DEER MANAGEMENT IN A RAPIDLY CHANGING WORLD: BRIDGING A GENERATIONAL DISCONNECT

FEBRUARY 23-25, 2020

43RD ANNUAL MEETING
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AUBURN, ALABAMA

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DEER MANAGEMENT IN A RAPIDLY CHANGING WORLD: BRIDGING A GENERATIONAL DISCONNECT

43RD ANNUAL MEETING
OF THE SOUTHEAST DEER STUDY GROUP

FEBRUARY 23 - 25, 2020 | AUBURN, ALABAMA

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WELCOME / ACKNOWLEDGMENTS

The Alabama Division of Wildlife and Freshwater Fisheries welcomes you to the 43rd Annual Meeting of the Southeast Deer Study Group in Auburn, Alabama.

We thank the Kentucky Department of Fish and Wildlife Resources who hosted last year's meeting, the Kentucky Fish and Wildlife Foundation, and all of the sponsors for their generous contribution to this years' meeting. A complete list of sponsors is listed below and inside the back cover.

COMMITTEES

MEETING ORGANIZERS
Chris Cook
Stephen Ditchkoff
Capt. William N. Gray II
William Gulsby
Kevin McKinstry

PAPER/POSTER SELECTION
Ryan Basinger
Stephen Ditchkoff
William Gulsby
Chris Cook

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Chris Cook
Elizabeth Kotowski
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THE 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 committee 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.

TWS Professional Development

The Wildlife Society will allow a maximum of 13 Continuing Education Units (CEUs) in Category I of the Certified Wildlife Biologist® Renewal/Professional Development Certificate Program for participation in the 43rd Annual Southeast Deer Study Group meeting. Participants will need to list these CEUs on their Renewal or Professional Development Certificate application. For more information about professional development, visit The Wildlife Society's website, www.wildlife.org.

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 pro- cess. 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

YEAR	LOCATION	MEETING THEME
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

COMMITTEE MEMBERS

SOUTHEAST DEER STUDY GROUP, THE WILDLIFE SOCIETY, SOUTHEAST SECTION

STATE	NAME	AFFILIATION
Alabama	Chris Cook	Alabama Division of Wildlife and Freshwater Fisheries
Arkansas	Ralph Meeker	Arkansas Game and Fish Commission
	Jeremy Brown	Arkansas Game and Fish Commission
Delaware	Eric Ness	Delaware Division of Fish and Wildlife
Florida	Cory R. Morea	Florida Fish and Wildlife Conservation Commission
	Becky Peters	Florida Fish and Wildlife Conservation Commission
	Steve Shea (Chair)	Shea Environmental Services
Georgia	Charlie Killmaster	Georgia Department of Natural Resources
	Tina Johannsen	Georgia Department of Natural Resources
	Karl Miller	University of Georgia
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	Kyle Sams	Kentucky Department of Fish and Wildlife Resources
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	Steve Demarais	Mississippi State University
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	Kevyn Wiskirchen	Missouri Department of Conservation
North Carolina	David Sawyer	North Carolina Wildlife Resources Commission
	Jonathan Shaw	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 Kelly	Tennessee Wildlife Resources Agency
	Ben Layton	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
	Nelson Lafon	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
QDMA	Kip Adams	Quality Deer Managment 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		

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

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

ORAL PRESENTATION SCHEDULE

8:00 AM - 10:05 AM | PLENARY SESSION | GRAND BALLROOM

Moderator: Chuck Sykes, Director - Alabama Wildlife & Freshwater Fisheries Division

Welcome *(8:00 AM-8:10 AM)*
Chris Cook

Introduction *(8:10 AM-8:25 AM)*
Chuck Sykes

Educating Future Wildlife Professionals: The University Perspective *(8:25 AM-9:00 AM)*

America's Wildlife Values are Shifting and Hunting is Facing an Uncertain Future. Is R3 the Answer? *(9:00 AM-9:35 AM)*

Conservation Leaders for Tomorrow; Professional Development and Cultural Awareness About the Role of Hunting in Wildlife Conservation *(9:30 AM-10:05 AM)*

10:25 AM - 11:45 AM | TECHNICAL SESSION I | GRAND BALLROOM

Moderator: Johnathan Bordelon - Louisiana Department of Wildlife and Fisheries

Using Fecal DNA and GPS Telemetry to Quantify the Consumption of White-tailed Deer by Carnivores *(10:25 AM-10:45 AM)*

White-tailed Deer Survival in the Florida Panther Range *(10:45 AM-11:05 AM)*

Effects of Predation Risk on Intra-specific White-tailed Deer Activity Overlap *(11:05 AM-11:25 AM)*

Behavioral Responses of White-tailed Deer to Heat Stress and the Potential for Interspecific Competition *(11:25 AM-11:45 AM)*

1:30 PM - 3:10 PM | TECHNICAL SESSION II | GRAND BALLROOM

Moderator: William McKinley - Mississippi Department of Wildlife, Fisheries, and Parks

Biology vs. Sociology: The Paradox of Chronic Wasting Disease *(1:30 PM-2:10 PM)*

First Full Hunting Season Since Discovery of CWD in Tennessee: An Update *(2:10 PM-2:30 PM)*

ORAL PRESENTATION SCHEDULE

Initial Response of Deer Hunters in West Tennessee to Discovery of CWD *(2:30 PM-2:50 PM)*

*Bonner L. Powell 22

Revisiting Hunter Perceptions Toward Chronic Wasting Disease: Changes in Behavior Over Time *(2:50 PM-3:10PM)*

Angela Holland 23

3:30 PM - 4:50 PM | TECHNICAL SESSION III | GRAND BALLROOM

Moderator: Mark Turner - School of Forestry and Wildlife Sciences, Auburn University

Becoming Preppers: Steps Florida is Taking to Protect Against and Prepare for CWD *(3:30 PM-3:50 PM)*

Rebecca Peters 24

A Look at Chronic Wasting Disease Sampling Frequency, Costs and Budgets, 2008 to 2018 *(3:50 PM-4:10 PM)*

Matthew D. Ross 25

A Changing Paradigm in Deer Harvest: Harvest Sex Ratios and Deer Densities Relative to Goals *(4:10 PM-4:30 PM)*

Kip P. Adams 26

Impacts of Special Hunting Clinics for College Students on Recruitment and Retention of Hunters *(4:30 PM-4:50 PM)*

*Teddy E. Fisher 27

Tuesday, February 25th

8:00 AM - 10:00 AM | TECHNICAL SESSION IV | GRAND BALLROOM

Moderator: Kevyn Wiskirchen - Missouri Department of Conservation and Natural Resources

Using FSI to Increase Summer Deer Forage While Retaining Acorn Production in Coastal Plain Hardwoods *(8:00 AM-8:20 AM)*

*Mark A. Turner 28

Attractiveness of Masting Oaks to White-tailed Deer and Cascading Effects on Plant Communities *(8:20 AM-8:40 AM)*

*Moriah Boggess 29

Understanding Adult Male White-tailed Deer Habitat Selection During the Mississippi Hunting Season *(8:40 AM-9:00 AM)*

*Colby B. Henderson 30

Shedding Light on Shed Antlers for Assessing Male Quality in White-tailed Deer Populations *(9:00 AM-9:20AM)*

*Nicholas J. Deig 31

ORAL PRESENTATION SCHEDULE

8:00 AM - 10:00 AM | TECHNICAL SESSION IV | GRAND BALLROOM

Moderator: Kevyn Wiskirchen - Missouri Department of Conservation and Natural Resources

10:20 AM - 11:40 AM | TECHNICAL SESSION V | GRAND BALLROOM

Moderator: Jeremy Meares - Westervelt Wildlife Services

1:20 PM - 3:00 PM | TECHNICAL SESSION VI | GRAND BALLROOM

Moderator: Monet Gomes – School of Forestry and Wildlife Sciences, Auburn University

ORAL PRESENTATION SCHEDULE

Using Artificial Intelligence (AI) and Big Data Technology to Revolutionize Trail Camera Population Studies *(2:40 PM-3:00 PM)*

Rans Thomas and Johnathan Samples 42

3:20 PM - 4:40 PM | TECHNICAL SESSION VII | GRAND BALLROOM

Moderator: Chris Cook, Alabama Division of Wildlife and Freshwater Fisheries

Estimating Effects of Season Structures on White-tailed Deer Harvest in Alabama *(3:20 PM-4:40PM)*

Amy L. Silvano 43

Changing Hemorrhagic Disease Patterns Over Four Decades *(3:40 PM-4:00 PM)*

David E. Stallknecht 44

An Evaluation of Crossbow Use in Wisconsin *(4:00 PM-4:20 PM)*

Robert R. Nack 45

Potential Effects of the 2019 River Flooding on the Lower Atchafalaya Basin Deer Herd *(4:20 PM-4:40 PM)*

Johnathan Bordelon 46

The Flood of 2019: An Ecological Disaster in the Mississippi Delta *(4:40 PM-5:00 PM)*

William T. McKinley 47

*Student Presenter

#SEDSG2020

POSTER PRESENTATION LIST

EDUCATING FUTURE WILDLIFE PROFESSIONALS: THE UNIVERSITY PERSPECTIVE

Author: William D. Gulsby

School of Forestry and Wildlife Sciences, Auburn University

Abstract:
Recruitment of competent wildlife professionals in the 21st century has been identified as a major hurdle for many wildlife management organizations. Factors that seem to frequently arise during discussions of this issue are a lack of interest in game management or a lack of experience with field-based wildlife management techniques. This problem may have worsened with time, but it is somewhat surprising that it was first identified in the wildlife literature more than 20 years ago. I will share data on the backgrounds, interests, and career goals of current undergraduate wildlife students, identify the challenges wildlife faculty face in providing them with a well-rounded education, and discuss how these factors combine to pose challenges in creating the next generation wildlife biologists and, more specifically, deer biologists. Finally, I will propose potential solutions that universities, state wildlife agencies, and other stakeholders might consider moving forward.

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Notes:

AMERICA'S WILDLIFE VALUES ARE SHIFTING AND HUNTING IS FACING AN UNCERTAIN FUTURE. IS R3 THE ANSWER?

