TX, Aug. 7-12, 2022.

Woodlief, J., N. Lussier, and **C. Kwit.** 2022. Investigating the impact of years post disturbance successional forest growth on avian community composition and functional traits in a tropical rainforest. Association of Field Ornithologists annual meeting, Plymouth MA.

Xie, D., **M Li.** 2022. Effect of Lignin Molecular Weight on Structural and Thermal Properties of Synthetic Lignin-grafted-poly( $\epsilon$ -caprolactone). American Chemical Society's (ACS) Spring Meeting, March 22, 2022, Advances in Renewable Materials Session.

Yost, E.C., and **W. K. Clatterbuck.** 2022. Intensity, Frequency, and Seasonality of Prescribed Burning to Control Survival and Growth of Red Maple. *Foundational Concepts in Silviculture: Emphasis on Reforestation and Early Stand Improvement*, 2022 National Silviculture Workshop, July 12-14, Kellogg, ID. Proc. RMRS-P-80. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. p 122-124.

Zhang, K., M. Tu, **D. Harper,** S Cui, **M. Li.** 2022. Development of antimicrobial films with cinnamaldehyde stabilized by ethyl lauroyl arginate and cellulose nanocrystals. American Chemical Society's (ACS) Spring Meeting, March 22, 2022, Advances in Renewable Materials Session.

Zhang, K., **M. Li.** 2022. Sulfonated cellulose nanofibers templated metalorganic frameworks for the rapid dye removal. *Frontiers in Biorefining*, Oct. 24-27, St. Simons Island, GA,

USA.

Zhou, Z., **S. Wang, T.M. Young, N. Labbé,** and K. Rajan. 2022. Development of energy-efficient and water saving mechanical grinding method for the production of nanolignin. *Frontiers in Biorefining*, Oct. 24-27, St. Simons Island, GA, USA.

## GRANT AWARDS

**Assogba, N.P.** Developing methodology for rapid assessment of hurricane damage on primary forest industry. USDA - Forest Service. \$20,000.

**Buehler, D.A.** Monitoring and evaluating Golden-winged Warbler (*Vermivora chrysoptera*). Tennessee Wildlife Resources Agency. \$69,256.

**Buehler, D.A.** and **C.A. Harper.** Tennessee cooperative wild turkey research project, Phase 2, Tennessee Wildlife Resources Agency. \$109,852.

**Buehler, D.A.** and **C.A. Harper.** Evaluation of NRCS cover crop practices as avian wintering, stopover, and nesting habitat in Tennessee, USDA-NRCS. \$160,141.

**Buehler, D.A.** and **C.A. Harper.** Tennessee cooperative northern bobwhite project. Tennessee Wildlife Resources Agency. \$110,702.

**Clark, J.** Movements and Fates of Relocated Black Bears in Great Smoky Mountains and Shenandoah National Parks. DOI, National Park Service. \$229,141.

**Clark, J.** Monitoring the Louisiana Black Bear. State of Louisiana. \$170,200.

**Clatterbuck, W.K.** Tennessee White Oak Initiative. Tennessee Forestry Association. \$26,000.

**Clatterbuck, W.K.** National Advanced Silviculture Program - NASP 13. USDA Forest Service. \$116,080.

**Eda, S.** NDA - US Biologic - University of



Tennessee Research Foundation - Mutual Non-Disclosure Agreement. U.S. Biologic, Inc.

**Eda, S.** Rapid and specific test format for detection of chronic wasting disease prionin live animal samples. SENSIS. \$10,000.

**Eda, S.** Invention Disclosure - Electrochemical detection of isothermal nucleic acid amplification product. University of Tennessee Research Foundation.

**Engman, A.** Invasive Armored Catfish (Pterygoplichthys spp.) and Midas Cichlids (Amphilophus spp.) in Puerto Rico rivers: Evaluations of invasion extent and efficacy of a physical control method. Gulf States Marine Fisheries Commission. \$50,000.

**Engman, A.** Trophodynamics of Mercury Contamination of Smallmouth Bass Micropterus dolomieu in Great Smoky Mountains National Park. DOI - National Park Service. \$36,073.

