

TAYLOR CHAIR

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MISSISSIPPI STATE UNIVERSITY™
COLLEGE OF FOREST RESOURCES





TAYLOR CHAIR

2023 REPORT HIGHLIGHTS

AS A LEADER OF THE MISSISSIPPI STATE UNIVERSITY Deer Ecology and Management Laboratory, the Taylor Chair provides oversight and direction to the lab's efforts to solve contemporary problems facing natural resource agencies, managers, and private landowners.

Importantly, MSU Deer Lab members present quality research results in a variety of forms and outlets that ensure managers may avail themselves of the new information and implement the most effective management actions.

The following is a summary of activities by Steve Demarais, Taylor Chair in Applied Big Game Research and Instruction, in cooperation with faculty and graduate students within the MSU Deer Lab.

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Yogi Berra got it right



YOGI BERRA IS FAMOUS FOR HIS exceptional baseball skills as well as his many "Yogi-isms." His statement, "It ain't over till it's over" applies to me. I'm winding down a 42-year career as a university researcher and teacher and looking forward to expanding other personal priorities after formally retiring June 30. However, I hope to continue participating in MSU's research and outreach as a professor emeritus in wildlife, fisheries and aquaculture. "Professor emeritus" is jokingly referred to as an opportunity to keep working without getting paid, but, in reality, it offers a chance to continue doing what we love without the pressure to think about it 24/7. I look forward to staying connected to the MSU Deer Lab and providing my input to several long-term research and outreach projects, in the spirit of lifelong learning.

Yogi was right when he said, "You can observe a lot by watching." Our Taylor-sponsored research team at the MSU Deer Lab has completed a lot of "watching" and will continue our commitment to impactful research. The arrival of Chronic Wasting Disease to Mississippi in 2018 was a pivotal event. We chose to serve the needs of many state wildlife agencies by developing an early-warning method to

find the disease on the landscape before traditional hunter-harvested samples allow, as described by research associate Miranda Huang. She has also led our effort to determine the relative disease risk of supplemental feeding, food plots, and mast trees within CWD Management Zones and develop fact-based educational materials for social media. My last graduate student advisee, Luke Resop, explored how timing and method affect promotion of desirable forbs and the elimination of undesirable hardwoods in managed pine stands, highlighting work by some of our undergraduate researchers. Luke is staying on for a doctoral dissertation that will compare the return on investment of traditional wildlife food plots and those managed using regenerative agricultural methods, with Bronson Strickland as his primary advisor.

Yogi's quote "Never answer an anonymous letter" inspires us to continue educational outreach based on sound biological principles. We've further expanded our efforts to educate our audience at home and beyond via social media and podcasts under the leadership of Bronson Strickland and management of Luke Resop. Our Deer University podcast is heading toward the impressive metric of one million total downloads. With 73,400 total Facebook and Instagram



SOCIAL MEDIA OUTREACH AT A GLANCE

#2

Deer University podcast all time ranking in the science and nature category

845,000

Total downloads of Deer University podcasts from 76 countries, including the U.S.

6.6 Million

Users reached on Facebook

358,000

Users reached on Instagram

followers and 14,600 YouTube channel subscribers, we are having a significant impact in adult educational outreach.

I have been richly blessed to work with great colleagues and capable, motivated graduate students who have helped put our program on the map. Eight of our graduate students have won the prestigious Best Oral Presentation Award 10 out of the 28 times it has been presented at the premier white-tailed deer conference in the U.S. I was honored to receive The Wildlife Society's Caesar Kleberg Award for Applied Research in 2021, the Southeastern Conference's Faculty Achievement Award for Mississippi State University in 2021, and the National Deer Association's Joe Hamilton Lifetime Achievement Award in 2022.

Yogi's quote "I always thought that record would stand until it was broken" applies to the various recognitions that

I have helped earn here at our wonderful university. It has been a great honor to finish my career as the Pat and Phyllis Taylor Chair in Applied Big Game Research and Instruction. As I head into retirement with a sense of accomplishment and making a difference, I am confident that the next Taylor Chair will continue the MSU tradition of "taking care of what matters" for hunters, landowners, and regulatory agencies.

Dr. Steve Demarais

Patrick and Phyllis Taylor
Chair in Applied Big Game
Research and Instruction

MIRANDA HUANG

Disease Educational Videos Provide Accurate Information on Social Media

Miranda Huang, Steve Demarais, Bronson Strickland

SOCIAL MEDIA POSTS sometimes prioritize sensationalism over factual information. Our team at the MSU Deer Lab set out to create a series of public informational videos on Chronic Wasting Disease (CWD) that would be impactful and—most importantly—grounded in accurate biological information. The series of 15 educational videos was posted to our MSU Deer Lab TV YouTube channel in 2023.

To ensure our videos represented science, our text and

story boards included input from 14 subject expert collaborators from 11 state and federal agencies and three universities. Twelve of the videos are animated and describe the main biological, social, and regulatory aspects of CWD, including what it is, how it spreads, what hunters can do to fight CWD, and why state agencies choose to ban attractants. Three videos include testimonials from hunters, landowners, biologists, and representatives of meat processors and veterinarians with first-hand experiences dealing with CWD issues.

The 15 videos have over 39,000 views and are shared on at least six state wildlife agency websites: Mississippi, Alabama, Louisiana, Tennessee, Washington, and Wyoming. The most popular video, “Is it safe to eat CWD-positive deer?” has 12,000 views on YouTube. Our videos won't eliminate misinformation, but we worked hard to make the biological facts available to everyone, from our backyard to anywhere. 🦌



CWD Series Episode 12 - Is it safe to eat CWD - positive deer?

