SEDSG 2023
LOUISIANA
46th Annual Meeting

February 26-28, 2023
Baton Rouge, Louisiana

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

LOUISIANA WILDLIFE & FISHERIES FOUNDATION
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2023
SOUTHEAST DEER STUDY GROUP

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SEDSG 2023
LOUISIANA

MANAGING DEER WHEN NORMAL ISN'T NORMAL ANYMORE

46TH ANNUAL MEETING OF THE SOUTHEAST DEER STUDY GROUP

FEBRUARY 26-28, 2023 | BATON ROUGE, LA

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WELCOME / ACKNOWLEDGEMENTS

The Louisiana Dept. of Wildlife and Fisheries and Louisiana Wildlife and Fisheries Foundation welcomes you to the 46th Annual Meeting of the Southeast Deer Study Group.

We thank the National Deer Association, who hosted last year's meeting, the Southeast Deer Study Group, and all of the sponsors and contributors for their generous contribution to the 2023 meeting. A complete list of sponsors and contributors is listed inside the cover.

COMMITTEES

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46th ANNUAL MEETING OF THE SOUTHEAST DEER STUDY GROUP AGENDA

Hosted by the Louisiana Department of Wildlife & Fisheries & the Louisiana Wildlife and Fisheries Foundation

February 26-28, 2023 | Baton Rouge, Louisiana

Managing Deer When Normal Isn't Normal Anymore

Time		Location
	SUNDAY, FEBRUARY 26	
12:00 - 6:00 PM	Conference Registration Desk Open	Premier Hall
12:00 - 6:00 PM	Exhibitor Set-Up	Premier Hall
12:00 - 6:00 PM	Poster Set-up	Cypress II
1:00 - 3:00 PM	Southeast Deer Partnership Committee Meeting	Cypress I
3:00 - 5:00 PM	SEDSG Technical Committee Meeting	Cypress I
6:00 - 9:00 PM	Welcome Social & Crawfish Boil (drinks and appetizers)	Premier I
	MONDAY, FEBRUARY 27	
7:00 - 10:05 AM	Conference Registration Desk Open	Premier Hall
8:00 - 8:15 AM	Welcome and Introduction	Premier II
8:15 - 9:45 AM	Plenary Session	Premier II
9:45 - 10:05 AM	Break	Premier Hall
10:05 - 11:45 AM	Technical Session 1	Premier II
11:45 AM - 1:20 PM	Lunch (on your own)	
1:20 - 3:00 PM	Technical Session 2	Premier II
3:00 - 3:20 PM	Break	Premier Hall
3:20 - 5:00 PM	Technical Session 3	Premier II
5:00 - 7:00 PM	Dinner (on your own)	
7:00 - 8:00 PM	Shoot From The Hip	Premier II
	TUESDAY, FEBRUARY 28	
8:00 - 9:40 AM	Technical Session 4	Premier II
9:40 - 10:00 AM	Break	Premier Hall
10:00 - 11:40 AM	Technical Session 5	Premier II
11:40 AM - 1:20 PM	Lunch (on your own)	
1:20 - 3:00 PM	Technical Session 6	Premier II
3:00 - 3:20 PM	Break	Premier Hall
3:20 - 5:00 PM	Technical Session 7	Premier II
5:00 - 6:00 PM	SEDSG Technical Committee Business Meeting	Cypress I
6:00 - 7:00 PM	Pre-Awards Dinner Social	Premier Hall
7:00 - 8:30 PM	SEDSG Awards Dinner	Premier I
	WEDNESDAY, MARCH 1	
Before 10:00 AM	Departure	

SOUTHEAST DEER STUDY GROUP

The Southeast Deer Study Group meets annually for researchers and managers to share the latest information on the most important wildlife species in North America. These meetings provide an important forum for the sharing of research results, management strategies, and discussions that can facilitate the timely identification of, and solutions to, problems relative to the management of white-tailed deer.

The Annual Southeast Deer Study Group Meeting is hosted with the support of the directors of the Southeastern Association of Fish and Wildlife Agencies and also the directors of Delaware, Maryland, Missouri, and Texas. The first meeting was held as a joint Northeast – Southeast Meeting in Virginia in 1977. Appreciating the economic, aesthetic, and biological value of the white-tailed deer in the southeastern United States, the desirability of conducting an annual Southeast Deer Study Group Meeting was recognized and urged by the participants. Since February 1979, these meetings have been held annually for the purpose of bringing together managers, researchers, administrators, and users of this vitally important renewable natural resource. A searchable list of all presentation abstracts from 1977 to present is available at *SEDSG.com*, as well as a list of the meetings, their locations, and themes.

The Southeast Deer Study Group was formed as a subcommittee of the Forest Game Committee of the Southeastern Section of The Wildlife Society. The Deer Subcommittee was given full commit- tee status in November 1985 at the Southeastern Section of The Wildlife Society's annual business meeting. States participating regularly in the Southeast Deer Study Group include Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Qualifying Statement

Abstracts in the proceedings and presentations at the Southeast Deer Study Group meeting often contain preliminary data and conclusions that have not undergone the peer-review process. This information is provided to foster communication and interaction among researchers, biologists, and deer managers. Commercial use of any of the information presented in conjunction with the Annual Meeting of the Southeast Deer Study Group is prohibited without written consent of the author(s). Electronic versions of this and previous proceedings are available at *SEDSG.com*. Participation of any vendor/ donor/ exhibitor with the Annual Meeting of the Southeast Deer Study Group does not constitute nor imply any endorsement by the Southeast Deer Study Group, the Southeast Section of The Wildlife Society Deer Committee, the host state, or meeting participants.

SOUTHEAST DEER STUDY GROUP MEETINGS

YEAR	LOCATION	MEETING THEME
1977	Fort Picket, VA	None
1979	Mississippi State, MS	None
1980	Nacogdoches, TX	None
1981	Panama City, FL	Antlerless Deer Harvest Strategies
1982	Charleston, SC	None
1983	Athens, GA	Deer Damage Control
1984	Little Rock, AR	Dog-Deer Relationships in the Southeast
1985	Wilmington, NC	Socio-Economic Considerations in Managing White-Tailed Deer
1986	Gatlinburg, TN	Harvest Strategies in Managing White-Tailed Deer
1987	Gulf Shores, AL	Management: Past, Present, and Future
1988	Paducah, KY	Now That We Got Em, What Are We Going To Do With Em?
1989	Oklahoma City, OK	Management of Deer on Private Lands
1990	Pipestem, WV	Addressing the Impact of Increasing Deer Populations
1991	Baton Rouge, LA	Antlerless Deer Harvest Strategies: How Well Are They Working?
1992	Annapolis, MD	Deer Versus People
1993	Jackson, MS	Deer Management: How We Affect Public Perception and Reception
1994	Charlottesville, VA	Deer Management in the Year 2004
1995	San Antonio, TX	The Art and Science of Deer Management: Putting the Pieces Together
1996	Orlando, FL	Deer Management Philosophies: Bridging the Gap Between the Public and Biologists
1997	Charleston, SC	Obstacles to Sound Deer Management
1998	Jekyll Island, GA	Factors Affecting the Future of Deer Hunting
1999	Fayetteville, AR	QDM: What, How, Why, and Where?
2000	Wilmington, NC	Managing Deer in Tomorrow's Forests: Reality vs. Illusion
2001	St. Louis, MO	From Lewis and Clark to the New Millennium: The Changing Face of Deer Management
2002	Mobile, AL	Modern Deer Management: Balancing Biology, Politics, and Tradition
2003	Chattanooga, TN	Into the Future of Deer Management: Where Are We Heading?
2004	Lexington, KY	Today's Deer Hunting Culture: Asset or Liability?
2005	Shepherdstown, WV	The Impact of Today's Choices on Tomorrow's Deer Hunters
2006	Baton Rouge, LA	Managing Habitats, Herds, Harvest, and Hunters in the 21st Century Landscape. Will 20th Century Tools Work?
2007	Ocean City, MD	Deer and Their Influence on Ecosystems
2008	Tunica, MS	Recruitment of Deer Biologists and Hunters: Are Hook and Bullet Professionals Vanishing?
2009	Roanoke, VA	Herds Without Hunters: The Future of Deer Management?
2010	San Antonio, TX	QDM to IDM: The Next Step or the Last Straw?
2011	Oklahoma City, OK	All Dressed Up With No Place To Go: The Issue of Access
2012	Sandestin, FL	Shifting Paradigms: Are Predators Changing the Dynamics of Managing Deer in the Southeast?
2013	Greenville, SC	Challenges in Deer Research and Management in 2013
2014	Athens, GA	The Politics of Deer Management: Balancing Public Interest and Science
2015	Little Rock, AR	Integrating the North American Model of Wildlife Conservation into Deer Management
2016	Concord, NC	The Challenges of Meeting Hunter Expectations
2017	St. Louis, MO	Disease: Science, Politics, and Management
2018	Nashville, TN	Stakeholder-focused, Science-based, and Data-driven: The Gold Standard for the State Deer Management System?
2019	Louisville, KY	Deer, It's What's for Dinner
2020	Auburn, AL	Deer Management in a Rapidly Changing World: Bridging a Generational Disconnect
2021	Virtual	Pandemic or Prospect: Managing Deer and Recruiting Hunters in 2021
2022	Virtual	The Importance of Deer and Deer Hunters to the American Public
2023	Baton Rouge, LA	Managing Deer When Normal Isn't Normal Anymore

COMMITTEE MEMBERS

SOUTHEAST DEER STUDY GROUP, THE WILDLIFE SOCIETY, SOUTHEAST SECTION

YEAR	NAME	AFFILIATION
Alabama	Chris Cook	Alabama Division of Wildlife and Freshwater Fisheries
	Kevin McKinstry	The Westervelt Company
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	Jeremy Brown	Arkansas Game and Fish Commission
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	Tina Johannsen	Georgia Department of Natural Resources
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	Jimmy Ernst	Louisiana Department of Wildlife and Fisheries
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	Ryan Meyers	North Carolina Wildlife Resources Commission
Oklahoma	Jerry Shaw	Oklahoma Department of Wildlife Conservation
	Dallas Barber	Oklahoma Department of Wildlife Conservation
South Carolina	Charles Ruth	South Carolina Department of Natural Resources
	Jay Cantrell	South Carolina Department of Natural Resources
Tennessee	James D. Kelly	Tennessee Wildlife Resources Agency
	Garret Clevinger	Tennessee Wildlife Resources Agency
	Craig Harper	University of Tennessee
Texas	Alan Cain	Texas Parks and Wildlife Department
	Bob Zaiglin	Southwest Texas Junior College
Virginia	Matt Knox	Virginia Department of Game and Inland Fisheries
	Katie Martin	Virginia Department of Game and Inland Fisheries
West Virginia	Jim Crum	West Virginia Division of Natural Resources
	Brett Skelly	West Virginia Division of Natural Resources
NDA	Kip Adams	National Deer Association
USFWS	Larry Williams	United States Fish & Wildlife Service

SOUTHEAST DEER STUDY GROUP AWARDS

CAREER ACHIEVEMENT AWARD

1996	Richard F. Harlow	2005	Kent E. Kammermeyer	2014	Mark O. Bara
1997	Larry Marchington	2006	William E. "Bill" Armstrong	2015	Larry E. Castle
1998	Harry Jacobson	2007	Jack Gwynn	2016	J. Scott Osborne
1999	David C. Guynn, Jr.	2009	David E. Samuel	2017	Karl V. Miller
2000	Joe Hamilton	2010	Bob K. Carroll	2018	Steve Demarais
2002	Robert L. Downing	2011	QDMA	2019	W. Matt Knox
2004	Charles DeYoung	2012	Robert E. Zaiglin	2020	Charles Ruth

OUTSTANDING STUDENT POSTER PRESENTATION AWARD

2010	Emily Flinn	Mississippi State University
2011	Melissa Miller	University of Delaware
2012	Brandi Crider	Texas A&M University
2013	Jacob Haus	University of Delaware
2014	Blaise Korzekwa	Texas A&M University - Kingsville
2015	Lindsay D. Roberts	Texas A&M University - Kingsville
2016	Lindsey Phillips	Texas A&M University - Kingsville
2017	Daniel Morina	Mississippi State University
2018	Onalise R. Hill	Texas A&M University - Kingsville
2019	Zachary Wesner	University of Georgia
2020	Lindsey M. Phillips	University of Tennessee
2021	Michael Muthersbaugh	Clemson University
2022	Lindsey Phillips	University of Tennessee

OUTSTANDING STUDENT ORAL PRESENTATION AWARD

1996	Billy C. Lambert, Jr.	Texas Tech University
1997	Jennifer A. Schwartz	University of Georgia
1998	Karen Dasher	University of Georgia
1999	Roel R. Lopez	Texas A&M University
2000	Karen Dasher	University of Georgia
2001	Roel R. Lopez	Texas A&M University
2002	Randy DeYoung	Mississippi State University
2003	Bronson Strickland	Mississippi State University
2004	Randy DeYoung	Mississippi State University
2005	Eric Long	Penn State University
2006	Gino D'Angelo	University of Georgia
2007	Sharon A. Valitzski	University of Georgia
2008	Cory L. Van Gilder	University of Georgia
2009	Michelle Rosen	University of Tennessee
2010	Jeremy Flinn	Mississippi State University
2011	Kamen Campbell	Mississippi State University
2012	Brad Cohen	University of Georgia
2013	Michael Cherry	University of Georgia
2014	Brad Cohen	University of Georgia
2015	Eric Michel	Mississippi State University
2016	Rebecca Shuman	University of Georgia
2017	Jared Beaver	Texas A&M University
2018	Dan Morina	Mississippi State University
2019	C. Moriah Boggess	Mississippi State University
2020	Jordan R. Dyal	University of Georgia
2021	Seth T. Rankins	Texas A&M University
2022	Blaise Newman	University of Georgia