Author: Charles S. Evans

Georgia Wildlife Federation

Abstract:
Outdoor recreation recently outpaced the U.S. economy, wildlife watching participation is up 17% over the past five years, and awareness of the health benefits of spending time outside is at an all-time high. Despite this, the wildlife conservation and hunting community are facing an uncertain future given that hunting participation has been trending down since the 1980s and dropped 16% just over the past half-decade. A likely contributor is that the rural traditions and values that formed the culture of hunting in the U.S. have shifted in society as a whole, but hunting has not shifted with them. This talk aims to explore America's wildlife value shift and how agencies, academic institutions, NGOs, and industry may be able use the insight provided by recent research to ensure hunting remains relevant in our society through recruitment, retention, and reactivation initiatives.

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Notes:

CONSERVATION LEADERS FOR TOMORROW; PROFESSIONAL DEVELOPMENT AND CULTURAL AWARENESS ABOUT THE ROLE OF HUNTING IN WILDLIFE CONSERVATION

Author: Zachary E. Lowe

Conservation Leaders for Tomorrow

Abstract:
The Conservation Leaders for Tomorrow (CLfT) program is a non-profit organization that offers advanced conservation education and hunting awareness workshops for select leadership of state and federal wildlife agencies and universities. Attending a CLfT workshop empowers participants to better understand how the consumptive use of wildlife directly impacts conservation as well as the motivations of the hunting, angling, and trapping constituency. CLfT advances conservation over the long-term by ensuring that agencies and other conservation organizations have a diverse workforce that understand, communicate, and support how the regulated take of wildlife can maintain and fund natural resources conservation. Recognized by The Wildlife Society, the Wildlife Management Institute, and all 4 regional associations of Fish and Wildlife Agencies as a professional development program, CLfT delivers a critical level of conservation understanding and experiential learning. CLfT allows professionals to critically evaluate the consumptive use of wildlife and make objective long-term conservation decision that integrates the values, benefits, and limitations of hunters, anglers and trappers. This is achieved by administering an apolitical curriculum, building an understanding of the constituency base, providing opportunity for first hand experiences, and exploring in detail how the Public Trust Doctrine and the user pay public benefit system of conservation are applied in the United States. CLfT will share some of their experiences and observations learned from delivering these programs as it relates to expanding a professional understanding about the role of hunting in conservation.

Contact:
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Notes:

USING FECAL DNA AND GPS TELEMETRY TO QUANTIFY THE CONSUMPTION OF WHITE-TAILED DEER BY CARNIVORES

Authors:
Robert S. Alonso[1], Dana J. Morin[2], David C. McNitt[1], Marcella J. Kelly[1]

[1]Department of Fish and Wildlife Conservation, Virginia Polytechnic Institute and State University
[2]Mississippi State University Department of Wildlife, Fisheries and Aquaculture

Abstract:
Frequency of occurrence (FOC) calculations from predator scat samples in western Virginia suggested white-tailed deer *(Odocoileus virginianus)* was a substantial component of coyote *(Canis latrans, 72%)* and bobcat *(Lynx rufus, 36%)* diets. However, it is difficult to infer predator impacts on prey populations using FOC. Remains of large prey species like white-tailed deer are easily detected due to high amounts of indigestible parts, and the same individual deer can be found in numerous carnivore scats. In addition, variable space use patterns among carnivore species can affect the detectability of deer consumption for each species, making across species comparisons problematic. As such, FOC measures may not indicate the number of deer consumed but are instead vague relative measures of carnivore diet. This can lead to ambiguous interpretations about predator resource consumption and impacts to prey populations. We combined GPS telemetry data with scat data from a network of established transects to estimate the number of deer consumed by each predator. Using mitochondrial DNA, we identified both the carnivore species that deposited the scat and the number of scats containing deer DNA. We generated partial genotypes for individual deer using nuclear DNA microsatellites and estimated the number of deer consumed on the landscape using unmarked SCR models. We incorporated GPS telemetry data for each predator species to account for variable distance of travel from a consumption site for each predator. This approach is a step forward in estimating deer consumption, allowing us to explicitly account for variable detection probabilities across carnivore species.

Contact:
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Notes:

WHITE-TAILED DEER SURVIVAL IN THE FLORIDA PANTHER RANGE

Authors:
Richard B. Chandler[1], Floret Bled[2], L. Mike Conner[3], Elina Garrison[2], Heather Abernathy[4], Hunter Ellsworth[4], Lydia Stiffler[1], Daniel Crawford[4], Brian Kelly[2], Karl V. Miller[1], Michael J. Cherry[4]

[1]Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia
[2]Florida Fish and Wildlife Conservation Commission
[3]The Jones Center at Ichauway
[4]Department of Fish and Wildlife Conservation, Virginia Polytechnic Institute and State University

Abstract:
The white-tailed deer *(Odocoileus virginianus)* is the primary prey of the endangered Florida panther *(Puma concolor coryi)*. White-tailed deer are also a valued recreational resource. Recently, concerns about the viability of deer populations in the Big Cypress Basin have arisen because of an increasing Florida panther population along with ongoing and proposed restoration to the hydrology in South Florida. To assess the effects of predation, hydrology, and hunting on white-tailed deer survival in the core of the Florida panther range, we collected known-fate survival data on 241 GPS-collared individuals (156 females and 85 males) from 2015 to 2018 in the Florida Panther National Wildlife Refuge (FPNWR) and the Big Cypress National Preserve (BCNP). We recorded 118,254 observation-days covering gradients of hydrology and hunting pressure. We modeled daily survival probability as a function of sex, behavioral season (rut, post-rut, fawning, and rearing), and water depth. Predation was the primary cause of death and accounted for 110 of 134 mortalities. Ninety-six of the depredation events were attributed to panthers. Hunting was not an important source of mortality, with only one legal harvest. However, two deer appeared to have been killed by poachers. Survival probability was negatively correlated with water depth, with female survival being more strongly impacted than male survival. Survival was also sex- and season- dependent with female having a higher survival probability, except during fawning season. Survival was slightly higher on the FPNWR than on BCNP. Unexpectedly, survival increased during the study period (from 2015 to 2018), with annual survival rates of 0.54, 0.64, 0.69, and 0.84. Deer fecundity is relatively low in South Florida, and our results indicate that survival is also lower than in other regions. Ongoing recovery efforts for the Florida panther should consider long-term viability of the white-tailed deer prey base.

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Notes:

EFFECTS OF PREDATION RISK ON INTRA-SPECIFIC WHITE-TAILED DEER ACTIVITY OVERLAP

Authors:
Daniel A. Crawford[1], Michael Cherry[1], Gail Morris[2], Mike Conner[2]

[1]Department of Fish and Wildlife Conservation, Virginia Polytechnic Institute and State University
[2]The Jones Center at Ichauway

Abstract:
Prey species often mitigate predation risk through alteration of spatiotemporal activity patterns whereby individual prey utilize temporal refugia to access high quality resources during predator downtimes. Spatiotemporal avoidance of predation risk by white-tailed deer has received substantial attention; however, experimentally controlled examinations of behavioral prey responses in large terrestrial mammals are limited. Recent studies have described spatiotemporal activity patterns of deer relative to predators, but they have relied on empirical data to define risky times and places with no regard to potential impacts of predation risk on intra-specific interactions. To assess the effects of predation risk on intra-specific interactions in white-tailed deer, we monitored deer activity with 16 passive, infra-red motion-triggered cameras during the fawning and fawn rearing seasons across four pairs of predator exclusion and control plots (~100 acres) from 2015-2018. We estimated the coefficient of activity overlap of males, females, and nursery groups using kernel density estimation of detection time-stamps within treatments and across treatments within demographic groups. Activity overlap of all demographic group pairings was significantly greater in predator exclusion plots with male-nursery group overlap exhibiting the greatest difference between predator exclusion (dhat = 0.91, CI: 0.87-0.95 and control plots (dhat = 0.67, CI: 0.57-0.76). In predator-free areas, males exhibited increased diurnal activity, a behavior that could help private land managers identify potential sanctuary areas. Further, our results suggest that sexual segregation in polygynous ungulates may arise as a function of male aversion to risk rather than maternal female risk aversion.

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Notes:

BEHAVIORAL RESPONSES OF WHITE-TAILED DEER TO HEAT STRESS AND THE POTENTIAL FOR INTERSPECIFIC COMPETITION

Authors:
Jacob L. Dykes[1], Randy W. DeYoung[1], Timothy E. Fulbright[1], David G. Hewitt[1], Charles A. DeYoung[1], J. Alfonso Ortega-S.[1], Aaron M. Foley[1], Tyler A. Campbell[2]

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

Abstract:
Heat stress is common in endotherms. Thus, it is important they avoid excess heat during warmer months. Behavioral adaptations, such as seeking shade or wind, or altering activity patterns are often less costly than physiological responses to heat stress. However, behavioral responses may lead to competition if thermal cover is limiting. The goals of this study are to evaluate behavioral adaptations of white-tailed deer *(Odocoileus virginianus)* to heat stress and assess competition for thermal cover with cattle. We deployed 40 GPS collars (30 deer, 10 cattle) at the East Foundation's El Sauz Ranch in South Texas during spring 2019. Collars recorded a GPS location at 30-minute intervals. Each collar was equipped with a black-globe thermometer to record operative temperature, an integration of convective and radiative heat transfer between an animal and its environment, every 30 minutes. In addition, we deployed 100 black-globes across the landscape to monitor the thermal environment. We will use animal GPS data and operative temperature in a resource-selection framework to evaluate the effects of heat stress on deer movement and resource selection. Also, we will assess spatial and temporal overlap between deer and cattle across the landscape. Knowledge of deer movements, resource selection, and competition for thermal cover will further our understanding of how heat affects deer and cattle and what landscape features are important in mitigating this stress. Management implications include improvements in brush and habitat management regimes, and a better understanding of deer-livestock competition.