MSU Deer Lab TV



White-tailed Deer Scrape Behavior-Demographics and Timing

Miranda Huang, Steve Demarais, Bronson Strickland, and Allan Houston

SCRAPING IS A UNIQUE BREEDING SEASON sign-post behavior by white-tailed deer. At scrapes, deer paw out a bare patch of soil to urinate in and chew an overhanging "licking branch." The visual cue combined with scent deposits from urine and gland secretions communicate presence during the breeding season.

We studied scraping behavior to better understand the social dynamics involved in this behavior. Sampling 105 scrapes using trail cameras from October 2021 to

January 2022 allowed us to detect over 3,000 scrape interactions by 218 different bucks, as well as does and fawns.

Our results showed that bucks performed 73% of scrape interactions, followed by does (23%) and fawns (4%). Deer experts estimated the age class of each of the 218 uniquely identified bucks. The age class that interacted with scrapes most frequently were 2- and 3-year-olds (59%), followed by yearling bucks (32%) and bucks that were 4 years and older (9%); the latter lower value could be related to their lower prevalence in the study area.

Most scrape interactions occurred overnight (67%) with only 33% of interactions happening during daylight. This trend differed by sex and age class. Fawns had the highest percentage of daytime visits (46%), and older bucks had the lowest percentage of daytime visits (16%). 🦌



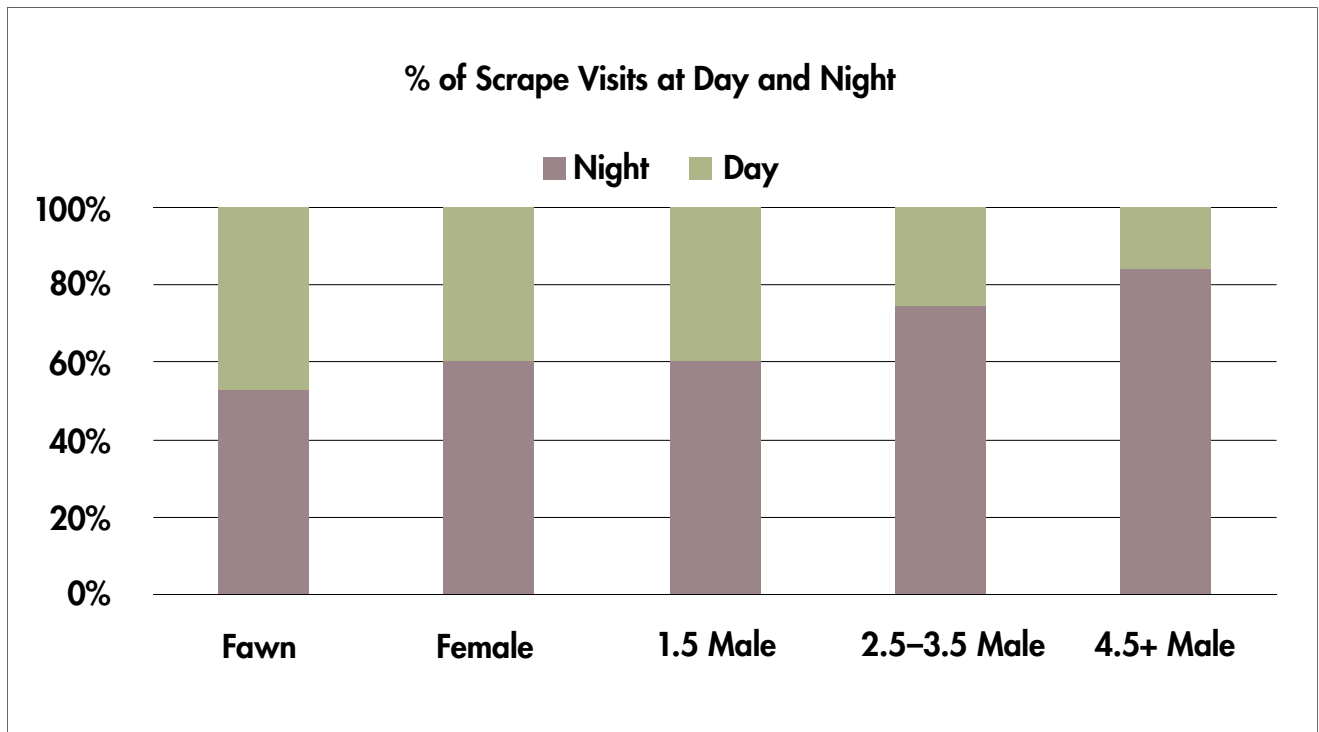


Photo by Paul T. Brown

Behavioral Scrapes as a CWD 'Canary in the Coal Mine'

Miranda Huang, Steve Demarais, Alejandro Banda, Bronson Strickland, Allan Houston, and Stuart Lichtenberg

CHRONIC WASTING DISEASE (CWD) IN A deer population has been likened to cancer, where early detection increases the chance of successfully combating the disease. Traditional identification relies heavily on hunters submitting samples from harvested deer, but this approach typically finds the disease only after it is entrenched in the population. Environmental sampling holds promise to find the disease on the landscape much earlier than the traditional method.