ORAL PRESENTATION SCHEDULE

MONDAY, FEBRUARY 27

Time		Speaker
8:00 - 9:45 AM	**PLENARY SESSION** ***Moderator:*** *Johnathan Bordelon, LDWF*	
8:00 - 8:05 AM	**Welcome**	Johnathan Bordelon, LDWF
8:05 - 8:15 AM	**Introduction**	Robert Shadoin, Deputy Secretary LDWF
8:15 - 8:45 AM	**Overview of the Mississippi River Basin and Flood Control Operations**	Joey Windham, USACE
8:45 - 9:15 AM	**Challenges Associated with Wildlife Focused Timber Harvests: A Perspective from the Pulp and Paper Sector**	Jeremy Poirier, International Paper
9:15 - 9:45 AM	**Becoming the Best Advocate You Can Be**	Sam Nelson, Cornell University
10:05 - 11:45 AM	**TECHNICAL SESSION 1: PREDATORS/COMPETITORS** ***Moderator:*** *Vic Blanchard, Louisiana Landowners Association and A. Wilbert's Sons*	
10:05 - 10:25 AM	**White-tailed Deer and Cattle Grazing - Consequences for Deer Nutrition** (page 13)	*Bryan D. Spencer
10:25 - 10:45 AM	**Can Berries Save Fawns? Dietary Switching by Coyotes in South Carolina** (page 14)	*Alex J. Jensen
10:45 - 11:05 AM	**White-tailed Deer Behavioral Responses to Coyote Encounter Risk in the Piedmont of South Carolina** (page 15)	*Mike S. Muthersbaugh
11:05 - 11:25 AM	**Population Response of White-tailed Deer to Removal of Wild Pigs** (page 16)	*Matthew T. McDonough
11:25 - 11:45 AM	**Feral Hogs and Their Impact on State Wildlife Agency Deer Management Programs** (page 17)	Benjamin M. Westfall
1:20 - 3:00 PM	**TECHNICAL SESSION 2: CHRONIC WASTING DISEASE** ***Moderator:*** *David Hayden, LDWF*	
1:20 - 1:40 PM	**CWD's 30th Victim: North Carolina** (page 18)	Moriah Boggess
1:40 - 2:00 PM	**Impacts of Chronic Wasting Disease on White-tailed Deer Survival in Northwestern Arkansas** (page 19)	*Marcelo H. Jorge
2:00 - 2:20 PM	**Are Hunters Concerned About the Prevalence Rate of Chronic Wasting Disease in Newly Affected States?** (page 20)	*Catherine A. Cummings
2:20 - 2:40 PM	**Harnessing Scraping Behavior for CWD Surveillance** (page 21)	Miranda H.J. Huang
2:40 - 3:00 PM	**Implementing a Veterinary Forensics Approach to Investigate Chronic Wasting Disease at a Deer Carcass Disposal Site** (page 22)	Peter A. Larsen
3:20 - 5:00 PM	**TECHNICAL SESSION 3: GENETICS/HERITABILITY** ***Moderator:*** *Steve Smith, LDWF*	
3:20 - 3:40 PM	**Genes are Not Destiny: Estimating Breeding Values and the Heritability of Antler Traits in White-tailed Deer** (page 23)	*Cole C. Anderson
3:40 - 4:00 PM	**Do Heavier Does Equal Larger Bucks? Predicting Antler Size From Doe Body Weight** (page 24)	*Mark A. Turner
4:00 - 4:20 PM	**Age and Body Size Relationships of Successful Mated Pairs in White-tailed Deer** (page 25)	*Tristan J. Swartout
4:20 - 4:40 PM	**Managing for Early-life Conditions Sets the Stage for Future Success of White-tailed Deer** (page 26)	*Joseph A. Hediger
4:40 - 5:00 PM	**Temporal Variation in Resources Influences Offspring Quality of White-tailed Deer in a Semi-arid Environment** (page 27)	*Miranda L. Hopper

Time	TUESDAY, FEBRUARY 28	Speaker
8:00 - 9:40 AM	**TECHNICAL SESSION 4: QDM/POPULATION ESTIMATION** ***Moderator:*** *Scott Durham, LDWF*	
8:00 - 8:20 AM	**Implementing QDM Under a Voluntary, Education-driven Framework** (page 28)	*Monet A. Gomes
8:20 - 8:40 AM	**Regional Differences in Deer Hunter Attitudes and Opinions of Quality Deer Management** (page 29)	*Travis E. Stoakley
8:40 - 9:00 AM	**Estimating Demographic Parameters of Unmarked White-Tailed Deer Using Novel Camera Trap Techniques** (page 30)	*Molly M. Koeck
9:00 - 9:20 AM	**Thermal Drove vs. Game Camera: Deer Abundance Comparison Estimates for a Large Captive Population** (page 31)	Chad H. Newbolt
9:20 - 9:40 AM	**Simplifying Sampling Design for Deer Abundance and Herd Composition** (page 32)	Paul M. Lukacs
10:00 - 11:40 AM	**TECHNICAL SESSION 5: DEER BEHAVIOR/HABITAT** ***Moderator:*** *Jimmy Ernst, LDWF*	
10:00 - 10:20 AM	**White-tailed Deer Behavioral Responses to Oak Masting** (page 33)	*Kelsey M. Demeny
10:20 - 10:40 AM	**Vegetation Structure and Predator Occupancy Influence Habitat use by Female White-tailed Deer** (page 34)	*Spencer G. Marshall
10:40 - 11:00 AM	**White-tailed Deer Grazing Behavior and Preference for Soybean Varieties** (page 35)	Luke T. Macaulay
11:00 - 11:20 AM	**Firing Technique and Season Influence Key Fire Metrics and Plant Community Response** (page 36)	*Luke M. Resop
11:20 - 11:40 AM	**Predation Risk Tolerance and Habitat Selection of White-tailed Deer Influenced by Temperature** (page 37)	*Breanna R. Green
1:20 - 3:00 PM	**TECHNICAL SESSION 6: BIOLOGY, MANAGEMENT AND HARVEST TRENDS** ***Moderator:*** *Dr. Kim Marie Tolson, University of Louisiana at Monroe*	
1:20 - 1:40 PM	**Weather Conditions Affecting White-tailed Deer Harvest in Iowa** (page 38)	Jace R. Elliott
1:40 - 2:00 PM	**Chronic Energy Limitation Cues Ontogeny Shift to Maintain Reproduction in White-tailed Deer** (page 39)	Levi J. Heffelfinger
2:00 - 2:20 PM	**Influence of Landscape Characteristics on Survival, Cause-specific Mortality, and Population Growth of White-tailed Deer in Western Virginia** (page 40)	Garrett B. Clevinger
2:20 - 2:40 PM	**Private and Public Land Deer Harvest in the United States** (page 41)	Kip P. Adams
2:40 - 3:00 PM	**Adapting Technical Guidance Strategies to Help Landowners with Deer Management in Mississippi** (page 42)	Pierce Young
3:20 - 5:00 PM	**TECHNICAL SESSION 7: STATE REPORTS** ***Moderator:*** *David Breithaupt, LDWF*	
3:20 - 3:40 PM	**Evolution of the Managed Lands Deer Program (MLDP) in Texas: Challenges and Opportunities for Engaging Private Landowners** (page 43)	Alan Cain
3:40 - 4:00 PM	**A Case Study in Grinding Through a Deer Management Issue in South Carolina** (page 44)	Charles Ruth
4:00 - 4:20 PM	**Oklahoma's Deer Program: Management Based by Regulation or Education?** (page 45)	Dallas Barber
4:20 - 4:40 PM	**White-tailed Deer Breeding Chronology in Southwest Georgia** (page 46)	Emily H. Belser
4:40 - 5:00 PM	**Florida Fish and Wildlife Conservation Commission** (page 47)	Cory Morea

PAPERS

(**denotes student presentation*)

Overview of the Mississippi River Basin and Flood Control Operations

Joey Windham, U.S. Army Corps of Engineers

Abstract:
The Mississippi Watershed covers 1,250,000 square miles. It is the largest watershed in North America and the third largest in the world; exceeded only by the Amazon and the Congo watersheds. The river drains 1.25 million square miles or 41% of the continental United States, which includes all or parts of 31 states and two Canadian provinces. From its source at Lake Itasca in northwest Minnesota, the Mississippi River flows southward for more than 2,300 miles to the Gulf of Mexico through the head of passes. The average flow is 640,000 cubic feet/second, with the highest ever peak flow in 2011 at 2.4 million cfs. The highest volume ever passed was in 2019, which was the longest flood on record. Major Basins that make up the Mississippi River Watershed include Ohio River, Missouri River, Upper Mississippi River, Arkansas/White River, Red River, Yazoo River, and Lower Mississippi River.

Although flooding has occurred in every month of the year on the Mississippi River, peak flooding generally occurs from the middle of February through the middle of June. On average 90% of the water that reaches the Gulf of Mexico from the Mississippi watershed is already in the river at the confluence of the Mississippi and Ohio Rivers near Cairo, Illinois.

The 1927 flood spearheaded the 1928 Flood Control act that led to the establishment of the Mississippi River and Tributaries Project (MR&T). The MR&T is a comprehensive plan for flood control for the lower Mississippi River Valley, that consist of levees, floodways, backwater areas, channel stabilization and tributary improvements. These features work together to provide risk reduction from floods, efficient navigation, and environment protection and enhancement.

Contact:
Joseph.M.Windham@usace.army.mil

NOTES:

Challenges Associated with Wildlife Focused Timber Harvests: A Perspective From the Pulp and Paper Sector

Jeremy Poirier, CWB®,
Senior Manager Fiber Certification and Sustainability, International Paper

Abstract:
Many forest landowners in the Southeast are interested in conducting timber sales on their property with the main objective of improving wildlife habitat (including improving habitat for white-tailed deer). However, these timber sales can come with significant operational constraints (e.g., unmarketable tree species/size, located on poorly drained sites, limited access, short logging windows, etc.) which can result in many forest landowners/managers unable to accomplish their management objectives. In addition, recent changes within the pulp and paper industry and a declining logging force add additional operational challenges. For example, within the last five years, three pulp and paper mills in the ArkLaTex have either changed their operations or closed – resulting in the loss of ~3.0 MM annual tons of hardwood pulpwood demand. In addition, during that same time across the U.S., logging employment declined by nearly 40%. This presentation will detail some of the current challenges and constraints from the perspective of a wildlife biologist who works within the pulp and paper industry, and offer some recommendations on how forest landowners/managers can best market their wildlife-focused timber sales during these changing times.

Contact:
jeremy.poirier@ipaper.com

NOTES:

Becoming the Best Advocate You Can Be

Sam Nelson, Cornell University

Abstract:
Research from a number of areas including academia and business has shed light on the best practices to employ when communicating with audiences and individuals while attempting to inform and persuade them. I will share in this presentation, some of the material that I use in my advocacy, debate, and rhetoric courses at Cornell University, that will be the most useful when strategizing about how to put forth messages to different audiences and that are likely to actually work in this groups field. A special emphasis will be put on those topics that can be viewed as "challenging."

Contact:
Smn33@cornell.edu

NOTES:

White-Tailed Deer and Cattle Grazing - Consequences For Deer Nutrition

***Bryan D. Spencer[1], Miranda L. Hopper[1], Randy W. DeYoung[1], Aaron M. Foley[1], David G. Hewitt[1], J. Alfonso Ortega-S.[1], Landon Schofield[2], Tyler A. Campbell[2], Michael J. Cherry[1]**

[1]Texas A&M University - Kingsville: Caesar Kleberg Wildlife Research Institute
[2]East Foundation

Abstract:
Understanding the interactive effects of competition and environmental conditions on white-tailed deer (*Odocoileus virginianus*) nutrition is important for monitoring population performance. It is suspected the competition between cattle (*Bos taurus*) and deer can reduce nutritional condition of deer, however environmental conditions may mediate this effect. We examined this interaction by linking metrics of nutritional condition (body mass, rump fat, antler scores) and reproduction (lactation status) of 475 male and 609 female white-tailed deer to cattle stocking rates and environmental conditions (percentage of sand in the soil, rainfall, herbaceous biomass, and brush cover). Deer were captured during October–November from 2017–2021 across four South Texas ranches. We fitted generalized linear mixed models to estimate the interactive effects of stocking rates and environmental conditions on white-tailed deer nutritional and reproductive metrics. Cattle stocking rates ranged between 0–0.5812 AU/acre/year. Stocking rates did not influence lactation status or body mass of males or females. Antler size decreased 3.939 inches for every 0.1 AU/acre/year increase in cattle stocking rates (β = -7.235; 85% CI: -14.248 to -0.430). Male rump fat also decreased with stocking rates, but the effect was influenced by environmental conditions; during dry years and in sandier soils, male deer had little rump fat regardless of stocking rates. These results indicate a sex-specific response in the nutritional consequence of white-tailed deer–cattle competition, as only male white-tailed deer nutritional metrics were negatively affected by cattle stocking rates, while female condition was largely driven by reproductive condition.