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Notes:

BIOLOGY VS. SOCIOLOGY: THE PARADOX OF CHRONIC WASTING DISEASE

Authors:
Bryan J. Richards[1], Nick J. Pinizzotto[2]

[1]USGS National Wildlife Health Center
[2]National Deer Alliance

Abstract:
Chronic wasting disease (CWD), a fatal contagious neurodegenerative disease of North American cervids, continues to grow and spread and has now been detected in free-ranging and/or commercial captive facilities in 26 U.S. states, three Canadian provinces, three Scandinavian countries and South Korea. Often referred to as an existential threat to wildlife conservation in North America, management efforts to contain or control CWD have been largely unsuccessful. Our understanding of disease characteristics, while incomplete, is fully adequate to inform harvest strategies that could alter disease outcomes. Attitudinal surveys of hunters and landowners show strong support for implementing effective management strategies, yet these stakeholders have been largely unwilling to alter their behaviors to implement these strategies. Therein lies perhaps the most important paradox in the history of the North American Model of Wildlife Conservation: an acknowledged issue that could alter the long-term viability of the model itself, yet the most critical cogs in the model have been largely unwilling to participate in potential solutions. In this presentation we will explore facets of CWD that may facilitate effective management, social constraints to effective management, and discuss potential strategies to alter outcomes.

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Notes:

FIRST FULL HUNTING SEASON SINCE DISCOVERY OF CWD IN TENNESSEE: AN UPDATE

Authors:
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Abstract:
In December of 2018, Chronic Wasting Disease (CWD) was first discovered in Tennessee from 10 hunter-harvested deer in southwest Tennessee. An emergency extension of the hunting season including several weekends of mandatory check stations allowed the Tennessee Wildlife Resources Agency (TWRA) to do a rapid assessment of the prevalence and spatial extent of the disease in the affected area. This effort allowed us to establish a baseline prevalence of 8.57% (95% CI = 7.39% – 9.76%) in the Core Zone (i.e., Fayette and Hardeman counties), and we found CWD in an adjacent county and within a mile of two other adjacent counties. Our primary surveillance objectives for the 2019-20 hunting season were threefold: 1) intensively sample in the Buffer Zone (i.e., counties adjacent to Core Zone) to identify the leading edge of the disease, 2) sufficiently sample in the Core Zone to detect a 1% change in prevalence, and 3) continue risk-based surveillance in the rest of the state. Preliminary results indicate the disease is present in five of six Buffer Zone counties at a prevalence of < 1% each. Prevalence in the Core Zone increased to 10.75% (95% CI = 9.80% – 11.70%). Outside the Core and Buffer Zones, sampling targets have been achieved in 79 of 87 counties; efforts to reach targets in the remaining eight counties will continue until completed or the end of the fiscal year (i.e., June 30). Now that a thorough assessment of the outbreak is complete, TWRA is exploring management alternatives to contain the disease.

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Notes:

INITIAL RESPONSE OF DEER HUNTERS IN WEST TENNESSEE TO DISCOVERY OF CWD

Authors:
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Abstract:
Concerns and interests among hunters can change quickly upon discovery of chronic wasting disease (CWD). Hunter participation may decline if deer density and sightings are reduced significantly and if there is perceived danger of eating the meat. We surveyed hunters of the Ames Hunting Club in May 2019 to determine concerns, opinions, and attitudes about CWD, which was discovered at Ames Plantation in December 2018. We received 66 completed surveys for a response rate of 78%. Ames hunters were extremely (59%) or moderately (26%) concerned upon discovery of CWD. Of their concerns, deer sightings was the most important (70%) factor related to hunter satisfaction and 56% of hunters believed deer sightings will be reduced because of CWD. Hunters (67%) did not favor reducing deer density additionally at Ames Plantation after discovery of CWD. Hunters (76%) believed CWD will spread into adjacent counties with increasing prevalence rates. Hunters (60%) believed emphasis to reduce CWD at the local level was most important, but opinions were split for what should be done to slow spread of the disease. Hunters (80%) believed CWD will negatively impact hunting in west Tennessee. Additionally, hunters (85%) expressed concern about eating meat that may contain the disease and stated they would not consume meat from an untested deer harvested in an area with CWD. Following discovery of CWD membership in the Ames Hunting Club decreased 44% from 2018 to 2019. Our survey results provide state wildlife agencies with useful information to better understand and address concerns regarding CWD.

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Notes:

REVISITING HUNTER PERCEPTIONS TOWARD CHRONIC WASTING DISEASE: CHANGES IN BEHAVIOR OVER TIME

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Abstract:
Hunter behavior varies in relation to perceived risk of Chronic Wasting Disease (CWD) and changes in perceptions of CWD will lead to changes in behavior over time. During 2018, we surveyed deer (*Odocoileus virginianus* or *Cervus nippon*) hunters from Maryland, USA, regarding behavioral changes due to CWD. We matched 477 respondents to their harvest record and created two geographical groups based on harvest history in counties closest to disease presence. We compared the proportion of hunters who claimed to have changed their behavior in each group using chi-square tests and estimated the effects of CWD on harvest rate for the 4 years immediately after the discovery of CWD and the following 4-year period using paired t-tests. We found no difference between the groups in the proportion of hunters who changed their behavior due to CWD ($p > 0.10$). We found a significant decline in harvest rate for hunters who claimed to change their behavior in the group closest to CWD presence during the period immediately after the discovery of CWD ($p < 0.01$); however, these same hunters increased their harvest rates in the next time period to pre-CWD levels ($p = 0.78$). Overall, we found that time alleviates some perceived risk of CWD and that this is reflected in hunting behavior.

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Notes:

BECOMING PREPPERS: STEPS FLORIDA IS TAKING TO PROTECT AGAINST AND PREPARE FOR CWD

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Abstract:
Chronic wasting disease (CWD) is one of the most important diseases affecting cervids in North America today. CWD is extremely difficult to control once established. The best control measures focus on prevention and early detection followed by a rapid response if detected. Although CWD has not been found in Florida or any adjacent states, Florida Fish and Wildlife Conservation Commission (FWC) has implemented a multifaceted approach to protect against and prepare for CWD. CWD sampling has been in place since 2002, but starting with the 2018-19 hunting season, a three-year surveillance surge was implemented to more effectively sample areas that historically had been under-sampled. Counties were assigned a quota based on several factors including deer density and number of captive deer facilities. Then, samples collected were assigned points based on age and the likelihood of infection (e.g. a clinical deer received more points than a hunter-harvested deer). Second, plans were developed to direct FWC staff and partners on procedures, field operations, and communications upon initial detection of CWD. Meetings to review and update plans and protocols as well as mock exercises to respond to initial CWD positives occur on regular intervals. Biologists and law enforcement personnel have been identified in each region to be trained in sharpshooting at night or CWD sample collection and biosafety. Trainings will be conducted annually, and each region will maintain a minimum number of trained personnel. Lastly, FWC has implemented several rules including a ban on the importation on all live cervids into the states and a rule on carcasses entering the state.

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Notes:

A LOOK AT CHRONIC WASTING DISEASE SAMPLING FREQUENCY, COSTS AND BUDGETS, 2008 TO 2018

Authors:
Mathew D. Ross, Kip P. Adams, Brian P. Murphy

Quality Deer Management Association

Abstract:
Chronic wasting disease (CWD) is an always fatal neurological disease that directly affects deer, elk and moose. There is no vaccine or cure. It indirectly impacts deer and other wildlife by drawing from wildlife agencies financial and personnel resources. To learn more about how this has changed over time we surveyed state wildlife agencies to determine the number of deer they sampled for CWD in 2008 and 2018, whether testing goals were met (2018), the cost per sample (2016) and an estimate of their latest budget (2019) dedicated toward surveillance and monitoring. Thirty-two states reported testing 59,565 samples in 2008 and 41 states reported testing 175,478 samples in 2018. The average cost per sample has not changed considerably between 2008 ($25) and 2016 ($28), but ranged widely from $10 to nearly $100 USD per sample. Notably, one of seven states in the Midwest, three of ten in the Southeast, six of ten in the Northeast, and two of four in the West all tested fewer deer in 2018 compared to 2008. Of the 27 states that provided data, the total national budget dedicated toward CWD surveillance and monitoring was at least $10,074,475 in 2019. Collecting tissue samples from harvested deer is time consuming and having them tested costs wildlife agencies millions of dollars annually; valuable funds that could be used for other wildlife projects. This discussion will provide a measure of how these influences have changed over the past decade.

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Notes:

A CHANGING PARADIGM IN DEER HARVEST: HARVEST SEX RATIOS AND DEER DENSITIES RELATIVE TO GOALS

Authors:
Kip P. Adams, Mathew D. Ross, Brian P. Murphy

Quality Deer Management Association

Abstract:
Hunters shot more antlerless deer than antlered bucks for the first time in 1999. From 1999 to 2009 hunters shot considerably more antlerless deer than antlered bucks annually. The 2014 hunting season marked the start of a significant decline in antlerless harvest, and the 2016 antlerless harvest was the lowest in nearly 20 years. Hunters then shot more antlered bucks than antlerless deer in the 2017 and 2018 seasons. Because this was a monumental switch in harvest sex ratios, we surveyed state wildlife agencies and collected data on harvest sex ratios, desired sex ratios, and deer densities relative to goals. In 1999 hunters harvested 1.01 antlerless deer per antlered buck nationally. That increased to 1.26 in 2009 and dropped to 0.99 antlerless deer per antlered buck in 2018. The vast majority of Southeast states (73%) prefer the antlerless harvest to be about equal to the antlered buck harvest. Conversely, the vast majority of Northeast states (78%) want to shoot more antlerless deer than antlered bucks, while the Midwest states fall in between the two. Over half (54%) of wildlife management units east of the Rocky Mountains are at current deer density goals, while 23% are above and 22% are below goals. Deer densities at or below goals result in successful deer management programs at reduced harvest sex ratios, but increased ratios of antlerless deer in the harvest are necessary where herd reduction is desired.