**Gray, M.J.** Socioeconomic and Epidemiological Drivers of Pathogen Dynamics in Wildlife Trade Networks. US - National Science Foundation. \$2,755,617.

**Grove, D.** Wildlife Veterinary Cases. Tennessee Wildlife Resources Agency. \$1,000,000.

**Harper, C.A.** Effects of Fire Seasonality in Southern Yellow Pine Communities. Alabama Department of Conservation and Natural Resources. \$70,800.

**Harper, C.A.** An evaluation of plant communities in pine systems as related to season of burning. Tennessee Valley Authority. \$32,500.

**Harper, C.A.** An evaluation of nutritional carrying capacity for white-tailed across the eastern US. Private Donor. \$10,000.

**Harper, C.A.** Native plant community research. Tennessee Valley Authority. \$25,000.

**Harper, C.A.** Effects of fire seasonality in Southern yellow pine communities. Mississippi Department of Parks and Wildlife. \$73,020.

**Harper, C.A.** and **D.A. Buehler.** Tennessee

cooperative northern bobwhite project. Tennessee Wildlife Resources Agency. \$81,000.

**Harper, D.** Invention Disclosure - Gram-scale lignin-derived carbon dots by one-step chemical reaction method. University of Tennessee Research Foundation.

**Harper, D.** Groundstar LLC & UTRF - NDA - Harper - #26324. Groundstar, LLC.

**Harper, D.** Invention Disclosure - Novel manufacturing process for short natural fiber reinforced composites. University of Tennessee Research Foundation.

**Harper, D.** Prisma, VW, and UTRF - 4-parties CDA - Harper - #25944. Prisma Renewable Composites, LLC.

**Harper, D.** Groco Specialty Coatings & VW - NDA - Harper - #25281. GROCO Specialty Coatings Inc.

**Harper, D.** Invention Disclosure - Use of Carbon Quantum Dots for Gas Separation. University of Tennessee Research Foundation.

**Hodges, D.** CESU SOAP 2021 - 2026 - Leadership, Coordination and Administrative Oversight for the Southern Appalachian Mountains Cooperative Ecosystem Studies Unit. DOI - National Park Service. \$30,625.

**Hodges, D.** Master Challenge Cost Share Agreement. USDA - Forest Service.

**Jean-Philippe, S.** Knox Urban Renewal DOW Landscape Design. DOW Chemical Company. \$10,000.

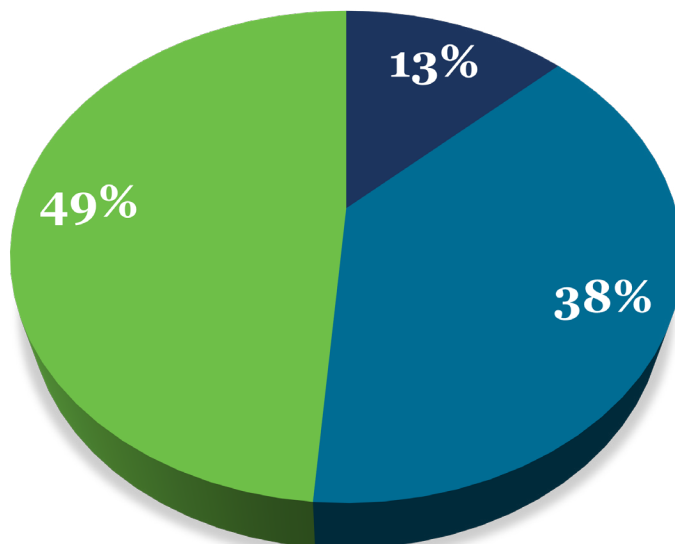
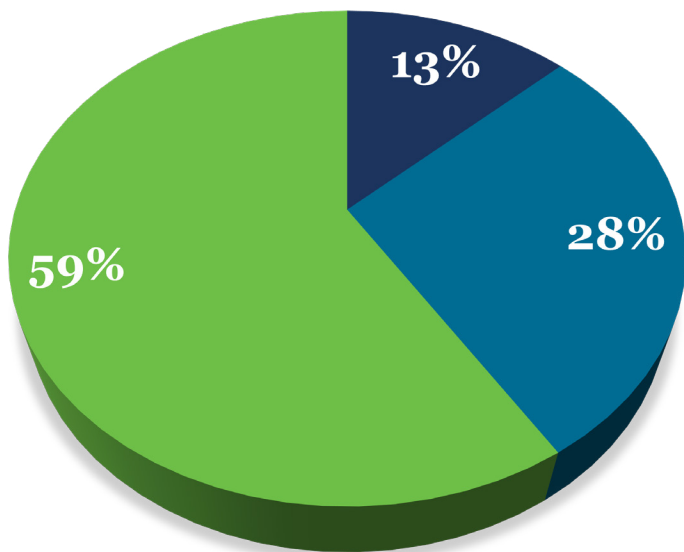
**Jean-Philippe, S.** UT Champion Tree Internship and administration to provide field students field experience and implement program. Tennessee Department of Agriculture. \$25,000.