Contact:
Bdspencer1516@gmail.com

NOTES:

Can Berries Save Fawns? Dietary Switching by Coyotes in South Carolina

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Abstract:
Predator removal and supplemental feeding are two popular strategies to reduce predation on game species, yet neither method seems to be very effective at reducing coyote predation on ungulate neonates (i.e., white-tailed deer fawns). Previous studies have also investigated whether naturally occurring foods (e.g., fruits and small mammals) could reduce fawn predation (finding no effect), but these studies did not quantify availability or track coyote diets throughout the summer. We did so in the Piedmont of South Carolina by collecting 540 coyote scats during the winter, summer, and fall; and also tracking the weekly availability of fawns and blackberries during the summer. Like previous studies, we found that coyote diets primarily reflected availability, but they also appeared to key in on fawns during the first half of summer. However, fawn consumption was substantially lower in the second half of summer, likely due to declining fawn availability combined with a pulse of blackberry availability. Using genetics to identify individuals and differentiate males from females, we found that nearly all coyotes we sampled ate fawns, which has implications for coyote management. We draw two main conclusions from these results: 1) habitat management which promotes the availability of blackberries (and other fruit) may be effective for reducing fawn predation, though future experiments are needed; 2) most (if not all) coyotes eat fawns, suggesting that targeted removal will not be effective for reducing fawn predation. We also contribute to predator-prey research more broadly by showing how a wild predator functionally responds to temporarily available foods.

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NOTES:

White-Tailed Deer Behavioral Responses to Coyote Encounter Risk in the Piedmont of South Carolina

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Abstract:
Coyotes (*Canis latrans*) are now well-established in South Carolina and directly impact white-tailed deer populations mainly through fawn predation. Researchers have found deer increase vigilance in response to increasing coyote predation risk and does with fawns seek temporal refugia. However, few studies simultaneously examine potential antipredator responses including shifts in space-use, diel activity, and vigilance behavior. We used passive camera traps during summer 2019-2021 to quantify the impacts of biological and environmental factors on deer spatial activity patterns, diel activity patterns, and vigilance behavior. We hypothesized that responses to coyote encounter risk would vary among deer demographics and predicted that the strength of responses would scale with vulnerability. Overall, our results suggest that deer are unable to eliminate the risk of encountering coyotes by modifying their spatial activity. Spatial activity patterns of does without fawns were positively related to daily coyote activity, possibly indicating coyotes key in on areas with does during fawning season, and such does were more vigilant at sites with greater long-term coyote activity. Nursery groups were more diurnal than adult deer without fawns, reducing diel activity overlap between fawns and coyotes. In conclusion, deer respond to coyote encounter risk by altering behaviors on temporal scales or increasing perceptive vigilance behavior. Future research should investigate how habitat and activity of humans and competitor species affect nursery group behaviors, particularly as these factors relate to nursery groups tendency to be active during the day as they attempt to reduce the risk of encountering coyotes.

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NOTES:

Population Response of White-Tailed Deer to Removal of Wild Pigs

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Abstract:
With the recent range expansion of wild pigs (*Sus scrofa*), there has been an increasing concern with how wild pigs affect native species in the ecosystems they invade. An abundance of research on the impacts of wild pigs has been through the lens of damage to anthropogenic resources and plant communities. However, quantitative research on how wild pigs affect native animal species is a relatively new topic. The goal of this study was to assess how wild pigs affect white-tailed deer (*Odocoileus virginianus*) at a population level. We did so by using camera trap surveys to monitor the response of white-tailed deer populations to removal of wild pigs between October 2018 and March 2019. This was done by modeling abundance of white-tailed deer on a control site and three treatment sites, from which wild pigs were removed, and comparing changes that occurred relative to a baseline established with the control site. We removed 1,851 pigs from May of 2019 to March of 2021. We found that wild pigs did not significantly affect white-tailed deer abundance, but that white-tailed deer were 1.12 (1.02-1.23; 95% CL) times as likely to be detected when 100% of the baseline wild pig population was removed. We suggest that removing wild pigs is unlikely to increase abundance of white-tailed deer, but could impact camera surveys and hunter satisfaction by increasing the ability to see white-tailed deer in an area.

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NOTES:

Feral Hogs and their Impact on State Wildlife Agency Deer Management Programs

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Abstract:
Feral hogs (*Sus scrofa*) are a highly destructive and invasive species that cause significant problems for white-tailed deer and other wildlife. To better understand the management implications of feral hogs, we surveyed state wildlife agencies to determine if feral hogs are currently present in their state, their impact on deer management programs, how that impact has changed over time, legality of transport and release, and whether they have a feral hog task force or committee. Twenty-three states indicated the presence of hogs, including 14 states in the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) region. Deer management efforts in eight states were negatively impacted by feral hogs while another eight states indicated the impact has increased over the past decade. To help mitigate the spread of hogs to new areas, 43 states prohibit the public from transporting and releasing live hogs, and 21 states have a dedicated feral hog task force or committee formed for the purpose of coordinating feral hog control efforts. Feral hogs are responsible for nearly $2 billion in damages annually in the USA and directly compete with deer for high quality food sources. Our results help shed light on the impacts and management implications of feral hogs on a state, regional and national level.

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NOTES:

CWD's 30th Victim: North Carolina

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Abstract:
North Carolina's first confirmed case of Chronic Wasting Disease (CWD) was detected in March of 2022 in a hunter-harvested deer from December 2021. The North Carolina Wildlife Resources Commission immediately activated the approved CWD Response Plan, establishing both a primary and secondary surveillance area surrounding the initial positive. Additionally, surveillance area regulations were established to mitigate CWD transport and transmission risk, and sampling goals were set for the 2022-2023 hunting season in both Surveillance Areas. Four public forums were held across the surveillance areas and extensive outreach efforts were implemented to raise awareness of CWD and communicate regulatory changes to the public. Testing options and locations were greatly increased in both surveillance areas to offer convenient testing sites in all affected counties. Surveillance and communication efforts resulted in a substantial increase in CWD sample submissions and additional CWD positive deer were detected within both surveillance areas. This presentation will summarize CWD response actions, challenges met during response, and results from the deer hunting season following the confirmation of CWD in North Carolina.

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NOTES:

Impacts of Chronic Wasting Disease on White-Tailed Deer Survival in Northwestern Arkansas

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Abstract:
Chronic Wasting Disease (CWD) is a fatal prion disease that is contagious to captive and wild cervids. As CWD has been discovered throughout the United States and Internationally, concern has grown over the long-term viability of cervid populations within CWD endemic regions. Some studies have modeled population declines in white-tailed deer, mule deer and elk within CWD endemic areas, but most of these studies have occurred in areas where CWD has been present for decades. We investigated survival probabilities of CWD positive (n=24) and presumed negative (n=74) deer within Arkansas' CWD management zone where CWD was first detected in 2016. Deer were captured and affixed with GPS collars and rectoanal mucosa-associated lymphoid tissues (RAMALT) were collected for testing. If a mortality occurred, the obex region of the brain stem and retropharyngeal lymph nodes were also collected and tested. Sample CWD prevalence was 24.5%. We used a parametric survival model with time-varying covariates to investigate the factors that impacted survival. To date, survival has been lower than in most studies for white-tailed deer from CWD endemic areas. Daily terrain ruggedness index, daily terrain roughness, and daily temperature were positively correlated with survival. Deer that tested positive for CWD had lower survival than those that tested negative. Our results suggest that CWD is reducing annual survival, and CWD may be working in concert with environmental factors (e.g., landscape structure and weather) and other diseases to reduce the long-term viability of cervid populations.

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NOTES:

Are Hunters Concerned about the Prevalence Rate of Chronic Wasting Disease in Newly Affected States?

***Catherine A. Cummings[1], Stephen S. Ditchkoff[1], William Gulsby[1], Ryan Williamson[2], Kelly H. Dunning[1]**

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Abstract:
Chronic Wasting Disease (CWD) is a 100% fatal neurological disease that affects members of the deer family, Cervidae. CWD has been found in 30 states across the United States, making it a management issue that has garnered national attention. The 2021-2022 deer hunting season resulted in four new states identifying CWD-positive animals. These new emergences of CWD could negatively affect hunting participation and license sales, and thereby funding for conservation and the economies of rural communities. In this study, we aim to determine if Alabama and Louisiana deer hunters were concerned about the prevalence rate of CWD in their respective state. An online questionnaire was distributed to deer hunters in Alabama (n =689) and Louisiana (n = 682) with the sample obtained from online hunting forums and email lists. Several logistic regressions were used to determine which factors might predict whether a hunter is concerned about CWD prevalence rates. Alabama deer hunters were statistically significantly more concerned about the prevalence rate of CWD if they were older and more educated with hunting motivations that included experiencing nature and managing deer populations. Louisiana deer hunters were statistically significantly more concerned about the prevalence rate of CWD if they harvested fewer deer in the 2021-2022 season and if their hunting motivations were to manage deer populations and to harvest deer for consumption. As CWD will likely continue to spread, results from this study can help state agencies respond to a positive detection with scientifically and socially sound management strategies

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NOTES:

Harnessing Scraping Behavior for CWD Surveillance

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Abstract:
Chronic wasting disease (CWD) impacted deer populations and upended wildlife management as it spread across North America. CWD surveillance using post-mortem testing is expensive and time-consuming for state wildlife agencies and may be limited by hunter hesitancy. Scrapes could serve as environmental sampling sites for CWD surveillance because saliva and urine deposited at scrapes can carry prions To test this utility, we monitored deer visitation to 98 scrapes in southern Tennessee, where CWD prevalence is high (~50%), determined CWD status of bucks harvested nearby, and tested for prions in soil and licking branch samples. We captured 3,063 scrape interactions by does, fawns, and 218 unique bucks, with a mean of 12.2 ± 7.5 unique bucks per scrape (mean ± SD, range: 1-39). Preliminary lab results found prion seeding activity in 20% of soil and 41% of licking branch samples from this high-prevalence area. Additionally, we detected prion seeding activity in soil and licking branch samples from scrapes sampled in northern Mississippi, where CWD prevalence is lower (~8%). Some Mississippi properties had not reported positive harvested deer. These results indicate a potential for harnessing deer scrape sites as environmental sentinels to identify CWD presence in an area without relying on harvested WTD. Initial identification of prion presence could inform agency decisions on where to focus efforts with regulatory-approved testing methods.

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NOTES:

Implementing a Veterinary Forensics Approach to Investigate Chronic Wasting Disease at a Deer Carcass Disposal Site

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Abstract:
Chronic wasting disease (CWD) is confirmed in 30 US states, three Canadian provinces, Nordic countries, and South Korea. Although the origin and progression is typically unknown, CWD spread over the past seven decades is attributed, in part, to cervid carcass transport and disposal. Given the potential for CWD-causing prions to resist degradation and remain infectious within the environment, the disposal of CWD-positive animal remains, whether from free-ranging or captive sources, can play an important role in the transmission of CWD. Management agencies provide disposal guidance and opportunities to reduce the risk of introduction to new areas. Upon the discovery of an illegal carcass disposal site associated with a CWD-positive captive cervid facility, we leveraged an integrative interdisciplinary approach of anatomic, entomologic, genetic, and prion amplification methods to discover multiple CWD-positive remains of white-tailed deer from six animals across all age classes and, using microsatellite markers, we confirmed a portion of these remains originated from the CWD infected captive herd. CWD prions were detected via RT-QuIC in 14 of 56 carcass samples, including fly larvae associated with the remains. Our multi-methods approach, coined as "Prion Forensics", provides the foundation for future investigations of prion transmission risk from carcass disposal.

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NOTES:

Genes are Not Destiny: Estimating Breeding Values and the Heritability of Antler Traits in White-Tailed Deer

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Abstract:
Antlers are both tools and targets for the management of cervid populations. For instance, antler restrictions are widely used to protect younger age classes from harvest. However, consistent removal of desirable phenotypes through harvest may result in smaller antlers in future cohorts. Culling or selective harvest attempts to improve the antler size of future generations by removing undesirable phenotypes from the breeding pool. The effects of these management strategies–intentional or unintentional–strongly depend on the heritability of the traits and the ability of offspring to develop and display them. We analyzed multiple half-sibling cohorts of wild white-tailed deer at maturity, including 2,167 antler records from 505 unique individuals. Fourteen bucks sired half-sib cohorts; sires had gross Boone & Crockett scores ≥ 21 inches above the population average. Offspring antler scores at maturity ranged from -31 to +77 inches from the average. The narrow-sense heritability (h2) estimates for antler characteristics were: gross Boone & Crockett score (0.36), inside spread (0.05), main beam length (0.17), antler mass (0.27), tine length (0.49), and antler points (0.23). Antler restrictions implemented on traits with low heritability, such as inside spread, will have the least chance of unintentional effects of harvest, such as high-grading. Conversely, selecting for traits with higher heritabilities, such as gross score and tine length, will produce the largest gains per generation. Our results can help wildlife managers and legislators make better-informed decisions and regulations when managing white-tailed deer populations.

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NOTES:

Do Heavier Does Equal Larger Bucks? Predicting Antler Size from Doe Body Weight

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Abstract:
Collecting biological data from harvested white-tailed deer is a critical component of management, as these data provide information on age structure, body condition, and herd productivity. Production of larger-antlered bucks is an important objective for many managers, but small sample sizes of bucks in harvest data often limit the ability of managers to gauge their progress. Additionally, evaluation of buck body weights is complicated because of weight loss during the breeding season. Doe harvest data are often used to evaluate herd health, yet we are not aware of any comparisons between property-level doe weight and buck antler size. We evaluated the relationship between doe body weight and mature buck antler size at two spatial scales to determine any relationship between these data. Using data collected from 24 properties across 17 states, we fitted a positive, nonlinear model between property-specific average doe weight and mature buck gross antler score (R^2=0.74) with an asymptote at approximately 115 lb doe live weight. Additionally, we found latitude had no significant influence on this relationship (p=0.3), suggesting other factors, such as high-quality forage availability, have a greater effect than latitude. When we compared doe body weight and buck antler size from 175 Deer Management Assistance Program clubs in Mississippi, linear regression predicted a one-inch increase in gross score for every one-pound increase in property-specific doe body weight (p<0.001). Our results should prove useful for managers and agencies who wish to provide predictions of expected mature buck antler size on properties with limited buck harvest data.