In response to this deadly disease, the MSU Deer Lab led an environmental sampling study. Deer leave urine and saliva at scrapes as part of their

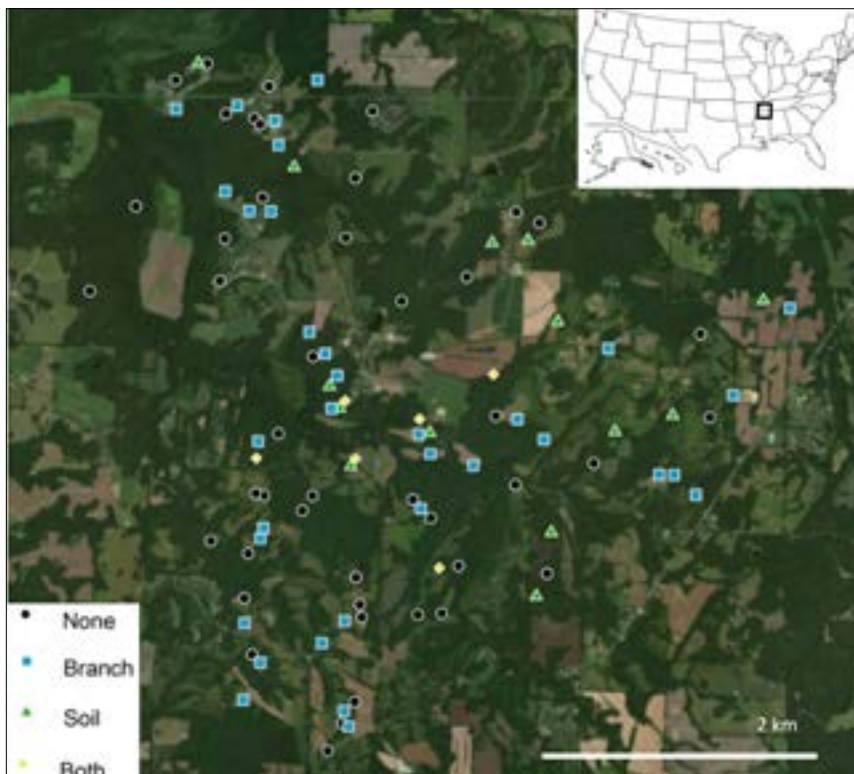
social scent-post marking. Both saliva and urine can contain prions if the deer is infected with CWD. For this reason, we hypothesized that scrapes could be used to detect CWD on the landscape earlier than relying on hunter-submitted samples from harvested deer. We received funding from USDA-APHIS-Wildlife Services to test our hypothesis.

We chose Ames Research and Education Center in the heart of a Tennessee CWD zone for our initial study. This property has experienced nearly 50% CWD prevalence recently, which made it an ideal location for a "proof of concept."

We sampled 100 scrapes across nearly 12,000 acres, collecting 1-2 inches of the licking branch tip and about two cups of soil from the bare patch on the ground. The samples were tested by our partners at the MSU College of Veterinary Medicine's Veterinarian Research and Diagnostic Lab to detect the presence of CWD prions using real-time quaking-induced conversion (RT-QuIC).

The results of our research proved the concept by finding evidence of prions in 54 of 100 scrapes. Prions were recovered from 20% of the scrape soil and 40% of scrape licking branches at the test site. Of equal importance, we discovered prions in portions of Mississippi's northern CWD Management Zone, as far as ten miles from the nearest positive hunter-harvested sample, showing that scrape sampling can serve as an early warning sentinel on the landscape. Subsequently, we found positive scrapes as far as 19 miles from the nearest hunter-harvested sample in Mississippi's southern CWD Management Zone.

Given our initial success in detecting CWD prions in scrape samples, we are expanding the project to better understand what scrapes can tell us about CWD





dynamics and if scrapes can aid materially in CWD surveillance. This year, we are collaborating with nine state agencies from across the Southeast, Midwest, and mid-Atlantic regions in cooperation with the University

of Minnesota's Center for Prion Research and Outreach. This partnership will allow us to confront CWD on a larger scale and develop management solutions for our collective future. 🦌

Are Deer Feeders a Concern in CWD Management?

*Miranda Huang,
Steve Demarais, Marc
Schwablander, and
Bronson Strickland*

ONE OF THE MOST COMMON strategies in management zones that have found Chronic Wasting Disease (CWD) among deer populations is to ban supplemental feeding. The rationale is that feeding unnaturally congregates deer and increases the risk of disease spread. Until recently, the technology has not existed to test for environmental contamination of feeders with CWD prions. Research partners at the University of Minnesota developed a method to detect the presence of CWD in the environment. Using this newly developed environmental indicator, our MSU Deer Lab team investigated whether feeders can become contaminated with CWD-causing prions. We also wanted to compare the relative risk of exposure to other deer at feeders and in agronomic food plots.

Twelve new gravity feeders were established in the northern CWD zone of Mississippi during the fall of 2022. Six feeders were set up normally and filled with a mix of corn and pelleted feed (“deer feeders”). Three feeders were filled and enclosed in fencing to exclude deer, but with holes allowing access to raccoons and other small wildlife (“raccoon feeders”). The last three feeders served as controls, so were

fully fenced to exclude all wildlife and not filled with any feed. We sampled these feeders for prion contamination about every six weeks until March 2023.

All deer and raccoon feeders showed statistically significant prion detection after 4 months post setup, with some as early as six weeks afterward, proving that supplemental feeding could contribute to the spread of the disease agent. The finding of prions on the raccoon feeders was concerning, so we obtained 10 raccoons from a hunter in the nearby area. Four of the 10 raccoons had prions on their paws, but none had internal signs of the disease. This suggests raccoons physically transfer the disease from the environment to the feeder but are likely not susceptible to the disease.