**Jean-Philippe, S.** Cooperative Work Study Partnership. USDA - Forest Service. \$75,800.

**Keyser, P.D.** BGAD Quail Telemetry Study. Kentucky Department of Fish and Wildlife Resources. \$15,000.

2022 Research expenditures: **\$8,085,773**

2022 Extension expenditures: **\$1,915,378**



- Grants, Contracts
- State Funds
- Federal Funds

**Keyser, P.D.** Back to the Future: Improving Productivity, Sustainability, and Resilience of Eastern Grasslands. USDA - National Institute of Food and Agriculture. \$499,724.

**Keyser, P.D.** BGAD Quail Telemetry Study. Kentucky Department of Fish and Wildlife Resources. \$15,000.

**Keyser, P.D.** Improving Native Vegetation Establishment Outcomes. Stone Barns Center for Food and Agriculture. \$299,924.

**Labbé, N.** Pennsaco Technologies - NDA - Labbe - #25764. Pennsaco Technologies, LLC.

**Li, M.** Conversion of Glucose to Glucaric Acid Employing Efficient and Recyclable Catalysts. Tennessee Corn Promotion Board. \$30,000.

**Li, M.** Synthesize and Develop Smart Materials Using Nanocellulose. ORAU Ralph E. Powe Junior Faculty Enhancement Grant. \$10,000.

**Li, M.** Development of Crystalline Nanocellulose (CNC) Based Flexible Piezoelectric Materials for Energy Harvest. USDA Sun Grant SER. \$100,000.

**Li, M.** Conversion of Glucose to Glucaric Acid

Employing Efficient and Recyclable Catalysts. Tennessee Corn Promotion Board. \$30,000.

**Mercker, D.** USDA Renewable Resources Extension Act FY 2022. USDA - National Institute of Food and Agriculture. \$73,969.  
Muller, L.I. 2021. Population Estimation and Ecology of Elk in Tennessee. Tennessee Wildlife Resources Agency. \$220,176.

**Mercker, D.** USDA RREA Renewable Resources Extension Act FY 2023. USDA - National Institute of Food and Agriculture. \$15,534.

**Poudyal, N.C.** Economic implications of Chronic Wasting Disease (CWD) on Deer Hunting. USDA - National Institute of Food and Agriculture. \$499,527.

**Poudyal, N.C.** A holistic evaluation of US forest sector carbon mitigation impacts of varying climate and socioeconomic futures using the consequential life cycle assessment framework. USDA - Forest Service. \$133,250.

**Poudyal, N.C.** Exploring potential for market development of hardwood mass timber products. USDA - Forest Service. \$80,804.

**Poudyal, N.C.** An Investigation of Economics, Market, and Policy Research Opportunities in Mass Timber Industry. USDA - Forest Service. \$33,500.

**Poudyal, N.C.** Approximating the economic impact of visitor spending at TVA stream sites. US - OIG - Tennessee Valley Authority. \$15,000.

**Poudyal, N.C.** Conduct surveys of Hunting, Fishing, Boating and other wildlife-associated recreation. Tennessee Wildlife Resources Agency. \$350,000.