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NOTES:

Age and Body Size Relationships of Successful Mated Pairs in White-Tailed Deer

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Abstract:
For decades, our understanding of the mating system of white-tailed deer assumed a small proportion of mature males monopolized breeding within a population. Recent studies, however, have suggested that mating may be random, and monopolization is uncommon, with minimal selectivity of mates by individuals. Yet, the observation of random mating in populations may be an artifact of a population undergoing demographic change (e.g., age structure and sex ratio). For this study, we examined the phenotypic characteristics of successful mated pairs in a captive population of white-tailed deer from 2008–2019. Over time the age structure of the population matured, and we were able to examine age and body size relationships of 184 mated pairs that successfully recruited fawns. We found significant positive relationships for age and body size of mated pairs. For each 1-year increase in female age there was a 0.17-year increase in male age among mated pairs, and for every 1.00 cm increase in female skeletal body size measurements there was a 0.44 cm increase in male skeletal body size measurements. We rejected the idea of random mating within the population, but still observed several cases of large differences in age between mates, indicating some plasticity with mating. Additionally, the proportion of immature individuals breeding in the population decreased over time as the age structure matured. Overall, our results document evidence of mate selectivity based on physical characteristics; however, it appears choice is dynamic and varies according to population demographics.

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NOTES:

Managing for Early-Life Conditions Sets the Stage for Future Success of White-Tailed Deer

***Joseph A. Hediger[1], Matthew T. Moore[1], Cole C. Anderson[1], Charles A. DeYoung[1], David G. Hewitt[1], Stuart W. Stedman[1], Randall W. DeYoung[1], Michael J. Cherry[1]**

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Abstract:
Early-life programming prepares an individual for the environment in which they are expected to exist. This programming can be adaptive or maladaptive depending on the match between the expected and the actual environment. In the event of an environmental mismatch, life history traits such as longevity and reproductive investment can be negatively influenced. We evaluated the effects of early-life conditions of white-tailed deer (*Odocoileus virginianus*) on the relationship between antler size and body mass utilizing a 15-year dataset containing annual antler and body weight measurements for 471 known-age white-tailed deer. These individuals were born in one of two 1100-acre, high-fenced pastures or a 5-acre pen. Within the pen, movement was limited, predators and interspecific competitors did not occur, and sires were selected for large antler sizes. All deer had access to ad libitum food and water. Deer born in pens were released to the larger pasture at ~4-months of age. We used linear mixed effects model with antler score and body weight as dependent variables predicted by independent variables including age and birth site while treating capture year and animal ID as random effects. Birth site had life-long effects on morphology as offspring born in pens were smaller bodied with larger antlers compared to pasture-born deer. Our results suggest early-life conditions permanently influenced the allocation of energetic resources in morphometrics of white-tailed deer. Management efforts should be focused on this critical life stage for it sets the roadmap for the health and vitality of male white-tailed deer throughout adulthood.

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NOTES:

Temporal Variation in Resources Influences Offspring Quality of White-Tailed Deer in a Semi-Arid Environment

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Abstract:
Timing of resource availability has important implications for population performance. Resource availability relative to consumer requirement influences the consumer's ability to acquire nutrients as energetic demands fluctuate. Temporal variation matters for wildlife; however, the temporal period when it matters most remains unknown. Our goal was to determine the biological period during which rainfall was most predictive of offspring quality for white-tailed deer in a semi-arid environment. We used rainfall as our environmental variable due to its strong effect on plant growth and offspring body mass as a proxy for quality, as mass is correlated with survival and time to primiparity. We captured 480 fawns (three to four months old) and 571 1.5-year-olds at four sites in South Texas during autumn of 2011 to 2021. We assigned precipitation data from seven biological seasons hypothesized to affect mass to each deer record and used linear mixed-effects models to identify the period when rainfall was most predictive. Rainfall in the early growing season (April) of the year of capture, about three months prior to birth of fawns, had the greatest effect on deer mass. For every 1-inch increase in rainfall, fawn body mass increased by 1.22 lb and yearling body mass increased by 1.61 lb. Our results demonstrate that offspring quality is most affected by rainfall in seasons relevant to plant phenology rather than rainfall in seasons relevant to reproductive chronology. Therefore, when assessing how temporal variation in resources influences population performance, managers should consider multiple trophic levels to fully capture this process.

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NOTES:

Implementing QDM Under a Voluntary, Education-Driven Framework

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Abstract:
Since its introduction in the 1980's, quality deer management (QDM) has grown to become one of the most widely implemented white-tailed deer management strategies in North America. While managers may implement QDM through legislative or educational means, research on QDM is mostly conducted in systems using legislative framework. We describe the effects of implementing QDM at Brosnan Forest, a 14,406-acre property located in the lower coastal plain of South Carolina, owned by Norfolk Southern Railway. This area provides a unique scenario where a group of majority-novice hunters were educated on and encouraged to practice QDM approaches to hunting. To assess the effect of voluntary QDM implemented with novice hunters, we used data collected from deer harvested between 1997 and 2019. Since 2000, hunters were encouraged via verbal educational briefings, taxidermy visuals, and informational notecards to practice restraint in harvesting young males and increase female harvest. Overall, this voluntary approach resulted in measurable changes to the herd's composition, such as a 0.6-year increase in the average age of harvested bucks and a 0.19-inch increase in yearling antler beam diameter (YABD). While this age and YABD increase remained consistent throughout the remainder of the study period, other metrics such as weights and lactation rates were not consistently improved. Our results indicate that an education-focused and completely voluntary approach to implementing QDM can result in measurable changes to herd health. However, management is a dynamic process and deer herd quality characteristics, such as condition and age structure, rarely remain static over extended periods.

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NOTES:

Regional Differences in Deer Hunter Attitudes and Opinions of Quality Deer Management

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Abstract:
Quality deer management (QDM) is the preeminent framework by which white-tailed deer are managed in the eastern USA. Historic differences surrounding the cultures, traditions, and regulations of deer hunting exist regionally, yet no published study has investigated regional differences in attitudes and opinions of QDM among deer hunters. We explored this knowledge gap by distributing a survey to gather information on attitudes and opinions of QDM to deer hunters across two Midwestern states (Missouri and Ohio) and two Southeastern states (Louisiana and South Carolina). Midwestern and Southeastern deer hunters held similar motivations for deer hunting, as well as similar attitudes and opinions of strategies and expected outcomes of QDM. However, there existed a mismatch between several practices associated with QDM and the general ideology of QDM, particularly with Southeastern hunters. QDM framework is facilitated by the protection of young bucks, harvest of does, and prioritization of native forbs over supplemental feed. Southeastern hunters were more likely than Midwestern hunters to say they have previously heard of QDM, QDM is already implemented on land they hunt, and they support legislation to expand funding for QDM. Yet, Southeastern hunters were more likely to support greater antlered deer bag limits, protection of does from harvest, and use of supplemental feeding. We postulate that this mismatch between ideological support and practical applications of QDM is largely driven by regional differences in cultures, traditions, and regulations surrounding deer hunting, and can be addressed through expanded outreach and education programs by state agencies and wildlife groups.

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NOTES:

Estimating Demographic Parameters of Unmarked White-Tailed Deer Using Novel Camera Trap Techniques

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Abstract:
Density and recruitment are hard to estimate, and quantifying them through physical capture can be invasive, expensive, and impractical. The use of camera traps as a tool for collecting demographic data has grown exponentially in recent years due to benefits associated with collecting data noninvasively. Further, recent advances in unmarked abundance models and camera trap technology facilitate better estimates of demographic parameters of unmarked species. Our objective was to use the space-to-event unmarked abundance model (STE) to estimate density and recruitment of white-tailed deer in a densely forested area. Previous work emphasized the importance of measuring camera viewable area (viewshed), but how best to do this in a dynamic landscape has not been tested, potentially leading to biased estimates associated with viewshed assumptions. Further, STE has not been used to quantify recruitment, so we extended the usefulness of this unmarked model. In 2021 we randomly deployed 100 cameras across two wildlife management areas in southeast Oklahoma. At deployment, we accounted for variation in forest structure across the viewshed through multiple maximum distance measurements, resulting in a unique sampling area per camera. Cameras were set to synchronously take time-lapse images at 10-minute intervals until retrieval. By using time-lapse photography, we eliminated biases associated with motion-triggered photography. Using STE, we successfully estimated late-summer white-tailed deer density at both sites, and we were able to derive fawn recruitment rates. Our results indicated greater densities when viewshed was uniquely measured per camera, indicating that quantifying viewshed can have measurable effects on density estimates.

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NOTES:

Thermal Drone vs. Game Camera: Deer Abundance Comparison Estimates from a Large Captive Population

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Abstract:
Thermal drone surveys have potential as an efficient and effective method to estimate deer abundance; however, few studies provide details on specific methods used and measures of result accuracy. We used a relatively low cost (~$7,000.00) DJI® thermal drone to estimate deer abundance in a ~6000ac high-fenced property in the Post Oak Region of East TX and compared these estimates to estimates generated using a traditional camera survey conducted with 35 camera stations in February 2022. We divided the study site into 33 flight blocks and used drone transect video footage captured during four nights in February-March 2022. Each block was flown twice, and sampling efforts resulted in about 60% of each block being viewed during each flight. We generated an average count of deer identified in thermal video for the two replicate flights and estimated average deer abundance within the transect area. Transect estimates were then extrapolated to each corresponding flight block area, and the block estimates were averaged to determine an overall estimate of deer abundance. Thermal Drone surveys estimated 255 deer in the study area, whereas the traditional camera survey yielded 267 deer. However, when doe and fawn number estimates were corrected by use of tagged deer ratio estimates in photo counts (26 does and 10 fawns tagged), a second camera estimate yielded 346 deer. Results suggest thermal drone surveys are a viable method for estimating deer abundance and closely compare to traditional ground-based camera survey estimates, but both methods are likely to underestimate the true population.

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NOTES:

Simplifying Sampling Design for Deer Abundance and Herd Composition

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Abstract:
Sampling design for white-tailed deer and other ungulate surveys can be a daunting process which has led to common use of subjective sampling designs. Moreover, abundance surveys are often imprecise with coefficients of variation more than 30%. Yet, designs for a wide array of field protocols including trail cameras, distance sampling, quadrat counts, or sightability can be implemented in a statistically rigorous way while not being difficult. We present a simplified approach to sampling design leveraging automated web-based tools combined with data management. We then demonstrate that frequent, low precision abundance surveys combined with an integrated population model can outperform intensive, infrequent, high precision surveys in terms of deer population model trajectory. We use mule and white-tailed deer populations as examples of the process.

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NOTES:

White-Tailed Deer Behavioral Responses to Oak Masting

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Abstract:
Oaks (*Quercus spp.*) provide an important food source for white-tailed deer throughout the fall and winter. To date, little work has directly studied the behavioral responses of deer to masting characteristics of different oak species. Using seed traps during fall of 2021, we tracked weekly acorn production for 194 oaks of two species (swamp chestnut oak, *Q. michauxii*; and water oak, *Q. nigra*) across seven forest stands in southern Georgia. We concurrently monitored deer detections and feeding behavior on 28 of those oaks using camera traps. The two oak species differed in masting patterns; swamp chestnut oak was more synchronous with a peak in December, whereas water oak was less synchronous with peaks in November and December. Interestingly, individual variation in acorn production was high for both species. Using generalized linear mixed models, we found that deer were more likely to consume swamp chestnut oak acorns (prob=0.29 ± 0.12) than water oak acorns (prob=0.08 ± 0.04; $P<0.01$). Additionally, mean detection of deer was twice as high at swamp chestnut oaks (6.03 ± 0.63) compared to water oaks (2.87 ± 0.20) despite water oaks producing four times more acorns on average. Our findings suggest that deer prefer swamp chestnut acorns as forage and show that oak species is a key factor influencing deer behavioral responses to oak masting. Furthermore, our data indicate that while managing for multiple oak species can extend acorn availability, it is also important to consider deer preference and individual variation in acorn production within species.

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NOTES:

Vegetation Structure and Predator Occupancy Influence Habitat Use by Female White-Tailed Deer

***Spencer G. Marshall[1], Jacob T. Bones[1], Craig A. Harper[1], Marcus A. Lashley[2], William D. Gulsby[3], Bronson K. Strickland[4]**

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Abstract:
Habitat use by female white-tailed deer during summer likely is influenced by vegetation characteristics related to fawning cover. Pine stands in the southeastern United States commonly are managed with thinning and prescribed fire, but season of burning may influence vegetation characteristics, which may lead to changes in use by females and fawns. We implemented a replicated field experiment using four fire-season treatments in nine loblolly (*Pinus taeda*) or shortleaf (*P. echinata*) pine stands across Tennessee, South Carolina, Alabama, and Mississippi. We measured vegetation characteristics and conducted trail camera surveys during summers 2021 and 2022. We placed three camera traps in each unit. Greater understory shrub cover was negatively correlated (p=0.04) to daily fawn detection, whereas visual obstruction below five feet was positively correlated (p=0.002) to daily fawn detection. Time spent loafing by females was positively correlated with percent forb coverage (p=0.001), stems per acre (p=0.01), and percent bramble coverage (p=0.008). Vigilance of females was greater (p=0.024) in areas with less dense visual obstruction, and we detected fewer coyotes (*Canis latrans*) with greater visual obstruction below five feet (p=0.048). Detection of bobcats (*Lynx rufus*) was not influenced by vegetation nor detection of fawns. Our results indicate that timing of burning may affect habitat use during the fawning season.