We compared relative disease risk at the six deer feeders with six food plots using trail cameras sampling a 24-square-yard area. Deer visited feeders three times more frequently than they visited food plots. Direct deer-to-deer contacts, where two deer physically touch each other, occurred four times more frequently at feeders than in food plots.

This project proves that supplemental feeding could increase the rate of disease spread due to the accumulation of the disease agent on the feeders and increased rates of contact between animals at the feeders compared to food plots. We conclude that supplemental feeding bans are an appropriate regulatory consideration for state wildlife agencies. As CWD presents an ongoing challenge, the MSU Deer Lab is dedicated to conducting research to discover solutions. 🐾





LUKE RESOP



Impacts of Firing Technique and Season on Midstory Hardwoods and Understory Plants

Luke Resop, Steve Demarais, Bronson Strickland, Ray Iglay, Marcus Lashley, and John Gruchy

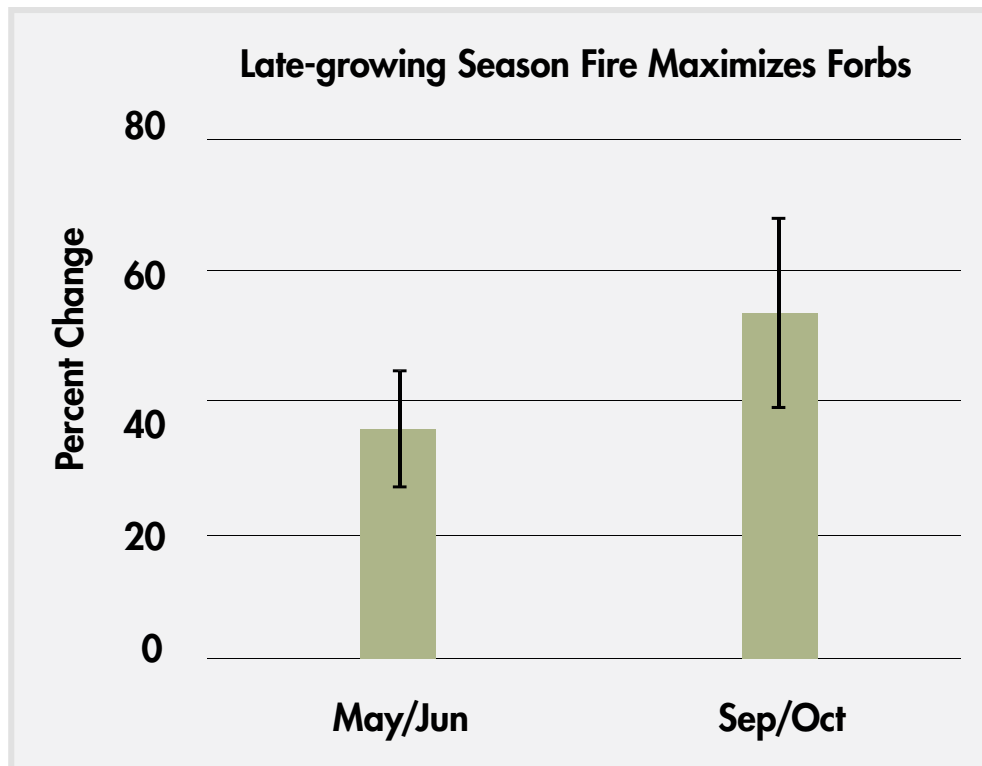
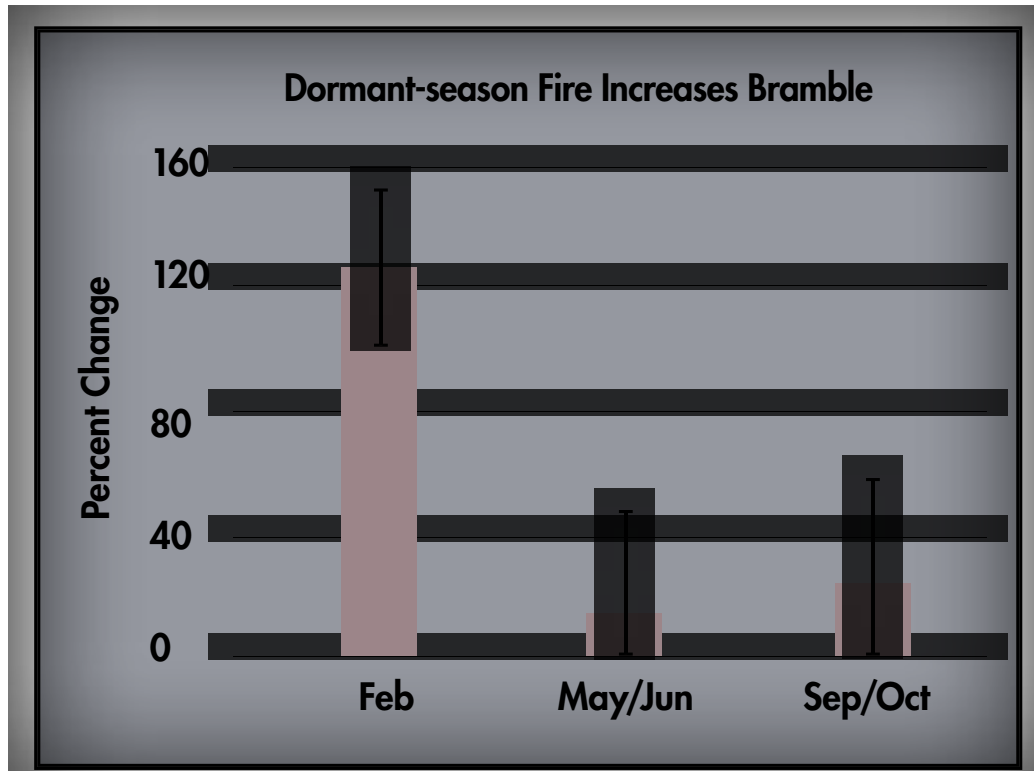
LUKE RESOP GREW UP IN THE Blue Ridge Mountains of southern Pennsylvania, where he kindled an interest for the outdoors at a young age. He didn't know it at the time, but his interest matured into a passion during his time as an undergraduate at Virginia Tech studying wildlife conservation. After finishing his Bachelor of Science, he continued his education and