**Poudyal, N.C.** Social feasibility of reforestation for climate change mitigation: A regional assessment of landowner's interest, perceived barriers and opportunities. Environmental Defense Fund. \$74,988.

**Schexnayder, S.** Development and facilitation of comprehensive training and resources for rural communities. Tennessee Department of Tourist Development. \$150,000.

**Schexnayder, S.** National Visitor Use Monitoring FY 2023 - FY 2027. USDA - Forest Service. \$197,600.

**Schexnayder, S.** Iowa Off Highway Vehicle Study. Iowa Department of Natural Resources. \$40,000.

**Schlarbaum, S.** Cooperative Research on Oak Reforestation and American Chestnut Reintroduction in the Southeastern United States. USDA - Forest Service.

**Schlarbaum, S.** Domesticating Hardwoods for Carbon Sequestration and Conservation of Genetic Resources. US - OIG - Tennessee Valley Authority. \$50,000.

**Schlarbaum, S.** UTK Tree Improvement Seed Orchard FY23. US - OIG - Tennessee Valley Authority. \$15,000.

**Taylor, M.** Accessing U.S. Roundwood Equivalent Factors. USDA - Forest Service. \$155,000.

**Taylor, M.** VinTech coating test. VinTech Nano Materials. \$1,000.

**Wilber, M.Q.** BII-Implementation: Uncovering

mechanisms of amphibian resilience to global change: from molecules to landscapes. University of Pittsburgh. \$114,321.

**Wilber, M.Q., L. Muller and D. Grove.** Using fine-scaled movement data to estimate the transmission potential of SARS-COV-2 in white-tailed deer. USDA - Animal and Plant Health Inspection Service. \$347,679.

**Wilber, M.Q.** Collaborative Research: LTREB Renewal: Long-term dynamics of amphibian populations following disease-driven declines. US - National Science Federation. \$34,837.

**Willcox, A.** Enhancing Climbing Recreation and Conservation in Vertical Environments Shared by Humans and Bats Through Input from Climbers Visiting National Parks. DOI - National Park Service. \$99,131.

**Willcox, E.V.** TWRA Internship Program - Fisheries. Tennessee Wildlife Resources Agency. \$59,280.

**Willcox, E.V.** Habitat Associations and Den Site Selection of the Eastern Spotted Skunk (*Spilogale putorius*) in Tennessee. Tennessee Wildlife Resources Agency. \$49,997.

**Willcox, E.V.** Environmental Contaminant Exposure and White-Nose Syndrome Vulnerability. DOI - US Fish and Wildlife Service. \$89,229.

**Willcox, E.V.** Faunal BioBlitz at the Bridgestone Reserve at Chestnut Mountain. The Nature Conservancy. \$4,195.

**Willcox, E.V.** 2022 UT Deer Hunts on the Oak Ridge Reservation. DOE - ORNL - UT-Battelle - Oak Ridge National Laboratory. \$8,000.

**Willcox, E.V.** Enhanced Research and Monitoring for the Tri-Colored Bat in Great Smoky Mountains National Park. DOI - NPS - Great Smoky Mountains National Park. \$51,650.

**Willcox, E.V.** Understanding the Winter Hibernation and Foraging Ecology of Red Bats (*Lasiurus borealis*) and Seminole Bats (*Lasiurus seminolus*) to Inform Prescribed Fire Management. The Nature Conservancy-

Tennessee Field Office. \$15,000.

**Willcox, E.V.** Wildlife Management assistants to aid with data collection and management of game species. Tennessee Wildlife Resources Agency. \$378,900.

**Willcox, E.V.** TWRA Internship Program - Biodiversity. Tennessee Wildlife Resources Agency. \$201,225.

Yang, S. 2021. Evaluating the sustainability of mixed-hardwood forest resources in the Eastern U.S. USDA - Forest Service. \$61,973.

**Yang, S.** Analyzing and Enhancing Harvest Utilization Studies. USDA - Forest Services. \$59,995.

**Yang, S.** Exploring Enhanced Methodology for FIA's Resource Use Monitoring. USDA - Forest Service. \$85,000.

**Yang, S.** Effect of Estimated Tree Height on Prediction Accuracy of Stem Taper for Loblolly Pine. Virginia Tech. \$30,000.