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NOTES:

White-Tailed Deer Grazing Behavior and Preference for Soybean Varieties

Luke T. Macaulay[1], James Lewis[1], Nicole Fiorellino[1]

[1]University of Maryland

Abstract:
White-tailed deer cause approximately 75% of wildlife damage to agricultural crops in Maryland at an estimated cost of over $10 million a year. We sought to evaluate the efficacy of using different forage soybean varieties to divert deer from prime agricultural production areas in 2021 and 2022. We evaluated deer grazing behavior on two conventional and four forage soybean varieties by planting a replicated and randomized complete block design at the Wye Research & Education Center in Maryland, USA. We placed motion activated trail cameras on each variety to quantify deer activity and grazing on each plot, and combined activity data with local weather data to better understand grazing activity under different weather conditions. We conducted monthly forage analysis of each variety during the growing season to better understand potential drivers of deer preferences. We provided forage soybean seeds to local farmers to use as buffers surrounding their fields and conducted a survey to assess their opinions of the efficacy of this approach.

Our analysis of weather patterns and deer activity found a statistically significant increase in deer grazing one and two days after rainfall events in 2021 (additional weather analysis and variety preference data is undergoing analysis and will be presented at the conference). Five out of six farmers who were provided forage soybeans said they reduced damage and that they would plant them again in the coming year. Results suggest that forage soybeans may serve as a useful diversionary tool for reducing crop damage by deer.

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NOTES:

Firing Technique and Season Influence Key Fire Metrics and Plant Community Response

***Luke M. Resop[1], Steve Demarais[1], Bronson Strickland[1], Raymond B. Iglay[1]**

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Abstract:
Hardwood encroachment into early successional plant communities and pine stands can inhibit white-tailed deer habitat and timber production in the southeastern USA. Many land managers use prescribed fire to manipulate plant succession for a variety of objectives including timber and deer habitat management but lack information on how firing technique interacts with fire season to influence plant community response. We designed an experiment to quantify these interactions with a pair of 15' x 20' plots (n = eight) randomly assigned a backing and heading fire within each of three seasons: Dormant (February), Early Growing (May-June), and Late Growing (September-October). We lit heading fires with a 10-15mph wind generated by a backpack blower and we lit backing fires into ambient wind. Datalogging thermocouples revealed backing fires raised temperatures above the 140F threshold required to kill a tree's cambium 51 seconds longer ($p = 0.048$) than heading fires but had similar max temperatures ($p = 0.96$). Early Growing resulted in the highest midstory tree mortality rate (22%) followed by Late Growing (6.7%) and Dormant (4.3%). Dormant resulted in the highest top-kill rate (81%) followed by Late Growing (72%) and Early Growing (58%). Crown scorch was positively related to midstory mortality in Early Growing only. Understory analysis revealed Late Growing produced the greatest increase in forb coverage, Early Growing resulted in the greatest grass coverage increase, and Dormant produced the greatest increase in brambles (Rubus spp.). Land managers can incorporate these findings into their fire prescriptions to better meet deer habitat management objectives.

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NOTES:

Predation Risk Tolerance and Habitat Selection of White-Tailed Deer Influenced by Temperature

***Breanna R. Green[1], Evan P. Tanner[1], Richard B. Chandler[2], Heather N. Abernathy[3], L. Mike Conner[4], Elina P. Garrison[5], David B. Shindle[6], Karl V. Miller[2], Michael J. Cherry[1]**

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Abstract:
Spatiotemporal partitioning of habitat use is a common behavior that species employ to avoid predation. Balancing demands of foraging and thermoregulation under predation risk introduces competing drivers of selection often underappreciated in studies of predator-prey dynamics. As temperatures rise due to climate change, thermoregulatory pressures will increasingly impact movement patterns by forcing prey to accept higher predation risk in exchange for thermal refuge. For instance, as Florida panthers (*Puma concolor coryi*) utilize vegetation to ambush prey, white-tailed deer (*Odocoileus virginianus*; hereafter: "deer") may select safer areas at the cost of increased solar radiation exposure. We tested the hypothesis that thermoregulatory demands influence predation risk tolerance in prey and that the strength of the effect will vary between nocturnal and dial periods. We assessed step selection of 224 deer from June through September 2015 to 2018 in the Florida Panther National Wildlife Refuge and Big Cypress National Preserve in southern Florida, USA. Resource selection varied with temperature, suggesting the thermal landscape is an important factor of selection. As temperature increased, deer increased their use of high-risk areas, indicating deer were less predation risk averse when confronted with high thermoregulatory costs. However, this pattern was temporally dynamic. Temperature influenced predation risk tolerance during both nocturnal and dial periods but was strongest during nocturnal hours, when panthers are most active. These movements indicate that the need for thermal refuge influences predator avoidance and highlights the critical importance of landscape features which offer thermal shelter.

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NOTES:

Weather Conditions Affecting White-Tailed Deer Harvest in Iowa

Jace R. Elliott[1], Tyler M. Harms[1]

[1]Iowa Department of Natural Resources

Abstract:
Weather conditions, such as temperature and precipitation, are likely to influence white-tailed deer activity and hunter participation, both of which are major factors contributing to deer harvest. Since harvest data are often used to inform white-tailed deer (*Odocoileus virginianus*) population trends and guide management decisions, understanding how certain abiotic factors may bias such data is crucial for effective population management. We examined the impacts of weather factors on deer harvest during the Iowa firearms seasons from 2006-2021. We found significant effects of weather conditions during the hunting season on overall deer harvest. Specifically, deer harvest was positively correlated with snowfall on opening day and negatively correlated with average minimum temperature, average snow depth, rainfall on opening day, and total number of both rainfall and snowfall days. Our findings demonstrate that abiotic factors have the ability to substantially impact deer harvest. As many white-tailed deer population models utilize harvest data, incorporating the effects of weather variability into such models may substantially improve population estimates. This study provides justification for correcting harvest rates in regard to hunting season weather conditions so that such data can represent a more accurate index of species abundance.

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NOTES:

Chronic Energy Limitation Cues Ontogeny Shift to Maintain Reproduction in White-Tailed Deer

Levi J. Heffelfinger[1], Ryan Reitz[2], Deanna Pfeffer[2], David Wester[1], Randy DeYoung[1], David Hewitt[1]

[1]Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville
[2]Texas Parks and Wildlife Department

Abstract:
Morphology varies regionally within species and may induce trade-offs between ontogeny and reproduction. The specific limitation for variable body sizes and signaling trade-offs is assumed to be nutritional quality of the diet but the specific dietary component is unknown. We test how a chronic reduction in dietary energy affects development and reproduction in white-tailed deer. We raised three cohorts (n=309) in captivity for five years. Individuals were split into a low digestible energy diet (1.77 kcal/g; LE) and a standard digestible energy diet (2.65 kcal/g; SE), both offered *ad libitum*. We recorded feed consumption per cohort and measured weight, body condition, skeletal size, and antler size annually for each individual until five years of age. We also measured reproductive output of females in each treatment. Adults exhibited lower mass and body condition throughout all ages on the LE diet compared to the SE diet. Male antler size and mass was lower across all ages within the LE diet. LE feed consumption was greater across all cohorts and sexes compared to the SE diet. Litter size and fawn birth mass did not differ between treatments. Individuals adjusted body condition, body size, and weaponry growth to reduce energy requirements but maintained the same level of reproductive output. Our results provide experimental confirmation for hypotheses regarding life-history trade-offs between growth and reproduction. Digestible energy concentration in the diet should be investigated as a factor explaining regional differences in morphology, especially in systems where individuals cannot maintain population performance under nutrient limitation.

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NOTES:

Influence of Landscape Characteristics on Survival, Cause-Specific Mortality, and Population Growth of White-Tailed Deer in Western Virginia

Garrett B. Clevinger[1,5], Randy W. DeYoung[2], W. Mark Ford[3], Marcella J. Kelly[1], Nelson W. Lafon[4], Michael J. Cherry[2]

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Abstract:
In the central Appalachian Mountains, deer are part of a complex, largely forested ecosystem that also supports black bears (*Urus americanus*), coyotes (*Canis latrans*), and bobcats (*Lynx rufus*) which often are important fawn predators. We estimated age-specific survival, cause-specific mortality, and the effects of landscape attributes on survival of fawns in western Virginia. We also determined population growth trends associated with observed vital rates and hypothetical future scenarios for the population. During 2019-2020, we monitored 38 GPS-collared, pregnant females equipped with vaginal implant transmitters. We estimated annual survival for adults and survival to 12 weeks for fawns to be 0.871 (95% CI=0.790-0.961) and 0.310 (95% CI = 0.210-0.475) respectively. We assessed mortalities using DNA and field-based evidence and observed 28 predation events and 9 deaths from other causes (e.g., abandonment, malnutrition, or disease). Black bears accounted for 48.6% of all mortality and 64.2% of known predations within our study. Mortality risk increased 20% for every 100m increase in elevation. Our model using observed vital rates predicted an increasing population ($\lambda = 1.10$) and the population was predicted to increase by 2% ($\lambda = 1.02$) with a 10% increase in doe harvest but decline by 7% ($\lambda = 0.93$) with a 20% increase in doe harvest. In conclusion, we found survival to be higher near fertile valley bottoms that are often cultivated and lower along ridges characterized by shallow rocky soils. Additionally, while predation resulted in low fawn survival, our study suggests the population could sustain a modest increase in female harvest.

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NOTES:

Private and Public Land Deer Harvest in the United States

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[1]National Deer Association

Abstract:
Hunters are fortunate to have over 600 million acres of public land in the U.S. to recreate on, and those acres are home to over 3,000 wildlife species. However, those acres and species are not evenly dispersed across the country, and deer typically distribute themselves based more on habitat quality than land ownership status. To determine private and public land harvest patterns across the nation we asked each state wildlife agency to provide the percentage of its 2021 total deer harvest that occurred on private and public lands. Twenty-seven of 37 states (73%) in the Midwest, Northeast and Southeast collect this information. Conversely, no states in the West record this data. Regionally, 81% of the Northeast harvest, 91% of the Midwest, and 93% of the Southeast harvest occurred on private land. Texas led the country with 99%. In total, 16 of 27 states (59%) took over 90% of their deer harvest on private land, which was an estimated total of 5,214,182 deer during the 2021 season. Massachusetts topped the country with 43% of the deer harvest taken on public land. This is noteworthy given the Bay State only includes 6% public land. For reporting states, deer hunting is largely a private land game as nearly 9 of 10 deer (88%) harvested in 2021 were taken on private land. This highlights the importance of hunter access, private land habitat and deer management assistance programs.

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NOTES:

Adapting Technical Guidance Strategies to Help Landowners with Deer Management in Mississippi

Pierce Young[1], John Gruchy[1]

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Abstract:
Benjamin Franklin once said, "Change is the only constant in life. One's ability to adapt to those changes will determine their success". This is evermore true with deer management and how state agencies adapt to changes that sometimes seem exponential. In Mississippi, private landowner participation in deer management is extremely important, as 80% of the land base is privately owned and 90% of all days spent hunting occur on private land. Like many state agencies, the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) is experiencing changing patterns in land ownership and landowner priorities. We analyzed descriptive data related to the key changes for biologists working with landowners on deer management in Mississippi over the last two decades. Although white-tailed deer management is still the most common priority of landowners requesting technical guidance from MDWFP (64%), we observed a 15% decline in deer management as a management objective from 2015 to 2019. The average size of properties participating in the Deer Management Assistance Program (DMAP) has declined 27% since 1992. The median tract size for new landowners requesting technical assistance (200 acres) is nearly ten times less than that of previously established DMAP properties (1,974 acres). These and other changes described by our data present a challenge when trying to enroll new DMAP properties and manage local deer populations on an effective scale. We discuss recent and future changes in organizational structure and implementation strategies to most effectively adapt to these challenges.

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NOTES:

STATE REPORTS

Evolution of the Managed Lands Deer Program (MLDP) in Texas: Challenges and Opportunities for Engaging Private Landowners

Alan Cain, Texas Parks & Wildlife Department

Abstract:
The Managed Lands Deer Program (MLDP) allows landowners enrolled in a formal wildlife management program with Texas Parks and Wildlife Department (TPWD) to have the state's most flexible deer seasons and bag limits. MLDP has been in effect since 1996 for white-tailed deer and 2005 for mule deer and has been a very successful vehicle for encouraging hunting and deer harvest, deer management, and habitat conservation on private lands in Texas. MLDP has been the key to opening gates and building relationships with private landowners. The program has experienced significant growth since its inception from about 813 properties covering 3.1 million acres in 1998 to over 11,000+ tracts of land covering more than 28 million acres in 2022. The phenomenal growth in participation coupled with static staff levels since 2000 presented TPWD with significant challenges in administering MLDP. These challenges prompted substantial program modifications over the years, necessary to help biologists keep up with the increasing demands for their time and expertise as requested by MLDP participants. Additionally, implementation of the Land Management Assistance (LMA) web-based application has allowed greater efficiency for administration of MLDP. Although these changes were necessary for continued growth and success of the program too much efficiency may have had unintended consequences by diminishing opportunities to maintain critical relationships with private landowners by lessening the need for one-on one contact between landowners and agency staff. TPWD continues to evaluate and address challenges with MLDP looking for best options to best serve landowner in MLDP.