gained real-world experience in the MSU Deer Lab. Under the tutelage of Drs. Steve Demarais, Bronson Strickland, and Marcus Lashley, he explored the effects of prescribed fire on plant communities with a focus on deer forage and cover production. Resop successfully completed his master's degree in June 2023 and is now working on his doctorate. Under Strickland, Demarais, and Dr. Craig Harper, University of Tennessee.

The results from Resop's research demonstrate the importance of burning in different seasons to maximize deer habitat. Although deer are generalists and do well in a variety of cover types and plant communities, they benefit greatly from structural and compositional diversity. For example, Resop's work demonstrates that dormant season fire increases bramble coverage and promotes resprouting of woody plants. Such responses can provide excellent hiding cover and foraging opportunities for deer. In contrast, early growing season fire

maximizes mortality of midstory hardwoods, which is beneficial when attempting to promote deer forage plants in the understory and controlling undesirable hardwoods in managed pine stands. Lastly, late growing season fire maximizes coverage of understory forbs—generally the highest-quality deer forage plants—relative to the other fire seasons. His results show that varying timing and return interval of prescribed fire across a property will create forage and cover of value to white-tailed deer.

In addition to his research, Resop manages the MSU Deer Lab's social media platforms, where his objective is to disseminate the results of the lab's research to hunters and land managers at home and beyond. This experience is a great opportunity for Resop to engage with the public and extend the impact of the Deer Lab far beyond Mississippi, as the Lab has a global social media presence. 🐾



White-tailed deer nutritional management in working forests of the southeastern U.S.

Luke Resop, Steve Demarais, and Bronson Strickland


UNDERSTANDING HOW LAND can be managed to meet the nutritional requirements of wildlife is a critical issue across North America. To inform wildlife students and professionals in the Southeast, the MSU Deer Lab team recently authored a book chapter as part of The Wildlife Society's textbook series for wildlife professionals. The forthcoming book titled "Nutritional Ecology of Wild Mammalian Herbivores," is edited by John Cook and others. Our chapter is titled "White-tailed Deer Nutritional Management in Working Forests of the Southeastern U.S."

In the Southeast, loblolly pine timber production and deer habitat management are often seen as competing objectives. However, our chapter describes how careful planning and implementation can optimize these seemingly dichotomous land uses.

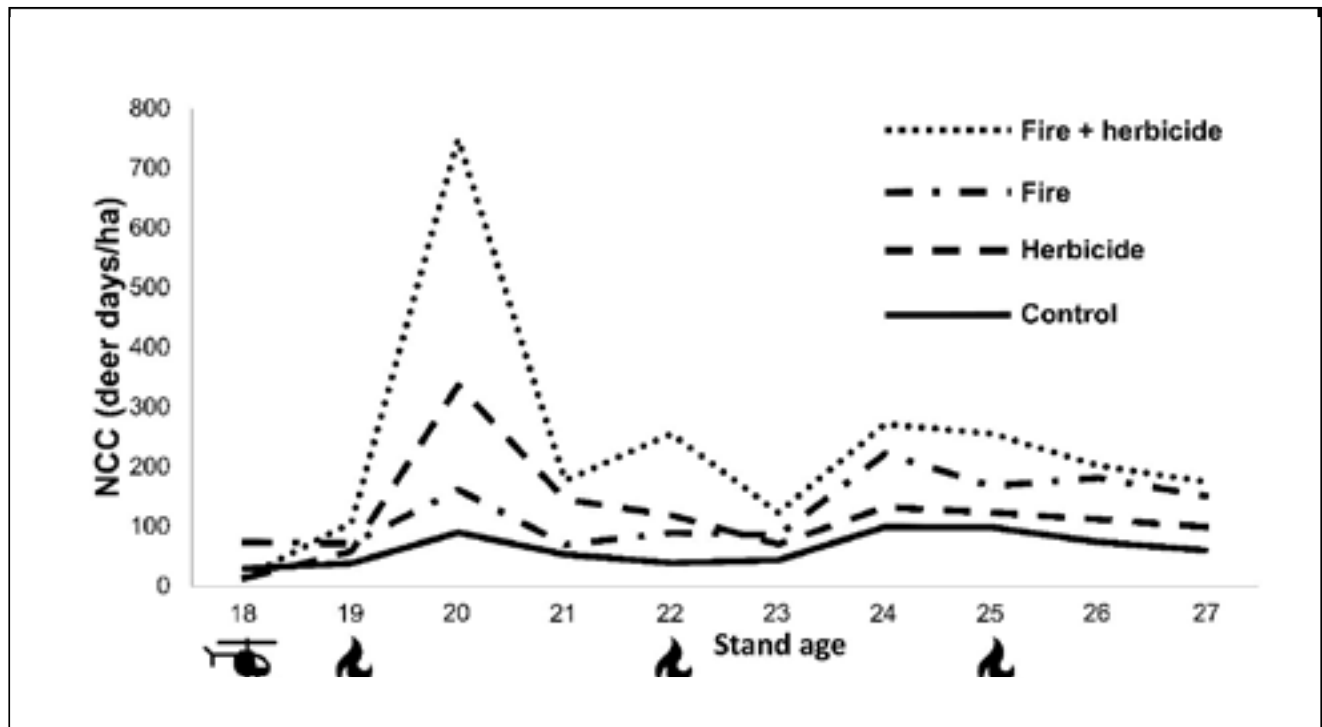
The trajectory of a timber stand and its future value to deer are molded when planting loblolly pine trees. Broadcast herbicide applications are often used to control vegetation that competes with seedlings. Rather than broadcasting herbicide over the whole site, a banded application—sprayed over rows of trees and not the inter-row space—is a first-step technique a manager can use to promote seedling establishment and growth while allowing deer forage plants to colonize between rows of trees.