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Notes:

IMPACTS OF SPECIAL HUNTING CLINICS FOR COLLEGE STUDENTS ON RECRUITMENT AND RETENTION OF HUNTERS

Authors:
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Abstract:
Persistent declines in hunting participation in the U.S. have presented a number of challenges for wildlife management and conservation. To address this decline, wildlife agencies have joined in a collaborative effort focusing on hunter Recruitment, Retention and Reactivation (R3). In an effort to recruit the largely untapped demographic of college students into hunting, South Carolina DNR began providing a one-day deer hunting clinic for Clemson University students. To determine the effectiveness of this R3 effort, we administered a questionnaire prior to, immediately following, and one year after the clinic. Between 2015-2018, 74 students have attended and completed the hunting clinic, with one clinic being held annually. Sixty-six percent of participants had no experience hunting or spectating a hunt, while the remaining 34% had some hunting experience. The most common barrier to hunting participation was a lack of skills and knowledge required to hunt (79%), which coincided with low confidence scores in a host of hunting related skills and knowledge. Following the clinic, the barrier was reduced by 53%, while confidence increased between 26% (firearm safety) and 109% (field recovery of game). Participants indicated they were likely to continue hunting into the future. The one year follow up survey suggests a positive impact of the clinic with 77% of participants indicating that they had already (49%) or were still likely to buy a hunting license (28%). These findings suggest that hunting clinics for college students may be an effective R3 programming method for recruiting and retaining young adults into hunting.

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Notes:

USING FSI TO INCREASE SUMMER DEER FORAGE WHILE RETAINING ACORN PRODUCTION IN COASTAL PLAIN HARDWOODS

Authors:
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Abstract:
Practices that increase forage availability for white-tailed deer *(Odocoileus virginianus)* are of interest to many managers. Canopy reduction and prescribed fire are two practices commonly applied to upland pine stands across the Southeastern Coastal Plain, yet they are rarely applied in hardwoods within the region. Currently, managers primarily value hardwood stands for mast production, as acorns are a readily-used energy source for deer in the fall. However, oaks are not the only tree species in these stands, and many upland oaks are relatively fire-tolerant. We evaluated the use of non-commercial forest stand improvement (FSI) and prescribed fire to increase coverage of understory deer forage in upland Coastal Plain hardwoods. We treated 4, 8-acre upland hardwood stands in Barbour County, AL with FSI during December 2017–February 2018. We girdled and sprayed trees with limited value to deer using triclopyr (Garlon® 3A) in half of each stand and a mixture of triclopyr and imazapyr (Arsenal® AC) in the other half of each stand, reducing canopy coverage by approximately 30%. Then, we applied low-intensity prescribed fire to half of each stand in March 2019. Our treatments resulted in >500% increase in biomass of deer forage plants with no cases of nontarget oak mortality. Based on these results, managers can use FSI and prescribed fire to substantially increase summer deer forage in Coastal Plain hardwood stands, while maintaining oak mast production.

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Notes:

ATTRACTIVENESS OF MASTING OAKS TO WHITE-TAILED DEER AND CASCADING EFFECTS ON PLANT COMMUNITIES

Authors:
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Abstract:
As white-tailed deer enthusiasts know, acorns commonly constitute a large portion of the white-tailed deer diet when available and individual masting trees can cause significant shifts in deer behavior. Because of this behavioral shift, mast seeding may indirectly increase heterogeneity in understory plant communities by causing a heterogenous distribution of deer herbivory and leaf litter disturbance. We designed an acorn addition experiment to determine the degree to which masting affects deer behavior and how those changes affect plant communities. In a paired design with 25 replications, we distributed 75,000 Shumard oak acorns under half of the paired parent trees to simulate a good mast year while the other half received no acorn addition. Deer use of plots was monitored using camera traps. We transplanted two blackgum and two Shumard oak seedlings under each parent tree and monitored herbivory pressure, growth rate, and survival. Additionally, we measured understory community responses using point-intercept transects the summer following acorn additions. Deer use of the parent trees was 541% greater in acorn addition treatments than controls, with activity peaking in late January. Acorn addition did not affect transplanted seedlings or community richness but cover of grasses, sedges, rushes, and forbs was greater in control plots than acorn addition plots. Of the 63 plant species detected, ~51% did not cooccur in treatments with ~17% being unique to acorn addition plots. Our data indicate that oak masting generates indirect effects that may be important to the structure of understory plant communities in oak forests.

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Notes:

UNDERSTANDING ADULT MALE WHITE-TAILED DEER HABITAT SELECTION DURING THE MISSISSIPPI HUNTING SEASON

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Abstract:
White-tailed deer *(Odocoileus virginianus)* are at an increased risk as the hunting season begins. This risk should alter how and when deer select for habitat as areas of higher risk should be avoided. To investigate how increased risk levels alter habitat selection, we conducted a resource selection function (RSF) and step selection function (SSF) on 34 adult (2.5+ years old) males during two hunting seasons in Mississippi. We used third order RSFs to compare night and day habitat selection within each buck's home range. The SSF analysis determined how risk altered deer movement among low, medium, and high hunting pressure. The RSF analysis indicated selection for cool season food plots, but nighttime selection was three times greater (ß = 0.84) than daytime selection (ß = 0.23). The SSF analysis indicated that selection for bottomland hardwoods, upland hardwoods, and herbaceous areas experienced a switch from positive selection to negative selection during high hunting pressure. These results show that hunters directly caused deer to alter areas of use within their home range, while also altering how deer select for areas as they travel. Using these results, managers can control hunting pressure to avoid altering deer behavior.

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Notes:

SHEDDING LIGHT ON SHED ANTLERS FOR ASSESSING MALE QUALITY IN WHITE-TAILED DEER POPULATIONS

Authors:
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Abstract:
Antlers are often used as indicators of the effectiveness of deer management efforts and increasing antler size is a common objective of management programs. Harvest data is often used to make assumptions regarding antler characteristics of the population, such as average antler size. However, hunter selection and antler-based harvest restrictions can introduce bias to hunter harvested animals and may not be representative of the unharvested segment of the population. Previous research suggests that shed antlers may provide managers with a more accurate assessment of population antler characteristics than harvest data. We captured and measured antlers of male white-tailed deer housed in the 430-acre Auburn Captive Deer Research Facility over a 7-year period. Individual deer in this facility are well documented as a result of extensive efforts to capture and monitor the population. We also collected shed antlers during each of these years to assess whether shed antlers were representative of the known male population. We found that larger antlered, older males were overrepresented in our sample of shed antlers due to the greater detection of larger antlers by observers. Specifically, we found that increased main beam length and total number of points were the most important antler characteristics for increased shed antler detection. Our results suggest that evaluations of population antler characteristics that use shed antlers may under-represent young males that possess smaller, less detectable shed antlers.

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Notes:

AN EVALUATION OF GPS-SIZED EXPANDABLE RADIO COLLARS DESIGNED FOR WHITE-TAILED DEER FAWNS

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Abstract:
Integrating GPS technology with expandable collars will allow researchers to more efficiently investigate survival and movements of white-tailed deer *(Odocoileus virginianus)* fawns. During 2018-2019, we tested fit and function of 5 GPS-sized expandable collar designs on fawns at Whitehall Deer Research Facility, Athens, GA. We fitted 46 fawns with collars (20 Vectronic Vertex v1.0, 3 Telonics TGW v1.0, 3 Telonics Recon v1.0, 10 Vectronic Vertex v2.0, 10 Telonics TGW v2.0) and ear-tagged 15 control fawns without collars. We conducted observations of fawns to evaluate potential effects of collars on behavior. The expandable folds of 88% (14 of 16) of Telonics collars expanded prematurely by 59 ± 2 (mean ± SD) days, resulting in extremely loose collars. To date, 94% (15 of 16) of Telonics collars failed (slipped or removed) before 365 days, lasting 89 ± 39 days before failure. Overall, expandable folds of Vectronic collars did not exhibit premature expansion and sufficiently accommodated neck growth of fawns during the first year. We found 17% (5 of 30) of Vectronic collars shed before 365 days, slipping at 174 ± 75 days. Notable effects of collars on fawn behavior included high-stepping during locomotion and erratic jumping, most prevalent in Vectronic fawns ≤1 month of age. Our results suggest these GPS collars would benefit from additional modifications before use in the field, including improved stitching pattern and thread, smaller battery housings, improved weight distribution, and smaller band circumference.

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Notes:

ANTLER DEVELOPMENT AND SELECTIVE HARVEST CRITERIA FOR KNOWN-AGED BUCKS: FIELD STUDY IN NORTHEAST MISSISSIPPI

Authors:

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Abstract:

Within the deer management community, there has been debate over the use of yearling antler size to predict antler size at older ages. If yearlings with below average antlers will have below average antlers at maturity, then targeting these bucks at younger ages when they are more naïve for differential harvest removal could be part of overall population control. The objective of this study was to determine antler size and growth rates for free-ranging, male white-tailed deer with known ages from 1 year old to maturity between groups of males with below average and above average antlers. Our study was conducted on a cooperative group of properties of 27,407 acres in Lowndes County, Mississippi from 2009–2017, in which we captured and tagged 182 known-aged bucks as either fawns or yearlings. We relied on hunter restraint and subsequent photographic recapture of known-age bucks at subsequent ages. Antler size was estimated from photographs using BuckScore technology (Flinn et al. 2015). Our results show that the bottom 1/3 of yearlings when grouped by antler size will average 18–20 B&C inches smaller compared to the upper 1/3 when these bucks reach older age classes. Therefore, targeting younger bucks with smaller antlers for removal can be a valid part of deer population management to reduce the number of bucks eating limited forage supplies while improving the standing crop of the buck population.