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NOTES:

A Case Study in Grinding Through a Deer Management Issue in South Carolina

Charles Ruth[1], Jay Cantrell[1]

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Abstract:
Deer management in South Carolina is largely an artifact of history, tradition, and politics. This is particularly the case in the coastal plain which encompasses two-thirds of the state and which is often touted as having the earliest opening date (August 15) and longest firearms season (140 days) in the nation, not to mention, no daily or seasonal limit on antlered deer, hunting over bait, and dog hunting. Following the turn of the century the state's deer population began to decline due to two decades of necessary aggressive antlerless harvest, habitat change, and the colonization of the state by coyotes and their impact on deer recruitment. Hunters began to discuss the need for deer management changes leading to an on and off 14-year process by the South Carolina Department of Natural Resources to document public sentiment to gain legislative support for change. Over the years this process involved 25 public meetings, a survey by Responsive Management, an in-house internet survey, a deer hunter mail survey, a survey of DMAP cooperators, and a response to a state Senate Joint Resolution to develop a report on tagging and reporting of harvested deer nationally. This ultimately led to a two-year legislative process resulting in a statewide daily and seasonal limit on antlered deer and an "all deer" tagging program in South Carolina.

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NOTES:

Oklahoma's Deer Program: Management Based by Regulation or Education?

Dallas Barber, Oklahoma Department of Wildlife Conservation

Abstract:
The Oklahoma Department of Wildlife Conservation (ODWC) focuses on balancing deer numbers with available habitat, improving sex ratios, and increasing hunter awareness about their role as a deer manager, leading to an increase in mature bucks in the harvest and minimizing human/deer conflicts. While the ODWC does not manage specifically for trophy deer, we do manage for healthy, well balanced sex ratios which are most likely to produce large antlers and stable populations. All of this is done while still having relatively liberal bag limits and generous season dates. Through education, Oklahoma hunters are seeing improved age structure, and better buck:doe ratios throughout the state.

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NOTES:

White-tailed Deer Breeding Chronology in Southwest Georgia

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Abstract:
It has long been a claim in Southwest Georgia that the peak of white-tailed deer breeding in the area occurs after the peak of deer breeding activity in the rest of the state. Previous data collection was limited to small sample sizes and biased to does harvested during the hunting season. Therefore, it was necessary to survey a larger area with a higher sample size and post-breeding season to limit bias. The Georgia Department of Natural Resources (GADNR) completed this breeding chronology study in Baker, Early, Colquitt, Mitchell, Miller, Seminole, Decatur, Grady, Brooks, and Thomas counties, Georgia. Study areas included private properties and public lands. Adult (1.5 years or older) female white-tailed deer were collected 1 February through 15 April 15, 2020-2022. Landowners harvested the majority of does with a special permit, but GADNR biologists assisted whenever needed. The landowners collected and preserved all fetuses in either a cooler/refrigerator or freezer. GADNR biologists measured fetuses using a standard fetal aging scale to determine conception dates. Number and sex of fetuses were also recorded. Conception dates were averaged for twins, triplets, and even one set of quadruplets. Harvest totaled 177 bred does (304 fetuses). Average conception dates by county ranged from 20 November (Brooks) to 2 January (Decatur). Understanding variation in the timing and duration of the breeding period for white-tailed deer in Georgia is crucial to setting hunting season dates. As a result of this study, changes are being made in the regulations to accommodate counties with a later rut.

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NOTES:

Florida's Private Lands Deer Management Program

Cory Morea, Florida Fish and Wildlife Conservation Commission

Abstract:
The voluntary Private Lands Deer Management Program was developed at the request of private landowners to have the Florida Fish and Wildlife Conservation Commission work closely with them to allow greater flexibility in deer hunting seasons and deer harvest opportunities within sustainable herd management goals for individual properties. Management plans are required for enrolled lands and must include conservation actions to benefit wildlife and could include hunting legacy efforts. As a result, the greater public benefits of the program are (1) better wildlife habitat management, (2) more data on deer populations and harvest to increase understanding of deer management in Florida, and (3) more opportunities to get youth involved in hunting and other fish and wildlife related programs. FWC oversight of deer management, including approval of the management plan and appropriate monitoring measures, ensures accountability and stewardship of the wild deer population on behalf of Florida residents.

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NOTES:

POSTERS

(**denotes student*)

Integrating Urban Deer Management into Statewide Deer Management Planning

***Shane D. Boehne[1], B. Bynum Boley[1], Amanda N. Van Buskirk[1], Kaitlin O. Goode[2], Charlie H. Killmaster[2], Kristina L. Johannsen[2], Gino J. D'Angelo[1]**

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Abstract:
In many regions of the USA, growing urban white-tailed deer (WTD) populations create conflicts with humans. As a result, state wildlife agencies are tasked with resolving urban deer-human conflicts using significant personnel and financial resources. Diverse stakeholder opinions about deer make it difficult for managers to reach consensus on strategies to minimize deer-human conflicts. The objectives of this study are to: 1) characterize the status of state agency urban deer management across the USA, 2) describe best-management practices available for urban deer management, and 3) increase understanding of stakeholder involvement in decision-making for urban deer management. We searched for digitized state WTD management plans to summarize how states manage urban deer. If plans were unavailable, we searched for other online resources and interviewed state agency biologists to identify other ways states manage urban deer. Of 46 states with WTD, we found that 41% had WTD management plans with urban deer considerations, 52% had online urban deer management resources, and 7% had no urban WTD management information. Public input is incorporated in all state plans. Lethal control remains the most common management tool. Overall, states lack strategies, protocols, and supplemental resources to effectively address site-specific urban deer management. This research identified gaps in state urban deer management resources and provides recommendations for integrating urban deer management sections into state WTD management plans. Our recommendations will improve urban deer management materials and facilitate collaboration with stakeholder groups experiencing deer-human conflicts.

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NOTES:

Connecting Urbanization to Population Dynamics: Movement, Resource Selection and Mortality Risk of White-Tailed Deer Across an Urbanization Gradient

***Mikiah Carver-McGinn[1], Christopher Moorman[2], Nils Peterson[2], John Kilgo[3], Elizabeth Kierepka[4], Moriah Boggess[5], Heather Evans[5], Jonathan Shaw[5], Nathan Hostetter[1]**

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[5]North Carolina Wildlife Resources Commission

Abstract:
Urbanization alters landscapes and the associated resources available for wildlife. These changes can drive new selection pressures, as individuals adapt to increased fragmentation and seasonal resources that differ from their historical environments. White-tailed deer (*Odocoileus virginianus*) are an important species to study in urbanizing landscapes because they are an adaptive generalist species that regularly interacts with human altered landscapes. We are conducting a three-year telemetry study to investigate white-tailed deer ecology across an urban-rural continuum in Durham and Orange counties in North Carolina. Our study applies a multi-scale approach to better understand how urbanization affects deer movements, resource selection, and mortality risk across these landscapes. Specifically, we are capturing male and female deer across a gradient from rural forest and farmlands to densely populated suburban areas to investigate: 1) deer movement relative to anthropogenic features and human activity, 2) seasonal home range size and how urbanization shapes landscape-level selection, and 3) deer survival and cause-specific mortality along the urban-rural continuum. Linking deer movement, selection of home range areas, and ultimately variation in mortality risks across these landscapes will provide science-based information to better understand deer ecology in urbanized areas and inform management of deer populations in North Carolina and beyond.

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NOTES:

To Every Thing There is a Season: Understanding Site Fidelity and Space Use in Mule Deer

***Calvin C. Ellis[1], Levi J. Heffelfinger[1], David G. Hewitt[1], Randy W. DeYoung[1], Timothy E. Fulbright[1], Louis A. Harveson[2], Warren C. Conway[3], Shawn S. Gray[4], and Michael J. Cherry[1]**

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[2]Borderlands Research Institute, Sul Ross State University
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[4]Texas Parks and Wildlife Department

Abstract:
Site fidelity is an important aspect of animal ecology and is crucial for understanding animal movement, resource selection, and disease dynamics. To improve our understanding of this vital life-history mechanism, we examined site fidelity of 125 GPS-collared adult mule deer (*Odocoileus hemionus*) across four sites in the Texas Panhandle from 2015-2019. We compared space use and spatiotemporal overlap for 1,115 unique combinations of biologically relevant seasons and years. Seasons for 59 males were pre-rut, rut, post-rut, and antler growth; seasons for 66 females were fawn-rearing, recovery and ovulation, early gestation, and late gestation. In males, mean space use varied throughout the year, ranging from 3,697 ± 219 ($\bar{x}$ ± SE) acres during the rut to 4,142 ± 298 acres post-rut. Mean male site fidelity between years peaked during antler growth at 34% overlap and was lowest during the rut at 25%. Mean female space use ranged from 1,196 ± 65 acres during recovery and ovulation to 1,284 ± 68 acres during late gestation. Female site fidelity between years peaked during late gestation at 42%, followed by recovery and ovulation and early gestation at 40%, and 39% during fawn-rearing. Seasonal variation in space use and site fidelity was common, where mule deer exhibited low overlap in space use (< 42%) during the same biological season across years. This shifting of space use across seasons and years has important implications for harvest management and informing the spatial scale of management for Chronic Wasting Disease.

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NOTES:

A Preliminary Evaluation of the Human Dimensions of Dog Hunting in the Southeastern United States

***Laura E. Franklin[1], Marcus Lashley[1], Elina Garrison[2], Rebecca Peters[2]**

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Abstract:
The use of domestic dogs (*Canis familiaris*) to hunt white-tailed deer, a practice referred to as "dog hunting," is a long-established cultural tradition in the Southeastern United States. Some literature has begun to illustrate the cultural significance of this practice, including its contribution to self- and community-identity, but has also highlighted associated conflicts between land managers, conservationists, and within the hunting community itself, such as trespassing, debates about fair chase, and concerns for animal welfare. In recent years, land managers in north Florida have voiced concern over potentially declining deer populations in areas open to dog hunting. While there may be unique effects on these deer populations and their behavior given the pressures of this hunting mode (i.e., chasing, dog training during fawning season), there is also an important cultural significance tied to this practice that is not well understood by those unfamiliar with its origins. To elucidate the overall impacts that dog hunting might have on deer populations in this region, we will first examine the human dimensions of dog hunting groups that use the Osceola Wildlife Management Area near Lake City, Florida. Our poster provides a local history of dog hunting, examines the origins of conflict described in other studies, and includes preliminary qualitative results from interviews with local dog hunters.

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NOTES:

Rapid Assessment of Deer Impacts io Suburban Plant Communities

***Jamie L. Goethlich[1], Timothy Van Deelen[1]**

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Abstract:
Suburban areas of the eastern United States consistently maintain white-tailed deer (*Odocoileus virginianus*) densities an order of magnitude greater than historic estimates. These dense populations can negatively affect native vegetation, and management, research, and monitoring of suburban deer populations and their impacts using common sampling techniques has proven difficult. Since most suburban land area consists of small private properties, gaining access to conduct research is a major constraint to field-based research. Our objective was to develop and test a method for wildlife managers and citizen scientists to rapidly and accurately assess impacts of deer on suburban plant communities. We focus on in-situ ornamental plantings of northern white cedar (*Thuja occidentalis*; hereafter cedars) and hostas (*Hosta spp*.) as indicator species. These indicators are common throughout the eastern United States and are preferred food plants for deer. Critically, deer browsing on both indicators is evident from a distance, allowing observers to assess browsing from public roads/sidewalks negating need for access to private properties. We tested this method in 11 suburban towns. We completed surveys in each town in 1-2 days, depending on town size (range= 15-50 mi^2) and housing density (range= 49-825 houses/mi^2). We surveyed 6,968 suburban yards, of which, 1,181 had cedars and 2,364 had hostas. Cedar browsing ranged from 17%-78% and hosta browsing ranged from 0%-16% across towns. Browsing frequency varied with landscape characteristics and deer management strategy. This method appears to efficiently and effectively monitor deer impacts to plant communities in suburbs.

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NOTES:

Uncovering the Role of Reproduction and Environmental Temperature on Heterothermy in White-Tailed Deer Utilizing Vits

***Breanna R. Green[1], Evan P. Tanner[1], Clayton D. Hilton[1], Michael J. Cherry[1]**

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Abstract:
Reproduction is typically the most demanding period of a mammal's life cycle, with late gestation and lactation dramatically increasing energetic demand and fasting metabolic rate. This increase in metabolism creates higher heat loads that may negatively affect the condition and health of the female and her offspring. Additionally, reproduction also affects a mammal's ability to thermoregulate and mitigate external heat stress. Determining the physiological cost of high environmental temperatures during reproductive periods is key to understanding the possible limits of thermoregulation. Vaginal implant transmitters (VITs) are commonly used for locating white-tailed deer (*Odocoileus virginianus*) birth sites and fawns. We retrofitted VITs with biologging technology including a temperature sensor and data logger to collect high resolution internal temperature data. We collected local environmental temperature data using black-body globes, which account for the influence of solar radiation on ambient temperature. We tested the hypothesis that pregnancy, time of day, and environmental temperatures would influence the internal temperature of white-tailed deer. We analyzed the internal temperature of seven unbred and three bred female deer from March to September 2022. We observed environmental temperatures ranging from 30 to 120°F, and internal temperatures of 92.5-108.5°F. We observed interactive effects of time of day, environmental temperature, and reproductive status on internal temperature. Greatest internal body temperatures occurred in bred females, during the day, at high environmental temperatures. Our approach of integrating novel technology to monitor both environmental temperature and internal body temperature revealed the effects of pregnancy on thermoregulation.