About 5-10 years after planting, the pines shade out deer forage plants. Thinning operations typically occur around years 15-18 of the stand's life cycle and often create an ephemeral flush of deer forage in the understory. To promote better foraging conditions for deer, managers can thin to a lower residual basal area and use selective herbicide applications and prescribed

fire to improve and maintain desirable deer forage plants in the understory.

Sometimes, pine stands may get a single thinning during their rotation. However, land managers wishing to optimize forest products and deer forage can implement a second thinning. In some cases, this can put timber products into higher-value product categories and further extend the value of the stand for deer. Second-thinned stands have fewer but relatively larger trees and abundant sunlight on the forest floor to stimulate understory growth. Such stands can be maintained with fire and selective herbicide applications for many years. They can continue to provide high-quality forage and cover for deer and other wildlife until the final harvest, after which the stand is replanted and the rotation starts over. 





This figure demonstrates the synergistic effect of fire and selective herbicide application on deer forage production in once-thinned loblolly pine stands. On the X-axis, the helicopter icon indicates a selective herbicide application, and the flame icons

indicate successive prescribed fires to maintain high-quality deer forage in the understory. The Y-axis shows nutritional carrying capacity, which is a measure of relative forage abundance and quality produced by the various treatments.

Our contribution to this book demonstrates the MSU Deer Lab's commitment to research, education, and providing evidence-based solutions for industry professionals.

Comparison of Regenerative and Conventional Techniques for Wildlife Management

Luke Resop, Bronson Strickland, Craig Harper, and Steve Demarais



IN THE MSU DEER LAB, WE are training tomorrow's industry leaders. Our graduate students are conducting research to address real-world problems in land and wildlife management.

Doctoral student Luke Resop focuses his research on assessing the value of regenerative management practices in food plots and old fields. Resop is evaluating the use of regenerative techniques for wildlife management on nine study sites across Mississippi, Tennessee, and Missouri.

In recent years, land managers and hunters have incorporated regenerative practices into habitat management plans with increasing frequency. Many claim these practices increase soil health, plant nutrient density, and deer selectivity compared to the same metrics in conventionally managed systems. The literature supports some claims regarding soil health. And it

indicates that regenerative practices can reduce tractor time and fuel consumption, decrease annual weeds, and equal or exceed yields of conventional systems. However, claims regarding nutrient density have little scientific foundation, and references to deer selectivity and overall wildlife value lack empirical verification.

For the purposes of his project, conventional techniques include tillage, soil amendment via liming and fertilization according to soil tests, and herbicide applications. Regenerative treatments exclude the aforementioned practices and include diverse species blends and cover crops to optimize soil health. The project also incorporates old fields managed with fire and disking to evaluate how these common management practices influence soil, plants, and wildlife responses in early successional plant communities.

Relative to conventional management, our objectives are to determine if regenerative techniques:

1. Improve soil health,
2. Increase nutrient density and biomass of selected deer forages,
3. Increase deer selection of forage plants,
4. Increase invertebrate abundance, and
5. Are a more cost-effective management approach.

Resop is wrapping up the first year of the project and will continue to implement and monitor treatments for up to three years. If our hypothesis regarding the efficacy of regenerative techniques for wildlife management proves true, we will make recommendations to land managers and hunters to adopt these practices to improve habitat for a diversity of species and save time and money. 🐾



UNDERGRADUATE RESEARCH SCHOLARS

THE MSU DEER LAB IS invested in training undergraduates to be effective wildlife biologists and researchers. Undergraduate research projects are one way we develop students, guiding them through experimental design, project implementation, data collection and analysis, and manuscript publication. Undergraduates Harris Groberg, Ray "Ret" Turner, and Adele Taber, under the direction of doctoral student Luke Resop, are comparing hinge cuts and mineral stumps as a spot-treatment for deer forage production.

Mineral stumps are created by cutting down select tree species at about ankle height. The resprouts have greater crude protein and mineral content than the vegetation previously in the tree's canopy and are highly selected forages by deer.