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Notes:

CONSERVATIVE MATERNAL CARE IN A LONG-LIVED ITEROPAROUS CAPITOL BREEDER, THE WHITE-TAILED DEER

Authors:
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Abstract:
Ecological disturbances have the capacity to impact predation risk, nutrimental requirements, and maternal care strategies. We used spatial variation in fire history, hydrology, habitat types, and predation risk to examine the effects of disturbance and predator activity rates on resource selection of a capital breeder, white-tailed deer *(Odocoileus virginianus seminolus)*, in southwestern Florida during lactation and fawn rearing. Our objective was to understand how energetic demands, perceived predation risk, and maternal care strategies interact to govern adult female behavior in a population that is experiencing declines in some areas. We used resource selection functions to quantify female white-tailed deer selection during the fawning season (January 1 – April 1) in regards to spatial variation in fire history, hydrology, habitat types, and white-tailed deer adult and fawn predators activity at the fawning season scale. We found that fawning white-tailed deer avoided forested habitats (hardwood hammocks [β= 0.141, $p<0.001$], pine forests [β= 0.097, $p<0.001$], hardwood swamps [β= 0.064, $p<0.001$]) and areas with high Florida panther activity rates (β= -1.200, $p<0.001$), but selected for recently (β= -0.071, $p<0.001$) and frequently burned areas (β= -0.041, $p<0.001$), habitat edge (β= -0.052, $p<0.001$), open habitats (i.e., marsh [β= -0.117, $p<0.001$] and prairies [β= -0.099, $p<0.001$]) and areas with higher fawn predators (bobcat [β= 1.344, $p<0.001$] and bear [β= 17.15, $p<0.001$]). We demonstrate that South Florida deer employ risk-sensitive foraging and display conservative maternal care due to constrains in nutrition; and, in our study area, fire may improve forage conditions, while simultaneously reducing predation risk.

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Notes:

MORE BANG FOR YOUR BUCK? TESTOSTERONE'S IMPACTS ON WHITE-TAILED DEER REPRODUCTIVE SUCCESS

Authors:
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Abstract:
Testosterone indirectly affects reproductive success in white-tailed deer by influencing the antler cycle, body size, and breeding behavior. However, little is known about its direct effects on reproductive success. To address this, we measured testosterone concentrations from adult males in Auburn University's 430-acre captive deer research facility from September-March 2007-2017, and compared them to antler and body size, and annual reproductive success. This population experiences peak breeding in mid-January, months later than many populations in the U.S. Peak testosterone concentrations coincided with the breeding season, as documented in other populations. We observed that testosterone concentrations for young males (1.5–2.5 years old) were significantly lower than older males ($P < 0.001$) during the breeding season. However, an individual's testosterone levels at 1.5 years old were a good predictor the individual's testosterone levels at older ages ($P = 0.006$). Antler ($P = 0.013$) and body size ($P = 0.035$) were positively associated with testosterone concentration for males ≤5 years old, but this pattern was not apparent in males >5 years old. Although testosterone was positively associated with body and antler size for some males, we found no evidence of a direct relationship ($P=0.293$) between testosterone concentration and reproductive success in the study population. These results suggest that although peak breeding dates differ among deer populations, the patterns of testosterone relative to the breeding season are retained. Additionally, these results provide insight into testosterone's dynamic role in shaping sexually selected characteristics at different ages.

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Notes:

DRIVERS OF WHITE-TAILED DEER RECRUITMENT IN THE APPALACHIAN MOUNTAINS OF VIRGINIA

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[3]United States Geological Survey Virginia Cooperative Fish and Wildlife Research Unit

Abstract:
During recent decades, white-tailed deer *(Odocoileus virginianus)* populations have declined in portions of the Appalachian Mountains concurrent with changed forest conditions, restoration of black bears *(Ursus americanus)*, and colonization of coyotes *(Canis latrans)*. These declines are not ubiquitous regionally and understanding the drivers remains an open question. We investigated drivers of white-tailed deer recruitment by evaluating lactation status of 28,316 harvested adult female white-tailed deer from 30 counties in the Appalachian Mountains of Virginia during 1997-2018. We used generalized linear mixed effects models to test the following predictions: (1) recruitment would increase with habitat diversity; (2) recruitment would decrease with increasing predator abundances; (3) recruitment would increase with growing season precipitation and decrease with winter severity; and (4) recruitment would increase with hard mast abundance. We found recruitment increased with habitat patch diversity at the county level (β=0.14, P=< 0.001), which largely reflected the extent to which mature even-aged forests were bisected by other land uses. Recruitment was lower in areas with large contiguous forests and greater in areas with more patch diversity. Recruitment decreased with increasing black bear observations (β=-0.09, P=< 0.001) reported by deer archery hunters. Bear observations may vary with actual changes in bear abundance and fluctuations in food availability. Potential management implications include increasing active forest habitat management, i.e., timber harvest and prescribed fire and manipulating predator densities. However, understanding the role of compensatory fawn mortality sources would be essential to predicting the success of reducing predator densities in an effort to increase white-tailed deer recruitment.

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Notes:

SURVIVAL OF RELEASED WHITE-TAILED DEER REWRITES POPULATION DYNAMICS MODEL

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Abstract:
A common practice in Texas is to release captive and trap/transplant wild deer to high fenced ranches. There is much to be learned from these practices. In the coming millennia, it is conceivable that translocation of wildlife will be needed to maintain or reestablish wildlife populations. For example, introduction of deer resistant to Chronic Wasting Disease may be a viable means of reestablishing deer populations and eliminating this disease where present. If so, survival information will be needed to aid in management alternatives. I followed survival of 365 captive and 142 tagged wild caught deer released to pastures in East Texas exceeding 1,000 acres in size from 1995-2015. Captive deer first year survival rates exceeded 68 percent and wild deer rates exceeded 72 percent. Released fawn, yearling, and adult one-year survival rates exceeded 81, 72, and 64 percent, respectively. Females had much greater long-term survival than males. Of 366 deer with birthdates on or before 2006, 59% of females were still known to be alive at 7 years, compared to 26% of males, and more than 17% of females were still alive at 14 years compared to 1 percent of males. These findings change perceptions of the population dynamics of white-tailed deer, doubling the commonly believed population turnover rate of 7-8 years in most population models.

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Notes:

DETECTING AND COUNTING WHITE-TAILED DEER IN PREDATOR AND SCAVENGER SCAT SAMPLES WITH DNA

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Abstract:
A primary challenge in white-tailed deer management is that total mortality is uncertain or unknown. One potential source of information about the number of dead deer in an area comes from detection of deer remains in predator and scavenger scats. We developed a DNA test to detect presence of white-tailed deer in carnivore scat (species identification: SID) using mitochondrial DNA amplification and individual deer (individual identification: IID) using nuclear DNA microsatellites. We tested these methods using controlled feeding trials with captive black bears, bobcats, and coyotes and using field collected scats from the same species. Deer detection (SID) was highest in black bear feeding trial samples (71.15%) where we were allowed to feed the animals a greater proportion of deer in their diet (~45%), and lower for coyotes (52.46%) and bobcats (33.33%) where deer was a smaller proportion (25%). We detected 7 of 11 deer used in the trials using SID and correctly identified at least four of the individuals using IID. Number of field samples containing deer was unknown, but we detected deer in 93 of 201 samples and amplified loci for IID for 38 samples. Using 20 samples with ≥4 confirmed loci, we identified 18 different deer in the field samples. Overall amplification success rates were lower for prey identification than when testing for predator identification, but current developments in hierarchical population modeling including spatial capture-recapture allowing for partial genotypes could allow for estimation of deer mortalities within an area using carnivore scats as the detection devices.

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Notes:

DEVELOPMENT OF A SIGHTABILITY MODEL FOR HELICOPTER SURVEYS OF WHITE-TAILED DEER IN FLORIDA

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Abstract:
On large management units where terrain allows observation of white-tailed deer *(Odocoileus virginianus)* from the air, helicopter surveys can provide managers with cost-effective and accurate estimates of population abundance. However, imperfect detection of deer biases abundance estimates resulting in potentially inappropriate management recommendations (e.g., harvest prescriptions). Sightability estimators are designed to model detection heterogeneity based on factors that affect observer detection of target animals. Sightability models have been developed for numerous western ungulate species; however, detection probability of white-tailed deer during helicopter surveys in Florida has not been established. Our objective was to model detection probability of white-tailed deer as a function of covariates including distance from transect, vegetation obstruction, and light conditions to improve population estimates derived from helicopter surveys. We conducted our study on a 6,474-acre study area within a 298,918-acre cattle ranch in central Florida. We placed 3-D archery targets as surrogates for white-tailed deer at randomly selected locations unknown to observers across a combination of distances and vegetation types. We conducted 12 flights during July 2019 for a total of 336 potential observations of surrogates. Detection probability on the flight path ranged from 0.97 (95% CI = 0.90-0.99) to 0.06 (95% CI = 0.03-0.15). Our study found the interaction between distance from the transect and vegetative obstruction negatively affect detection of deer, especially when vegetative obstruction is greater than 50%; however, light conditions were found to be insignificant. Observers simultaneously recorded live deer during flights, of which only 41% of groups were observed while movement occurred.

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Notes:

ESTIMATION OF DEER DENSITY USING A THERMAL-EQUIPPED DRONE

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Abstract:
Drones equipped with thermal sensors are able to mitigate some of the challenges commonly associated with traditional methods of surveying wildlife; however, thermal drones have not been thoroughly evaluated as a population monitoring tool. We conducted autonomous fixed-wing thermal drone flights over Auburn University's 430-acre deer research facility located near the city of Camp Hill, AL. to test their effectiveness in surveying white-tailed deer. The high-fenced facility houses a captive deer population with known abundance [~157 deer (234 deer/mi2)]. We recorded flight footage from 3 flights [morning = 30 minutes prior to sunrise (n = 1), evening = 30 minutes prior sunset (n = 2)] during 16–17 March 2017. Each flight consisted of 15 non-overlapping parallel transects covering 11.7mi. Observers (n = 2) independently identified deer in flight footage using contrasting thermal radiation and body shape. Our average deer density estimate across all observers and flights was ~78% of the known deer abundance. Thermal contrast was better during evening flights than morning, and our drone-based density estimate improved to ~92% of the known abundance when utilizing only the evening flights. Timing of flight and vegetation type were both important factors influencing thermal contrast and subsequently our observer's abilities to distinguish deer. Our findings provide evidence that thermal drones are able to provide reliable deer density estimates and suggest that evaluation of thermal-equipped drones should continue.