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NOTES:

Detection of *Tritrichomonas Foetus* within the Reproductive Tract of Male White-Tailed Deer in Louisiana

***Hope E. Hebert[1], Kim Marie Tolson[1], Jim LaCour[2]**

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Abstract:
Tritrichomonas foetus is a protozoan endemic in a variety of animal hosts, both wild and domestic, although no available literature has been found documenting its presence in white-tailed deer. This protozoan is the causative agent of trichomoniasis, a sexually transmitted infection of high economic importance to the cattle industry. Trichomoniasis leads to spontaneous miscarriage and infertility in cows that have copulated with infected bulls. These bulls are asymptomatic lifelong carriers and must be culled from herds to avoid reinfection, potentially resulting in substantial economic loss and decreased productivity in infected herds. Hunters and biologist alike have noticed declining deer numbers in Louisiana. During the 2013-2014 deer season, hunter harvest data from Sherburne WMA in southcentral Louisiana revealed a decrease in fawn production and lowered lactation rates of adult does. The fortuitous testing of five adult bucks for the presence of *Tritrichomonas foetus* the following season resulted in a positive PCR (polymerase chain reaction) test from one of the samples. This research project aims to determine the presence and distribution of *T. foetus* in Louisiana's free-ranging herds of white-tailed deer. Hunter-harvested bucks two and a half years old and older have been sampled during the 2019-20, 2020-21, and 2021-22 hunting seasons in multiple locations across the state. Testing has revealed that *T. foetus* is present in free-ranging adult bucks in southwest, southcentral, and northeast Louisiana. Additional testing will be performed on juvenile bucks (six months old and 1.5 years old) during the 2022-2023 hunting season.

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NOTES:

Sika Deer Occupancy on the Delmarva Peninsula

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Abstract:
Effective management of a non-native deer species requires knowledge of its potential for range expansion. Sika deer (*Cervus nippon*) were introduced to the Delmarva Peninsula in 1916 and are managed with the goal of limiting range expansion. However, factors influencing sika deer distribution and occurrence remain uninvestigated and sika deer range continues to expand. Understanding how sika deer relate to landscape variation is the first step in anticipating and addressing their impacts on native communities and their role as a potential competitor with white-tailed deer. From 10 January 2022 – 30 March 2022, we surveyed 61 sites in Dorchester, Wicomico, and Somerset counties in Maryland with camera traps. We selected sites through a stratified random sampling scheme focused on capturing variation in forest cover, marsh cover, and sika deer density across the study area. Each site was surveyed with one camera trap baited with 25 lbs of corn for ≥ 14 days, yielding 207,490 photos. We evaluated single-season occupancy models to estimate sika deer occupancy within current range, project potential sika deer distribution across the Delmarva Peninsula, and to identify landscape-level covariates that predict sika deer occurrence. Both forest cover and wetland cover positively impacted sika occupancy and no sika were detected in sites with < 60% cover. Improving our understanding of sika deer occurrence relative to landscape-level covariates is key to developing effective management strategies and informing further research into sika deer ecology, especially their relationship with white-tailed deer.

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NOTES:

Anomaly or Cause for Concern? Congenital Defects in a Population of White-Tailed Deer

***Mike S. Muthersbaugh[1], Alex J. Jensen[1], Elizabeth Saldo[1], Charles Ruth[2], Jay Cantrell[2], John C. Kilgo[3], Davis S. Jachowski[1]**

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Abstract:
Stillbirths and congenital defects in white-tailed deer are reportedly rare but may be more prevalent in some populations. As part of a fawn survival study, from April 2019-July 2021 we captured 90 fawns from does implanted with vaginal implant transmitters (VITs) and 10 fawns from unmarked does. Among the 100 fawns, seven were stillborn and four living fawns were piebald. Two living fawns were malformed, with obvious skeletal abnormalities (possibly piebald anomaly but with normal coat patterns). Three of the stillborn fawns were also piebald. In addition, we captured one piebald doe that was too small to implant a VIT. Although piebald anomaly is usually reported to affect less than one percent of deer, we observed at least seven percent of all fawns displaying the genetic abnormality. If we assume all malformed fawns and partially formed fetuses were caused by piebald genetic abnormalities, greater than 10% of all observed fawns displayed this condition. All living piebald and malformed fawns died from a failure to thrive or predation, suggesting these genetic abnormalities were maladaptive. Research on piebald anomaly in deer is scant, but our observations suggest a deeper understanding of genetic abnormalities in deer may be warranted in certain populations. Ultimately, piebald anomaly likely has little impact on deer populations on a regional scale but may impact local deer populations. Future research should explore piebald anomaly generally and evaluate possible impacts to population dynamics in deer herds with existing population growth rate concerns.

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NOTES:

Effects of Preemergence and Postemergence Herbicide Applications to Control Sericea Lespedeza for White-Tailed Deer Forage Management

***Lindsey M. Phillips[1], Mark A. Turner[1], Bonner L. Powell[1], J. Wade GeFellers[1], Jacob T. Bones[1], Spencer G. Marshall[1], Craig A. Harper[1]**

[1]University of Tennessee

Abstract:
Sericea lespedeza (*Lespedeza cuneata*) is a nonnative perennial legume that outcompetes native plant species in early successional plant communities, including forage plants for white-tailed deer (*Odocoileus virginianus*). Postemergence herbicide applications control sericea, but little research has been conducted evaluating preemergence herbicides. We measured sericea control following four postemergence and preemergence herbicide applications across three study sites in Tennessee and Alabama (2018–2022). We established nine, 0.2-acre treatment units at each site. One unit (control) received no herbicide application. Eight units were divided between two postemergence treatments: four with 2 qt/ac of glyphosate and four with 16 oz/ac of triclopyr+fluroxypyr. We randomly assigned one of four preemergence imazapic treatments to each unit: 0 oz/ac, 4 oz/ac, 8 oz/ac, or 12 oz/ac. Initial postemergence treatments were applied August 2018. We applied preemergence treatments following prescribed fire in April 2019 and March 2022. We applied postemergence spot-treatments in early summer 2019–2021. We measured plant coverage in late May/early June (2018–2022). We used linear mixed-effects models to estimate differences in coverage of sericea, deer forage plants, and annual grasses. Both postemergence herbicide applications controlled sericea, but the addition of imazapic did not increase control. Low rates of imazapic reduced annual grass coverage, but a high rate (12 oz) reduced coverage of deer forage plants. We recommend managers use glyphosate or triclopyr+fluroxypyr postemergence to control sericea and include low rates of imazapic if annual grasses are present to compete with deer forage plants.

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NOTES:

Training Future Leaders in Conservation While Furthering Our Understanding of White-Tailed Deer Biology

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Abstract:
Capturing and handling of white-tailed deer (WTD) are critical components of research and management efforts. However, hands-on educational opportunities demonstrating these techniques are increasingly rare at universities. Additionally, as highly contagious wildlife diseases such as chronic wasting disease become more prevalent, there is a need to develop capture protocols that minimize risk to biologists and deer populations. Since 2010, the East Foundation and the Caesar Kleberg Wildlife Research Institute have filled these needs by conducting a large scale, WTD study evaluating a free-ranging WTD population across 215,000 acres in South Texas. The objective of this effort is to quantify population performance, investigate responses to environmental variation, train future professionals in data collection and animal handling, and to develop capture methods that best mitigate the risk of disease spread. Individual deer are captured via aerial net gunning, transported to a central processing trailer, and released back onto the landscape following collection of biological data. Capture and data collection methods are constantly assessed and modified to improve animal welfare and to mitigate the risk of spreading wildlife disease. To date, over 1800 graduate and undergraduate students from over 12 universities, wildlife biologists from multiple state agencies, and professional veterinarians have supported and learned from the capture of over 5500 deer. Through this effort we are able to educate the next generation of science-minded managers and management minded scientists through hands-on training and also gather data that reveals drivers of WTD population performance, furthers our understanding of WTD biology, and informs wildlife management.

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NOTES:

CWD Sentinels: Detecting Environmental Prion Protein (ePrP) via Surfaces for the Early Discovery of Chronic Wasting Disease

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Abstract:
Chronic wasting disease (CWD) continues to be detected in new regions throughout North America utilizing traditional diagnostic tests (e.g., ELISA, IHC) on post-mortem tissue samples, negatively affecting deer management. Although these tests are accurate for such purposes, scientists are developing highly sensitive prion detection methodologies to fight the war against CWD in new ways. Real-time quaking-induced conversion (RT-QuIC) is one such assay for misfolded prion (PrPRes) detection. Similar to environmental DNA (eDNA) advances for the detection of pathogens and discovery of species in aquatic and terrestrial environments, our work investigates a rapid method for extracting prions from swabs of environmental surfaces to detect PrPRes when paired with the RT-QuIC assay. We deployed surfaces shown to effectively bind misfolded prions as environmental prion protein (ePrP) sentinels in food sources of captive and free-ranging herds known to have CWD at various prevalence. We were able to detect PrPRes in natural settings using the swabbing and extraction methods in conjunction with RT-QuIC. CWD prevalence of a captive deer herd interacting with the sentinels coincided with intensity of PrPRes detection - in a herd with one of 12 IHC positive animals, one of 16 swabs were RT-QuIC positive, and in a herd with 13 of 19 IHC positive animals, 19 of 34 swabs were RT-QuIC positive. Importantly, we identified potential environmental factors (e.g., feed type) that affected RT-QuIC detection results. Our preliminary findings open the possibility for ePrP detection through non-invasive, "non-normal" methods for real-time surveillance and discovery of CWD.

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NOTES:

TABLE 1. Southeastern tate deer harvest summaries for the 2021-2022 FY or most recent available season.

State	Land Area (sq. mile)	Deer Habitat		Percent Forested	% Land Area Public Hunting	Harvest		
		(sq. mile)	(% Total)			Male	Female	Total
AL	51,628	46,981	91	69	5	134,113	160,172	301,122[1]
AR	52,068	38.607	74	56	12	97,840	83,539	181,379
DE	1,954	1,592	81	15	10	6,891	8,492	15,383
FL	53,632	27,573	51	48	17	52,254	21,817	74,098
GA	57,800	38,674	67	67	6	108,966	148,488	257,454
KY	40,406	39,092	97	59	9	75,202	57,126	132,328
LA	41,406	26,562	64	52	9.5	128,370	105,030	233,400
MD	9,837	8,766	89	39	6	27,947	39,498	67,445
MO	69,561	63,910	92	31	4	170,565	124,578	295,143
MS	47,296	31,250	66	66	6	117,839	152,062	269,901
NC	52,660	36,154	67	57	6	98,581	90,383	188,964
OK	69,919	37,425	54	19	3	69,308	48,321	117,269
SC	30,207	21,920	73	63	7.5	95,351	79,218	174,569
TN	42,246	25,770	61	49	9	81,621	50,584	132,214
TX	261,914	177,272	58	40	<2	447,972	379,958	827,929
VA	39,589	37,939	96	61	11	107,611	82,971	190,582
WV	24,064	22,972	95	79	11	69,282	35,992	105,278
Avg or Total	946,187	682,459	75.06	51.18	7.88	1,889,713	1,668,229	3,564,458

Footnote

[1] Total harvest includes deer of unknown gender.

Harvest/sq. mile		Method of Data Collection[2]	Estimated Preseason Population	Length of Season (Days)[3]			Method of Setting Seasons[4]	% Land Area Open to Dog Hunting
State	Deer Habitat			Archery	Black Powder	Firearms		
AL	5.8	A, B,C,E,F	1,250,000	133 (C)	5 (A)	98 (A,C)	A,B	67
AR	4.9	A, C, F, G	1,000,000	160 (C)	12 (C)	50 (C)	A,B	70
DE	10.7	B, F, G	46,000	155 (C)	17 (A,B)	43 (A,B)	A,B,C	0
FL	2.7	E, F	-	35-38	14	74-79	A,B	20
GA	6.7	A, C, D,E, F, G	1,000,000	128-145 (C)	92 (A,C)	85 (C)	A,B,C	23
KY	3.6	A, C, D, F, G	919,308	136 (C)	2(A), 9(B)	16 (C) + 4 Jr	A,B,C	0
LA		A, B, C	500,000	119-138 (C)	14(A,B)	64-79	A,B,C	80
MD	7.7	B,C,D,F,G	231,000	3(B) 110 (C)	3(A), 15 (B)	15(A), 3 (B),+ 2 Jr day	A,B,C	0
MO	4.7	B,C,D,F,G	1,500,000	112	11	11-20 + 5 Jr	A,B	0
MS	8.6	C, E	1,475,000	122 (C)	12 (A)	71	B,C	90
NC	5.2	A,B,C,D,F,G	1,111,000	21-117	14	20-78	A,B,C	50
OK	2.4	A,C, E, online	750,000	107 (C)	9	16	A,B	0
SC	9.3	A,B,C	700,000	16 (A)	10 (A)	70-140	C	60
TN	5.7	A, B, C, D, G, I	-	40 (C)	14 (C)	60 (C)	A,B	0
TX	4.6	B	5.4 million[5]	35	14	72-86 (B, C)	A,B	0
VA	5.5	A,B,C,D,F	1.18 million	42-77	14-36	15-50	A,B	55
WV	4.6	F	460,000	102 (C)	11 (C)	26 (C)	A,B,C	0
Avg or Total	5.8		17,522,308					30.29

Footnotes

[2] A–Check Station; B–Mail Survey; C–Jawbone Collection; D–Computer Models; E–Telephone Survey; F– Telecheck; G– Butchers/Processors, H – Harvest card submitted end of season, I – Voluntary Internet Reporting.

[3] A–Early Season; B–Late Season; C–Full Season.

[4] A–Harvest & Biological; B–Departmental/Commission Regulatory; C–Legislative.