Similarly, hinge cuts are created by cutting about 60% of the way through a tree between knee and chest height and "hinging" the upper portion of the tree onto the ground. By retaining the vascular connection between the roots and the canopy, hinge cut trees stay alive and provide horizontal screening cover and forage for deer. Hinge cutting is a wildly popular technique of deer habitat managers

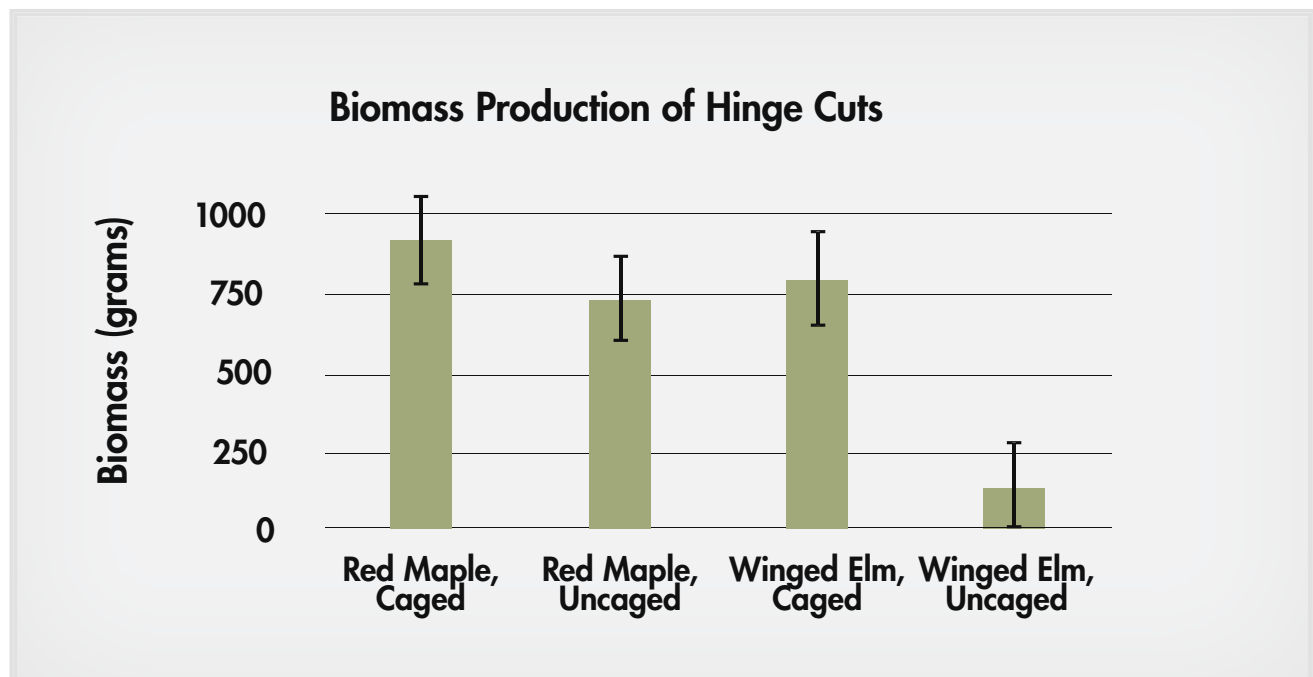
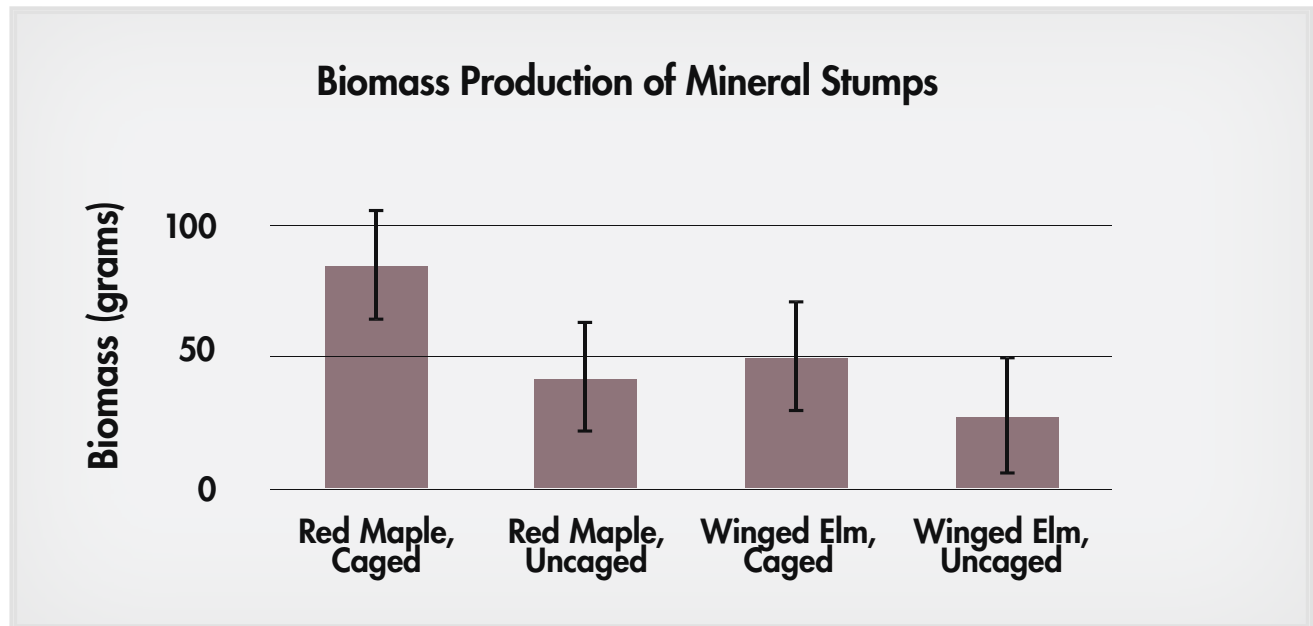


across the country, but no data exist to indicate optimal cut timing, expected biomass production, or deer use.

The MSU Deer Lab documented the fundamental value of mineral stumps in a previous project, but optimal cut timing, biomass production, and deer selection metrics warranted further research.