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Notes:

A COMPARISON OF GROUND-BASED SURVEY METHODOLOGIES IN MISSOURI FOR ESTIMATING WHITE-TAILED DEER DENSITIES

Authors:
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Missouri Department of Conservation

Abstract:
Estimation of deer density and herd composition is necessary for informing certain management decisions and for satisfying the curiosity of a public that expects such information from their local wildlife management agency. Numerous studies have examined survey methodologies to estimate deer abundance, documenting detection probabilities and possible biases of each. However, wide variation in findings across studies causes one to question which methodology is best and creates the temptation to "reinvent the wheel" by comparing methods again. We conducted concurrent camera, spotlight, and two IR survey techniques on a 2,718-acre Conservation Area in Missouri during the summer of 2019. As expected, survey results were widely variable with density estimates ranging from 48.4 to 89.2 deer per square mile. Estimates from camera and IR surveys were markedly higher than the spotlight survey. Some discrepancies can be explained by published literature while others cannot, resulting in continued uncertainty as to which method is best.

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Notes:

USING ARTIFICIAL INTELLIGENCE (AI) AND BIG DATA TECHNOLOGY TO REVOLUTIONIZE TRAIL CAMERA POPULATION STUDIES

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Abstract:
Wildlife researchers, professionals and managers rely heavily on field data to better understand the wildlife populations, formulate management strategies, educate new wildlife professionals and recommend public policy. Over the last several years, improvements in data collection technology, especially in using trail cameras, have enabled this community to acquire and accumulate massive amounts of raw field data that their predecessors only dreamed of. However, trail camera innovation is a double-edged sword, as wildlife professionals must compile, review, analyze, and sort terabytes of raw data to transform it into useable information. Doing so is incredibly time consuming, exacting, expensive and inefficient because it requires a significant amount of human interaction. Advances in Artificial Intelligence (AI) and Big Data technology have given rise to image recognition, analysis and filtering capabilities that will revolutionize trail camera wildlife population studies.

- Foldering is now filtering: Manually processing tens of thousands of raw images that once took weeks can now be automatically analyzed and filtered in minutes.
- Context driven insights: Advanced analytics can now easily be compiled, combining formerly discrete data like species type, GPS location, weather conditions and time into deep insights.

Field capable and collaboration friendly: Field data can be uploaded to a cloud-based AI engine from anywhere there is connectivity. Custom filtered results and analytics can be accessed online to analyze, download and share. This session will show how AI and Big Data will revolutionize population studies using practical insights and a technology demonstration.

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Notes:

ESTIMATING EFFECTS OF SEASON STRUCTURES ON WHITE-TAILED DEER HARVEST IN ALABAMA

Authors:
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Abstract:
Management decisions are often made without a clear understanding of expected outcomes. The Alabama Department of Conservation and Natural Resources initiated an effort to develop a transparent science-based framework for making annual decisions regarding white-tailed deer *(Odocoileus virginianus*) management based on analytical techniques. This effort was triggered by public dissatisfaction with harvests of buck and does, and timing of the hunting season in relation to rutting activity. We developed a Bayesian Belief Network to examine relationships between daily harvest success rates, hunter effort, and timing of hunting season relative to peak rutting period (i.e. season coincidence with the rut). We utilized existing harvest data reported on annual statewide hunting surveys and machine learning to estimate the number of days hunted per hunter, expected daily success rates of bucks and does, and evaluate changes in those rates given the timing of hunting season. Our results indicate that bag limits have a large impact on total deer harvest but synchrony between rut and hunting season increased both the number of successful hunters as well as the number of harvested buck and doe per hunter. This model could be used to predict the effects of season structures on harvest outcomes in an adaptive decision-making process for white-tailed deer management in Alabama.

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Notes:

CHANGING HEMORRHAGIC DISEASE PATTERNS OVER FOUR DECADES

Authors:
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Southeastern Cooperative Wildlife Disease Study

Abstract:
Forty years ago, an annual hemorrhagic disease (HD) survey designed to document and better understand the distribution and annual patterns of this disease in the United States was launched by the Southeastern Cooperative Wildlife Disease Study. The success of the HD survey can be attributed to a simple but informative design and dedicated and reliable reporting from state fish and wildlife agency personnel. During 2019, reported HD was widespread in Kentucky, Indiana, Ohio, and West Virginia, and retrospective data from the annual HD survey provided an opportunity to view this recent activity in a historical and regional context. Three long-term trends are apparent that may have important implications to white-tailed deer health: 1) the reported range of HD within this region has increased; 2) the area affected during an outbreak year has increased; and 3) large-scale outbreaks are occurring more frequently. These regional outbreaks primarily have been caused by EHDV-2, but other viruses including EHDV-1, EHDV-6, BTV-1, BTV-3, BTV-10 and BTV-17 have been isolated from affected deer. Based on these patterns, it is possible that HD is now endemic in this region, but the environmental and climatic factors that facilitated this epidemiologic change have not been identified. Likewise, the implications to white-tailed deer health are not known. Observed changes over these four decades are consistent with the expansion of these viruses into areas with naïve white-tailed deer populations, but it is unknown if these patterns will persist or if potential impacts will be reduced as white-tailed deer herd immunity increases.

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Notes:

AN EVALUATION OF CROSSBOW USE IN WISCONSIN

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Abstract:
The Wisconsin Department of Natural Resources (Wisconsin DNR) initiated a review in March 2019 at the request of the Natural Resources Board (NRB) to provide a detailed collection and review of crossbow information relative to several areas of interest. We approached this assignment from several independent lines of inquiry that included data mining of licenses sales, trend analysis, literature reviews, reviews of recent bow technology changes, surveys of current and lapsed deer hunters, key informant interviews of agency personnel in other states, and telephone interviews of Wisconsin businesses that sell archery and crossbow equipment. At the highest level, our evaluation did not identify any biological concerns about the current or anticipated number of bucks or total deer harvested under the current crossbow season structure. The preponderance of the evidence from these multiple lines of inquiry suggests that all-inclusive crossbow use is not currently a biological concern for deer herd management or a pressing social issue for most hunters in Wisconsin. As society changes and as the use of technology continues to evolve, it is Wisconsin DNR's responsibility to ensure the deer herd is managed properly and to provide deer hunters the flexibility to establish their own deer hunting traditions. In other words, the Wisconsin DNR is responsible for adapting to changing social and technological changes, but the agency should neither be the drivers of these changes nor the resistance to them.

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Notes:

POTENTIAL EFFECTS OF THE 2019 RIVER FLOODING ON THE LOWER ATCHAFALAYA BASIN DEER HERD

Authors:
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Abstract:
The Atchafalaya River Basin is the largest river swamp in the United States at 1.4 million acres. Approximately 70% of the Basin is forested with the remaining acreage in open water or marsh. The Basin is home to a wide range of wildlife species including white-tailed deer. While flooding is common within the Basin, the duration and timing of the 2019 flood was something that hasn't been observed in recent history. Floods are often characterized as winter, spring or summer floods. Unfortunately, all three were experienced in 2019, with flooding that stretched from January to August. As a result, many hunters and landowners are concerned about potential impacts to the habitat and wildlife that inhabit the floodplain. Unfortunately, perceived or potential impacts are not fully understood until after thorough evaluation of an event from start to finish. However, we are armed with historical data that does provide insight into possible outcomes. Based on past analysis of hydrograph and lactation data, we are anticipating a below average fawn crop within the areas impacted by summer flooding. Deer harvest recommendations and either-sex days were modified in anticipation of declines in recruitment.

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Notes:

THE 2019 FLOOD OF THE LOWER MISSISSIPPI DELTA

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Abstract:
Above average rainfall in 2019 resulted in a devastating, record-breaking flood event in the lower Mississippi Delta. The Mississippi River, measured at the Vicksburg, MS gauge, remained above flood stage for 162 days, the longest duration since 1927. The Steele Bayou Landside experienced the longest duration flood on record, remaining above flood stage for 219 consecutive days. Approximately 775,000 acres in Mississippi were inundated, covering greater than 75% of two entire counties. Over 200,000 acres of agriculture land remained unplanted. Wildlife suffered on levees for months, many of which succumbed to starvation, heat, and exposure. The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) monitored wildlife during the flood through weekly live counts and mortality surveys for white-tailed deer on the exposed land. A total of 503 white-tailed deer mortalities were logged on the 26-mile route. After the flood receded, MDWFP, Mississippi State University, and participating private landowners conducted a passive camera survey on the flooded areas. The results of this survey are currently being analyzed, but initial observations reveal a near-complete loss of the 2019 fawn crop. The magnitude of this flood's effect on wildlife and the habitat will take years to fully realize.

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Notes:

PELLET PERPLEXITIES: CAN PELLET COUNT SURVEYS ACCURATELY ESTIMATE DENSITY OF WHITE-TAILED DEER?

Authors:
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Abstract:
White-tailed deer are at the foundation of the North American Model of Wildlife Conservation, and management for this species is improved with accurate estimates of population density. A variety of techniques for estimating deer density have been proposed, developed, and tested over the years, but there is considerable debate regarding their accuracy and precision. Pellet count surveys, although an often overlooked and dated technique, have been previously suggested to be ineffective for determining density. However, unpublished data suggest they may generate accurate estimates of density. Additionally, pellet surveys have rarely been applied to populations of known size, which limits understanding of the accuracy of this technique. However, the Auburn University Captive Deer Facility, a 430-ac high fence facility located in Camp Hill, Alabama, offers a unique, controlled environment for further examination of pellet surveys. Specifically, the high number of tagged individuals (>85%) in the facility provides an opportunity to generate accurate estimates of density using photographic data and mark-recapture models. During winter-spring of 2020, we will systematically establish 600 plots within the facility to evaluate the effectiveness of pellet surveys for determining density of white-tailed deer. Concurrently, we will conduct camera surveys over both baited and unbaited sites to collect photographic data that will be used in mark-recapture analyses. We will then compare density estimates from pellet surveys and mark-recapture analyses and, using distribution data from pellet surveys, we will develop estimates of sample sizes necessary for accurate deer pellet surveys.

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Notes:

DO HABITAT CHARACTERISTICS AFFECT WHITE-TAILED DEER FAWN SURVIVAL IN THE APPALACHIAN MOUNTAINS OF NORTH GEORGIA?