**Yang, S.** USDA - Forest Service - Data MTA - Yang - #26156. USDA - Forest Service.

**Yang, S.** USDA FS Southern Station - Incoming Data MTA - Yang - #25970. USDA - Forest Service.

**Yang, S., N.P. Assogba.** Modeling of Forestry Practices for the Family Forest Carbon Program. The Nature Conservancy. \$116,673.

**Young, T.M.** Quality Management and Systems Training Program - Continuous Improvement through Process Analytics and Statistical Process Control. Bush Brothers and Company. \$58,687.

**Young, T.M.** Data Science and Predictive Analytics Training Using A New Data Fusion System. Huber Engineered Woods. \$27,657.

# Awards

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*From left: Melody Mount, Kyle Hanners,  
Matt Barnicki and Jared Beeler*



## STUDENTS

### UT Forestry Club

*Outstanding Sportmanship Award, 63rd Association of Southern Forestry Clubs Conclave*

### UT Forestry Club

*Society of American Foresters National Convention Quiz Bowl Champions*

### UT Forestry Club

*Third Place in Outstanding Society of American Foresters Student Chapter*

### Ash Cable

*Best Student Presentation, Tennessee Bat Working Group*

### Lindsey Phillips

*Best Study Presentation, The Wildlife Society Tennessee Chapter annual meeting*

*Outstanding Student Poster Award, Southeast Deer Study Group Annual Conference*



### Joe Quehl

*Second Place for Best Study Presentation, The Wildlife Society Tennessee Chapter annual meeting*

### Ashlyn Smith

*Best Fish ID, 2022 Southeastern Bat Diversity Network Annual Meeting*

### Mark A. Turner

*2022 Outstanding Student Presentation Award, 45th Annual Conference of the Tennessee Chapter - The Wildlife Society*

## FACULTY

### Stacy Clark

*Partnership Award, 2022 Southern Research Station Director's Awards, USDA Forest Service*

### Chris Graves

*J.E. Moss Award in Teaching*

### Matt Gray

*Outstanding Wildlife Technical Paper, Southeastern Association of Fish and Wildlife Agencies*

### Don Hodges

*Forest Resources Award, Tennessee Forestry Association*

### Sharon Jean-Philippe

*Member Spotlight!, Society of American Foresters*

### Sharon Jean-Philippe

*SAF Celebrates Women's History Month, Society of American Foresters*

### Sharon Jean-Philippe

*Women in Arboriculture Series for the International Society of Arboriculture*

### Sharon Jean-Philippe

*Workforce Opportunities for Increasing Recruitment, Retention and Leadership, 2022 Women's Forest Congress*

### Charles Kwit

*Baker Experts Program Fellow, Howard H. Baker Jr. Center for Public Policy*

### Charles Kwit

*Smith Global Leadership Fellow, UT Institute of Agriculture Smith Center*

### Mi Li

*Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities*

### Mi Li

*Faculty Research Award, UT Knoxville*

### Debra Miller

*Excellence in Graduate Mentoring, Boehringer Ingelheim*

### Lisa Muller

*W.S. Overton Faculty Award of Merit, UT Institute of Agriculture*

### Neelam Poudyal

*Fulbright U.S. Scholar Award, U.S. Department of State*

### Scott Schlarbaum

*Partnership Award, 2022 Southern Research Station Director's Awards, USDA Forest Service*

### Adam Taylor

*Fulbright Scholar, Council for International Exchange of Scholars*

### Mark Wilber

*Graduate Student Professor of the Year, UT Graduate Student Committee*

### Mark Wilber

*Graduate Student Research Mentor of the Year, UT Graduate Student Committee*

### Emma Willcox

*B. Ray Thompson Sr. Outstanding Faculty Performance Award, UT Institute of Agriculture*

## STAFF

### Alyssa Merka

*Tennessee Urban and Community Forestry Media Award, Tennessee Urban Forestry Council*



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