[5] Texas population estimates should not be compared to estimates prior to 2005 due to changed methodology.

TABLE 1. Continued

State	No. of Hunters	5-Year Trend	Hunting License Fees (Full Season)		Tagging System		
			Resident	Non-Resident	Physical Tag? License Tag? None?	Mandatory? Volunteer? None?	Bonus Tags Available?
AL	237,878	Stable	$30.25	$152.55-$350.15	Hunter Log	Mandatory	DMAP
AR	257,742	Stable	$10.50 – 25	$55 – 350	License Tag	Mandatory if not checked immediately upon harvest	DMAP & CWD Private Lands Program
DE	18,660	Down	$22	$199.50	Physical Tag	Mandatory	2 Antlered, Unlimited Antlerless
FL	122,312	Stable	$22	$156.50	Electronic Reporting	Mandatory	Private Lands Programs
GA	209,742	Stable	$40	$325	License Tag	Mandatory	DMAP, WMAs
KY	350,000	Up	$62	$335	License Tag/ Hunter Log/ Carcass Tag	Mandatory	Yes, select zones
LA	208,200	Stable	$35	$300	Physical or Electronic Tag	Mandatory	DMAP
MD	55,550	Down	$36.50	$130	Physical Tag or Electronic Proof of Registration	Mandatory	Antlered only
MO	476,194	Down	$17	$265	License Tag	Mandatory	DMAP
MS	195,380	Up	$25-$45	$300-$375	None	None	DMAP & FMAP
NC	241,619	Up	$39	$200	License Tag	Mandatory	DMAP & CDMAP
OK	366,547	Stable	$25	$300	License Tag	Mandatory	DMAP
SC	129,591	Stable	$25	$235-375	Physical Tag	Mandatory	Yes & DMAP
TN	185,900	Stable	$68-166	$306	Electronic Proof of Registration	Mandatory	Select WMAs and Unit CWD
TX	756,171	Stable	$25	$315	License Tag	Mandatory	MLDP tags
VA	185,427	Down	$46-82	$197-259	License Tag	Mandatory	Unlimited on private lands, antlerless only
WV	178,281	Down	$35	$196	Physical Tag	Mandatory	Yes
Total	4,175,194						

Footnote

[6] **(Not applicable this year) Asterisk if estimate includes landowner exempted hunters.**

State	Mandatory Orange	Crossbow Permitted	Deer Related Accidents						Highway Kill[7]
			Firearms		Stands		Other		
			Injuries	Fatalities	Injuries	Fatalities	Injuries	Fatalities	
AL	Yes	Yes	4	0	5	0	6	0	30,000 (C)
AR	Yes	Yes	3	0	13	4	1	0	22,000 (C)
DE	Yes	Yes	0	0	0	0	0	0	5,350 (C)
FL	WMAs only	Season & Handicap	2	0	0	0	0	0	38,483 (C)
GA	Yes	Yes	NA	NA	NA	NA	NA	NA	65,000 (C)
KY	Yes	Season & Handicap	NA	NA	NA	NA	NA	NA	NA (A)
LA	Yes	Yes	3	1	2	0	0	0	9,200-13,250 (C)
MD	Yes	Yes	3	0	8	0	0	1	33,530 (C)
MO	Yes	Yes	2	1	-	-	0	0	44,500 (C)
MS	Yes	Yes	7	0	3	0	0	0	33,425 (C)
NC	Yes	Yes	5	0	6	0	0	1	77,673 (C)
OK	Yes	Yes	3	0	3	0	0	0	12,605 (C)
SC	WMAs only	Yes	8	0	7	2	0	0	6,409 (A)
TN	Yes	Yes	1	0	7	2	NA	NA	36,146 (C)
TX	WMAs only	Yes	0	1	0	0	0	0	60,857 (C)
VA	Yes	Yes	11	1	9	1	NA	NA	64,538 (C)
WV	Yes	Yes	NA	NA	NA	NA	NA	NA	24,961 (C)
Total									566,702

Footnote

[7] **A–Actual number based on reports; B–Estimated road kill; C-State Farm estimate**

TABLE 1. Continued

State	Limits[8]			Antler Restrictions[9]	% Hunting Success[10]			Avg. Leasing Fees/Acre
	Season	Antlerless	Antlered		Archery	Muzzleloader	Firearms	
AL	3/None[8]	1 per day	3	A (one buck must have 4-points on 1 side); B (one county all bucks must have 3-points on 1 side); C (23 WMAs and SOAs)	~15	~20	~45	$6-18+
AR	6	3-6	2	A,B,C No antler restrictions within CWD Management Zone counties	?	?	?	$6-10
DE	None	4+	2	One buck must have a spread ≥15"	?	?	?	$5-20
FL	5	Up to 2	Up to 5	A	-----	35.5% Combined	-----	$10-15
GA	12	10	2	A (One buck must be 4-points on 1 side or 15" outside spread); B (9 counties are more restricted)	12	2.5	54	$5-25
KY	None	Varies	1	None	-----	35% Combined	-----	$5-40
LA	6 statewide/ 3 in 2 of 10 deer areas	3, 1either-sex	2, 1 either-sex	No	30	26	58	$5-40
MD	Varies	Varies	2; only 1 with firearm	3-pt restriction on two bucks	38	28	44	$5-35
MO	Varies	Varies	2; only 1 with firearm	B (50 counties) Doesn't apply to Jr.	23	-	42	?
MS	14	10/5/2	4/3	C	34	33	55	?
NC	6[8]	4[8]	2	NA	-----	49% Combined	-----	?
OK	6	Up to 6	2	No	31	27	40	$10-20
SC	8+	3+	5	A (on 2 of buck bag limit); C (16 WMAs)	31	20	70	$8–20
TN	None	Varies	2 statewide/ 3 in Unit CWD	C (on select WMAs)	?	?	?	?
TX	5	Up to 5	Up to 3	Yes, 117 counties	-----	62% Combined	-----	$7-30
VA	6 (east) & 5 (west)	6	3 (east) & 2 (west)	On 1 WMA + 5 counties	~30	~37	~51	UNK
WV	11	Up to 8	Up to 3	5 WMAs & 2 State Forests	34	11	42	$3-10
Avg.					24.36	8.79	42.6	

Footnotes

[8] AL – 3 antlered bucks per season. No season limit on antlerless deer.
FL – A total of two deer may be harvested per day. Both may be antlerless deer during archery season and if taken with antlerless deer permits. Only one/day may be antlerless during firearms antlerless deer seasons.
MD – In Region B: 10 antlerless deer limit in firearms, 10 antlerless deer limit in muzzleloader, 15 antlerless deer limit in archery. In Region A: 2 antlerless deer limit, no more than one per weapon season. Statewide Antlered Deer Limit: Two antlered deer, no more than one in a weapon season. One bonus antlered deer may be harvested in Region B during any weapon season.
MO – No daily or annual limit of antlerless deer but number that can be harvested in each county varies.
NC – Unlimited bonus antlerless tags are available during the Urban Archery Season in participating municipalities.

[9] A–Statewide Antler Restrictions; B–County Antler Restrictions; C–Region or Area Antler Restrictions.

[10] Averages do not include combined reports.

State	Private Lands Program				Trailing wounded deer with dogs legal?	Supplemental feeding legal?	Baiting legal?
	Type[11]	Min. Acreage Requirements	Fee	No. of Cooperators			
AL	A	None	None	140	Yes	Yes	Yes[12]
AR	A	500	None	648	Yes	Yes (except in CWD Zone where bait may only be used from Sept. 1-Dec. 31)	Yes, Private
DE	3 levels DDAP	None	None	79, 350, 12	No	Yes	Yes, Private
FL	A, C	640; 5000	None	921; 34	Yes	Yes	Yes, Private
GA	DMAP	250-1500	$200-$1,000	130	Yes	Yes	Yes
KY	B	None	None	500	Yes	Yes (except March – May)	Yes, Private (Except CWD Zones)
LA	A	40/500/1,000	$100-$1500	687	Yes	Yes (Except CWD CA)	Yes, Private (Except CWD CA)
MD	None				Yes	Yes	Yes, Private Only
MO	A,B	20 landowner tags; 500 DMAP (40 municipalities)	None	89 DMAP landowners	Yes	Yes (except CWD zone)	No
MS	A,D	Variable	None	532	Yes	Yes	Private land only
NC	A	Regional; 1,000/500	$50	63	Yes	Yes	Yes, Private
OK	A	1,000	$200-400	150	Yes	Yes	Yes, Private
SC	A	None	$50	1,383-2.9 mil ac	Yes	Yes, Private	Yes, Private
TN	None				With officer approval	Yes (except in CWD positive or high risk counties)	No
TX	A	None	None	7,524 properties under a wildlife management plan – 135 wildlife cooperatives (4,500 + members) 32.2 mil ac	Yes	Yes	Yes
VA	DCAP DMAP DPOP	None	None	670 680 13	Yes (weapon allowed)	No (Sept 1 – first Sat in Jan) statewide. Illegal year round in 34 of 95 counties.	No
WV	None				Yes	Yes[13]	Yes[13]

Footnotes

[11] A–DMAP; B–Landowner tags; C–Antlered buck tags; D–Fee MAP.

[12] Must possess Baiting Privilege License ($15.25 resident, $51.85 non-resident) to hunt deer with bait on private lands; hunting deer with bait illegal on public lands

[13] Hunting deer with bait illegal on all public lands and on private and public lands in CWD disease management area.

NOTE: All states require hunter education, permit handguns for use on deer, and do not permit use of drugged arrows on deer.

TABLE 2. Southeastern state summaries of chronic wasting disease (CWD) surveillance and management information for captive and wild cervids, Southeast Deer Study Group Annual Meeting, 2023.

State	Year of First Detection	Previous Year Cervid Testing Season				Total Cervid Testing (all years)				Number of Positive Cases	Sampling Methods	Surveillance and Management Practices
		Captive		Free Range		Captive		Free Range				
		# S	# P	# S	# P	# S	# P	# S	# P			
AL[1, C]	2022	579*	0	3,372	2	2,064*	0	14,615	2	1	A, B, D	A, B, D, E, F, H, I 4
AR[1, C]	2016	>75	0	8,389	209	>1000	0	48,706	1,328	19	A, B, C, D	A, B, C, D, E, F, G, H, I, J
DE[1, A]	NA	0	0	492	0	0	0	10,539	0	0	A, B	A (Draft), B, E, F
FL[1, B]	NA	14	0	1,255	0	111	0	17,689	0	0	A, B, D	A, B, E, F, I
GA[1, A]	NA	0	0	1,404	0	0	0	14,404	0	0	A, B, D	A, B, C, D, E, F, G, I
KY[2, B]	NA	781	0	7,548	0	2,751	0	42,838	0	0	A, B, D	A, B, C, D, E, F, G, I
LA[1, A]	2022	UNK	0	1,602	1	UNK.	0	13,551	1	1	A, B, D	A, B, C, E, F, G, H, I
MD[1, C]	2010	0	0	710	53	0	0	11,500	133	2	A, B, D	A, C, D, E, F, I
MS[1, B]	2018	727	0	6,356	51	3,295	0	40,281	134	9	A, B	A, B, C, D, E, F, G, H, I
MO[1, C]	2010	863	0	32,761	86	1,958	11	214,576	292	22	A, B, C, D	A, B, C, D, E, F, G, I, J
NC[1, A]	2022	49	0	7,346	1	>2,000	0	22,616	1	1	A, B, D	A, B, C, D, E, F, G, H, I
OK[1, A]	1998	UNK	0	117	0	UNK	3	>12,000	0	2	B, C	A, B, E, I
SC[1, B]	N/A	0	0	3	0	0	0	4,788	0	0	A, B, D	A, B, E, F, H, I
TN[1, A]	2018	UNK	0	16,240	631	UNK	0	66,786	1,953	16	A, B, C, D	A, B, C, E, F, G,H, I, J
TX[3, C]	2012	21,304	130	14,284	19	139,533	312	120,976	87	16	A, B, D	A, B, C, D, E, F, I
VA[1, A]	2009	15	0	6,157	26	633	0	33,119	135	11	A, B	A, B, C, D, E, F, G, H, I
WV[1, A]	2005	A	A	1,003	108	A	A	>21,000	572	5	A, B, C, D	A, B, C, F, G, I
Total		24,407	130	109,039	1,187	153,345	326	709,984	4,638	105		

NOTE: Captive refers to pen facilities or release sites (high-fenced pastures/enclosures). Those states that have not tested captive sites may not have the authority to do so.

Legend

S-Number Samples
P-Number Positive
UNK-Unknown
* For Herd Certification Program herds only.

Sampling Period

[1] July 1 – June 30
[2] March 1 – February 28
[3] September 1 – August 31

Sampling Methods Key

A. Hunter Harvested (taxidermist, meat processor, veterinarian, drop-off freezer/container, and/or CWD sampling station)
B. Select Sampling (roadkill, sick deer, and/ or found dead)
C. Targeted Sharpshooting
D. Risk Based

Surveillance and Management Practices Key

A. CWD Surveillance and/or Management Plan
B. Statewide and/or targeted CWD sampling
C. Establish CWD Management Zones
D. Require captive cervid testing
E. Live cervid importation restriction
F. Dead cervid transportation restriction
G. Baiting restriction
H. Lures or other body fluid use restriction
I. Outreach / Education campaigns regarding CWD
J. Targeted removals

Captive Cervid Authority

[A] State Fish and Wildlife Agency does not have captive cervid authority
[B] State Fish and Wildlife Agency has shared captive cervid authority
[C] State Fish and Wildlife Agency has full captive cervid authority
[D] No captive cervid industry

NOTES

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