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Abstract:
White-tailed deer *(Odocoileus virginianus)* population declines have been observed throughout the Chattahoochee National Forest of North Georgia based on harvest data collected annually since 1979. Across this region, timber harvest has decreased over the past few decades resulting in a diminished understory conceivably lacking adequate refugia for fawns. During this same period, predators have increased in abundance. Our objective is to quantify landscape-scale habitat features utilized by fawns to assess possible influences on survival. During 2018-2019 on the Blue Ridge and Cooper's Creek Wildlife Management Areas, and surrounding private lands, we captured 32 neonates opportunistically and with the aid of vaginal implant transmitters and fitted them with VHF collars. We monitored fawn mortality until 12 weeks of age while triangulating 1 location per day until 4 weeks old to create a Minimum Convex Polygon (MCP) for each fawn. Preliminary data suggest poor fawn recruitment may be the leading cause of population decline as fawn survival rates are estimated at 18.9% (95% CI = 0.089 – 0.399) with predation being the leading source of mortality (67%). In FRAGSTATS, we will measure habitat characteristics based on cover type patch metrics within each fawn's MCP using modified data from the 2016 National Land Cover Database. We will use Cox proportional hazards models to estimate the effects of habitat covariates on fawn survival by comparing the surrounding habitat structure of those fawns that died via predation verses surviving fawns. We will continue to capture and monitor fawns through 2020 with results aiding future management decisions.

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Notes:

IMPACTS OF WILD PIGS ON ACORNS AS A FOOD SOURCE FOR NATIVE WILDLIFE

Authors:
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Abstract:
Wild pigs *(Sus scrofa*) are an invasive species that compete with native wildlife for seasonally-available food resources. White-tailed deer *(Odocoileus virginianus)* depend on hard mast throughout winter months. Despite anecdotal observations and food habits studies suggesting wild pigs impact acorn availability for native wildlife, no studies have comparatively examined acorn consumption among species in a natural environment. Our objective was to estimate acorn consumption by wild pigs relative to that of white-tailed deer and other wildlife. We established 40 stations beneath acorn-producing trees at an 8,416-acre study area in eastern Alabama. At each station, we placed 5 acorns on a 3.2 ft x 3.2 ft sand pad with a game camera to record acorn fate every minute continuously during 2-week intervals once a month from November-February 2018-19. We constructed acorn traps from 5 gal buckets to estimate total number of acorns potentially available. From approximately 3.5 million images, we observed that 367 acorns were consumed by 13 animal species while 183, 322, and 328 were lost due to flooding, remained on the sand pad at the time of camera failure, or were not consumed during the sampling period, respectively. Of consumed acorns, white-tailed deer were responsible for 22%, whereas wild pigs (23%), and squirrels (19%) were close in comparison. Consumption by species varied among sampling periods ($P < 0.001$). Wild pigs consume a significant number of acorns and likely reduce the availability of this pulse resource for white-tailed deer and other native wildlife species and may potentially influence oak regeneration.

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Notes:

EFFECTS OF WATER SALINITY ON DRY MATTER INTAKE BY WHITE-TAILED DEER

Authors:
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Abstract:
Surface water in the southwestern United States is often limited due to frequent droughts. Large mammals in this environment are forced to rely on pumped ground water or rapidly evaporating pools of poor-quality water that may contain high (≥7,000) levels of salt and dissolved solids. I hypothesized that water quality will affect the nutritional plane of white-tailed deer *(Odocoileus virginianus)* by decreasing the quantity of dry matter consumed. Salinity is the focus of this study because it is the primary cause of poor-quality water in South Texas. Throughout fall, spring, and summer, nutritional requirements are elevated for both sexes due to reproductive endeavors, so consumption of adequate amounts of forage and supplemental feed is critical. To evaluate the impact of water salinity on dry matter intake of white-tailed deer, I will perform a series of studies at the Albert and Margaret Alkek Ungulate Facility, Kingsville, Texas. We will house deer in 14.75 x 30.0-ft. pens. Water will be provided ad libitum at varying (1,000, 2,500, 4,000, and 6,000ppm) salinity levels to determine 1)the upper threshold of salinity at which white-tailed deer will drink, 2) how water salinity effects water intake across season, and 3) to observe how salinity affects their daily intake of dry matter. Individuals will be randomly assigned to a 4×4 Latin Square. The ultimate objective is to improve water resource management for white-tailed deer and determine its effects on dry matter intake; a relationship that is poorly understood for this species.

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Notes:

CAUSES OF WHITE-TAILED DEER FAWN MORTALITY IN THE PIEDMONT REGION OF SOUTH CAROLINA

Authors:
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Abstract:
White-tailed deer *(Odocoileus virginianus)* populations in South Carolina have declined since the late 1990's according to annual harvest data, and these declines are often attributed to the increasing prevalence of coyotes *(Canis latrans)*. Coyote predation rates on fawns vary widely between regions and perhaps locally, and the conditions that lead to this variation remain largely unknown. It is possible that coyote predation rates may interact with land use and climatic and human effects. The objectives of our study are to determine overall survivorship and causes of mortality of fawns and assess does' behavioral responses to variable predation risk on private lands in McCormick County, South Carolina. In 2019 we fitted 29 does with GPS collars and vaginal implant transmitters and 39 fawns with store-on-board GPS/VHF transmitters. Here we present preliminary data and observations on causes of mortality of white-tailed deer fawns, doe-fawn paired space-use, and birth-site selection. These data will be applied to additional research on the demography and population dynamics of deer, factors influencing fawn mortality, influence of risk on adult doe behavior, and indirect effects of adult doe behavior and physiology on fawn survivorship. When completed, findings from our study will inform the current debate about the impact of coyote predation on fawns in this region and could be used to inform management strategies in an attempt to mitigate coyote-related deer population declines on private lands.

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Notes:

ALLELIC EVOLUTION OF THE MAJOR HISTOCOMPATIBILITY COMPLEX

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Abstract:
To undergo evolutionary change a trait needs to be variable and undergo some type of selection. As genetics are passed to offspring, alleles that determine trait expression may undergo genetic mutations, including nucleotide substitution, recombination error, or deletion/insertion events. These types of mutations can be detrimental, but in some cases convey a competitive edge. The major histocompatibility complex (MHC) is a genetic locus that is important for recognition of pathogens. Balancing selection plays a role in maintaining beneficial MHC alleles in a population because heterozygous individuals are resistant to a wider range of diseases and parasites. We used next-generation sequencing to assay MHC alleles for 294 deer from Comanche ranch in Maverick County, Texas. We observed 20 alleles in the population, 10 previously unreported. Between these alleles, amino acid replacement ranged from 0 amino acids to 27 out of 83 amino acids. We compare the divergence of these new alleles with 18 previously reported alleles and similar MHC alleles in taxa of the Artiodactyla family by constructing phylogenetic trees and comparing genetic distance between alleles. Allele diversity is typically high in many populations of ungulates, but the diversity and genetic differentiation among alleles varies by region. This variation suggest that over time MHC alleles have evolved under different selection pressures. Understanding the divergence of MHC alleles can be beneficial in understanding selection pressure imposed by pathogens and result in a better understanding of MHC function.

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Notes:

STUMP SPROUTS, THE CLOSED CANOPY MINI FOOD PLOT

Authors:
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Abstract:
Many woody plant species have evolved to re-sprout following top-kill. These re-sprouts (hereafter, stump sprouts) may affect nutrient availability, which could be important when managing for high quality deer forage during the growing season. However, researchers have not quantified biomass and forage quality of stump sprouts of woody species. During June 2018 in each of 10 replicates we mechanically cut 2 trees (3-5 inch DBH) each of 3 common species with a range of browse preference from high to low: black gum (Nyssa sylvatica), red maple (Acer rubrum), and sweet gum (Liquidambar styraciflua). We estimated monthly deer browse, biomass, and nutritional quality using a 1-m2 enclosure on one of the stumps during each of the 2018 and 2019 growing seasons (July-September). Black gum, red maple, and sweet gum produced 0.05, 0.06, and 0.007 pounds of dry weight forage per stump respectively during the 2018 growing season and 0.06, 0.06, and 0.02 during 2019. Crude protein and phosphorus content of the browsed biomass of stumps averaged 13-18% and 0.24 – 0.30%, respectively. In comparison, leaves from mid-story trees averaged only 10-16% crude protein and 0.16 – 0.17% phosphorus. Creating stump sprouts produced forage that was significantly greater quality and more accessible because regrowth occurred within reach of deer. Mechanical cutting of mid-story trees creates stump sprouts that produce localized food patches that can supplement nutrition in areas where summer food plots are not feasible. Additionally, stump sprouts can serve as a natural attraction to augment early fall hunting opportunities.

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Notes:

DOES SOIL AMENDMENT IMPROVE EARLY SUCCESSIONAL PLANT COMMUNITIES FOR DEER?

Authors:
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University of Tennessee, Department of Forestry, Wildlife, and Fisheries

Abstract:
Many landowners add lime and fertilizer to natural plant communities to improve the nutritional quality of plants for white-tailed deer *(Odocoileus virginianus*). However, there is little evidence to suggest soil amendments influence plant nutrients, and the relationship between soil nutrient availability and plant nutrients remains unclear. We compared the effects of 3 amendments (liming, fertilizing, and liming + fertilizing) in four fields across Tennessee. In spring 2018, we disked fields and applied amendments according to soil tests to increase pH to 7.0 and P and K to high levels. We applied 60 pounds actual N per acre. During summer 2018, we recorded all plant species in each field, measured vegetation structure, and collected blackberry *(Rubus canadensis)*, Canada goldenrod *(Solidago canadensis)*, common ragweed *(Ambrosia artemisiifolia)*, horseweed *(Erigeron canadensis)*, and pokeweed *(Phytolacca americana)* for nutritional analysis. The effect of soil amendment differed by nutrient and species and was not consistent. All species met the Ca requirement for a doe during peak lactation without soil amendment. Three of the five species did not meet the P and CP requirement with or without amendment. Fertilizer and fertilizer + lime treatments resulted in greater structure (mean vegetation height (in) = 66±6 and 64±5) than lime and control treatments (40±5 and 39±4). Average fertilizer and liming cost were $278 and $228/ac. We caution application of lime and fertilizer to increase nutritional quality of naturally occurring plants. However, amendment may be used to increase plant structure in early successional communities on poor soil-quality sites.