For this project, undergraduate researchers cut down hundreds of trees and constructed exclusion fences around half to monitor deer use during 2022-2024. Treatment cuts take place at two-month intervals so we can evaluate how cut timing influences survival, biomass production, and deer use.

The undergraduates conducted their first round of sampling during the summer of 2023. Although this is the first year of a multi-year project, preliminary results indicate that red maple mineral stumps produce about two times as much biomass as winged elm mineral stumps. Deer, however, don't seem to prefer mineral stumps of



one species over the other. Hinge cuts provide about ten times the biomass of mineral stumps, but preliminary data suggest deer much prefer to browse hinge cut winged elms relative to hinge cut red maples. The important nutritional results are pending laboratory analyses.

The MSU Deer Lab's undergraduate researchers will continue implementing treatments through summer 2024, analyze data as it is collected, and soon begin drafting manuscripts for publication in a peer-reviewed journal. 🐾

DR. STEVE DEMARAIS

CO-DIRECTOR
DEER ECOLOGY
AND MANAGEMENT



DR. STEVE DEMARAIS IS THE TAYLOR Chair in Applied Big Game Research & Instruction and the Dale H. Arner Professor of Wildlife Ecology & Management. Demarais has spent 24 years at Mississippi State University conducting white-tailed deer research. Prior to joining MSU, Demarais spent 15 years as a big game specialist in Texas. His research includes genetics in deer management, harvest strategies with antler restrictions, aging and scoring with technology, recreational hunting, and buck movement behaviors. He is co-director of the MSU Deer Laboratory and a Fellow in The Wildlife Society.



DR. BRONSON STRICKLAND

CO-DIRECTOR
DEER POPULATION
MODELING

DR. BRONSON STRICKLAND IS THE St. John Family Professor of Wildlife Management and an extension wildlife specialist. He is a professional member of the Boone and Crockett Club and a Certified Wildlife Biologist. Strickland's research focuses on deer herd management, habitat improvement, deer movements, and nutrition. As co-director of the MSU Deer Lab, Strickland has led communication efforts through podcast, videos, social media, and mobile apps to share the lab's knowledge with deer hunters and other members of the public.

2023 IN REVIEW



Dr. Harry Jacobson (center), emeritus wildlife, fisheries and aquaculture professor and "father" of the MSU Deer Lab, is flanked by a cadre of Mississippi State students, alumni, and professionals at the Southeast Deer Study Group meeting in West Virginia.



Luke Resop (center), doctoral student, won first place in the student presentation and the student poster competition at the Southeast Deer Study Group annual meeting. Resop is joined by MSU Deer Lab co-directors Dr. Bronson Strickland (left) and Dr. Steve Demarais (right).



Our students enjoyed meeting with landowners and hunters at the Neshoba National Deer Association meeting.

2023 SOCIAL MEDIA STATISTICS



@msu.deerlab

FACEBOOK

56,000 followers (lifetime)

6.6M people reached

133,000 video views



@msudeerlab

INSTAGRAM

14,300 followers (lifetime)

358,000 impressions

49,000 video views



@MSUDeerLab

X

1,279 followers (lifetime)

62,298 impressions

4,766 engagements



MSU Deer Lab TV

YOUTUBE

14,600 subscribers (lifetime)

592,000 video views

44,300 video watch hours

6.5M impressions



DEER UNIVERSITY has been downloaded **845,000** times since it began. Listeners were concentrated in the eastern U.S., but spanned all states and 76 other countries.

845,000

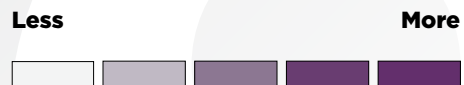
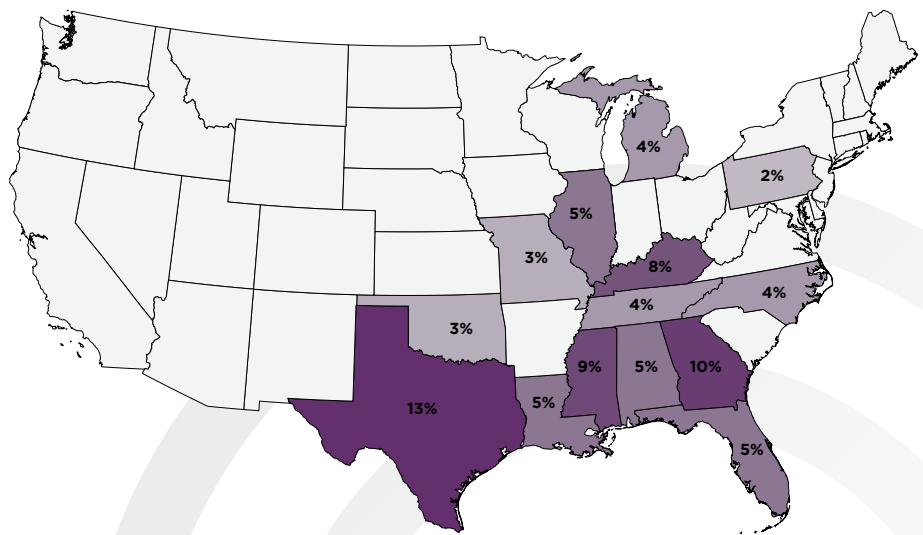
DOWNLOADS

50

STATES

76

COUNTRIES



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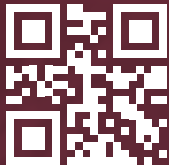



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