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Notes:

PERENNIAL FOOD PLOTS: SHOULD YOU MOW OR LET THEM GROW?

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Abstract:
Mowing perennial food plots regularly through the growing season is commonly recommended to increase nutritional quality and attractiveness for white-tailed deer. We collected biomass (lbs/ac), nutritional (percent crude protein [CP], phosphorus [P], and calcium [Ca]), and digestibility (percent acid detergent fiber [ADF]) data on alfalfa (2018, 2019) and red clover (2018, 2019) to determine effects of mowing. On average, mowing reduced biomass of alfalfa by 23% and red clover by 30%. Mowing did not increase the nutritional quality of the two forages, though CP and P were slightly greater numerically 1 – 3 weeks after the first mowing event in young plant material. Mowing had no effect on ADF or Ca among the forages. Nutritional quality of young plant material of both forages, mowed or not mowed, approached or exceeded the maximum requirement of a doe with twin fawns. Our data suggest mowing red clover and alfalfa food plots throughout the growing season provides little, if any, benefit with regard to nutritional quality or digestibility for deer. We recommend mowing perennial forages once in late summer and perhaps as necessary during the growing season to reduce weed competition, but presence of some naturally occurring forbs complement planted forages by providing additional nutrition and structure that can make the plot more attractive to deer.

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Notes:

DETERMINING THE MINERAL STATUS OF FREE RANGING WHITE-TAILED DEER

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Abstract:
Liver samples are the standard benchmark for assessment of trace mineral status in ungulates, an index of health and body condition. Unfortunately, liver samples are only available post-mortem. Blood or serum is generally used to assess mineral status of living animals, but requires capture and restraint or sedation of the animal. Non-invasive alternatives to blood or serum provides an additional tool for the evaluation of animal health. We evaluated the performance of hair and antler samples to determine the mineral status of un-managed, free-ranging white-tailed deer *(Odocoileus virginianus)* on South Texas rangelands. We compared relative mineral levels in 3 substrates (serum, antler, and hair) collected from 28 deer on 2 sites. We included a female and male deer from each site and each age class (0.5 yrs. – 6.5+ yrs.). Mineral composition (Ca, P, K, Mg, Na, S, Fe, Zn, Cu, Mn, Mo) was measured using inductively coupled plasma mass spectrometry by an independent laboratory, and we tested for correlation between mineral levels among the 3 substrates. Mineral concentration in hair, antler, and serum were not correlated ($r^2 < 0.46$). Our results indicated that hair and antler are poor substitutes for serum for monitoring the nutritional health of deer. Antler is the fastest-growing tissue, meaning that most of the minerals in antler come from endogenous sources, making it a poor indicator of diet intake. This research suggests that the benefits of using more invasive methods to collect serum and blood samples to assess mineral health of live deer is normally justified.

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Notes:

QUANTITY OR QUALITY? FORAGING ECOLOGY AND MORPHOLOGY OF WHITE-TAILED DEER ACROSS ENVIRONMENTAL GRADIENTS

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Abstract:
Long-term capture data from free-ranging populations of white-tailed deer *(Odocoileus virginianus)* in South Texas show that body and antler size are correlated with sand content of the soil. Deer in sandy soils are up to 31 pounds and 12 Boone and Crockett inches smaller than deer in loamy soils. Presumably this relationship is nutritionally driven, but it is not clear if the observed differences in deer phenotypes are a result of differences in forage quantity or forage quality. Sandy soils differ in nutrient content, water-holding capacity, and plant species composition. If quantity of high-quality forage is limiting, then deer morphology is more likely to exhibit density-dependent responses. In contrast, if forage quality is limiting, deer growth will be largely controlled by environmental factors. We will assess forage abundance, diversity, and nutrient content, focusing our analysis on high-quality forage plants and plant parts preferred by deer. We will index nutrient content via fiber, minerals, and crude protein. Additionally, we are using a blood serum mineral assay from a subset of captured deer to determine if gradients in forage mineral content might cause chronic deficiencies in ungulates. Preliminary results indicate that variation in serum mineral concentrations were miniscule and not influenced by availability in the surrounding environment. Results from our research will provide valuable insight into mineral transfer through multiple trophic levels of an ecosystem. Furthermore, it will expand our understanding of how foraging ecology influences body and antler size of ungulates in stochastic environments.

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Notes:

HUMAN DIMENSIONS OF MANAGING PUBLIC LAND DEER HUNTING IN THE NORTH GEORGIA MOUNTAINS

Authors:
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Abstract:
From 1979 to 2017, the number of white-tailed deer *(Odocoileus virginianus)* hunters on 8 Wildlife Management Areas (WMAs) within the Chattahoochee National Forest in northern Georgia declined 65% while overall hunter numbers in the state of Georgia increased 12%. This indicates that hunters may have been displaced from these WMAs, which poses a threat to the Georgia Department of Natural Resource's (GA DNR) mission to conserve and promote hunting. Our objective was to determine the satisfaction, motivations, and preferences of the remaining North Georgia WMA deer hunters and to identify ways to improve their hunting experiences. We mailed questionnaires to 1,216 hunters, 438 of which were returned, providing a 36% response rate. Forty-six percent of respondents were dissatisfied and 25% were neither dissatisfied nor satisfied with their current WMA hunting experiences but 79% indicated they would likely return to hunt the following year. Their most important motivation for pursuing deer was to 'escape' their regular routine and disconnect from technology while enjoying the outdoors. However, respondents wanted to see improvements in their ability to see deer and have more opportunities to harvest bucks. To improve hunting experiences and curtail the decline in hunter numbers, we recommend management efforts to increase the deer population. GA DNR eliminated opportunities for antlerless harvest on all North Georgia WMAs for the 2019-2020 hunting season to address the issue of low deer populations. This study provides a baseline to assess changes in hunter attitudes due to these recent modifications in hunting regulations.

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Notes:

EFFECTS OF COVER AND FORAGE AVAILABILITY ON WHITE-TAILED DEER USE OF MANAGED FORESTS

Authors:
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Abstract:
Both forage and cover are important predictors of white-tailed deer *(Odocoileus virginianus)* use of an area, but cover has received less attention in the literature. Thus, we performed an experiment to quantify the relative contribution of these factors to deer use of loblolly pine *(Pinus taeda)* stands treated with various forest management practices. We measured percent cover of preferred deer forage and visual obstruction within 5 stands thinned to 40 (low), 60 (medium), and 80 ft2/ac (high) in central Georgia during 2017. We applied prescribed fire to half of each treatment unit during 2018. We randomly placed two camera traps (n=60) within each subplot from August 7-September 14, 2019 and used Poisson regression to analyze photo counts and provide an index of deer use of each treatment. On average, deer use was two-times greater in the 60 and 40 ft2/ac units compared to the 80 ft2/ac units. Compared to unburned units, deer use was 2.6 times greater in burned 80 ft2/ac units and about 1.6 times greater in burned 40 and 60 ft2/ac units. Because both visual obstruction and preferred deer forage increased with decreasing basal area, and were similar between burned and unburned units, we could not assess the relative contribution of cover and forage availability to deer use. However, our data suggests thinning to lower basal areas increases both forage and cover, resulting in increased deer use of loblolly pine stands.

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Notes:

IMPACTS OF WHITE-TAILED DEER AND FIRE TIMING ON GOPHER TORTOISE DIET

Authors:
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Abstract:
Gopher tortoises are an endangered, keystone species whose burrows provide habitat to over 350 animal species. However, changing fire timing have altered plant communities, and in combination with competition for food with white-tailed deer, may limit food availability for tortoises. To better understand the consequences of fire timing and deer competition on tortoises, we quantified these species' dietary overlap and conducted a replicated field experiment in southeastern Mississippi. Microhistological analyses of 272 samples collected between 2017 and 2019 detected a total of 77 plant genera. Although 72% of the plant genera were common to deer and tortoises, further analysis revealed that their diets were statistically distinct (Multivariate ANOVA based on dissimilarities, $p < 0.001$.) Tortoise diet was dominated by grasses *(e.g., Panicum, Andropogon, and Paspalum)*, while deer diet was dominated by woody plants *(e.g., Quercus, Vaccinium, and Rhus)*. To determine how fire timing influences the availability and quality of these plants, we conducted a field experiment with plots designated control, dormant, and growing season fires. Preliminary analyses suggest that the timing of fire influenced the plant community, such as reduced dominance of woody species in growing season fire treatments. We are still awaiting results from plant nutrient content testing after growing season fires; however preliminary results from control and dormant season fire treatments suggest that fire timing influenced plant nutrient content. Taken together, results from our data support the hypothesis that fire timing affects forage plant quantity and quality in ways that can affect competition between deer and tortoises.

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Notes:

COMPETITION FOR ACORN MAST BY DEER, BEARS, AND FERAL PIGS IN THE SOUTHERN APPALACHIANS

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[1]Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia
[2]School of Natural Resources, University of Nebraska - Lincoln
[3]Game Management Section, Wildlife Resource Division, Georgia Department of Natural Resources

Abstract:
White-tailed deer *(Odocoileus virginianus)* densities on 8 Wildlife Management Areas (WMAs) in the Chattahoochee National Forest of North Georgia have declined substantially during the past several decades. Harvest opportunities for antlerless deer were restricted, but populations failed to recover. Timber harvests on National Forest land were reduced significantly in the early 2000's, resulting in homogenous, mature, and closed-canopy forests possibly limiting resource availability. As deer populations have declined, black bears *(Ursus americanus)* and feral pigs *(Sus scrofa)* have simultaneously increased, potentially negatively influencing the ability of deer to procure acorn mast *(Quercus spp.)*. Our objectives are to model temporal variations in space-use and resource selection of adult female deer and compare space-use of deer, feral pigs, and bears relative to acorn availability. We deployed a grid of 64 passive, infrared cameras at 1,640-ft spacing to monitor occurrence of deer relative to feral pigs and bears and assessed acorn abundance within grid cells prior to mast drop. We will use linear regression, Poisson regression, Inverse Distance Weighting Interpolation, and overlap analyses to examine the spatial and temporal use of deer, black bears, and wild pigs relative to acorn abundance across the landscape.

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Notes:

DNA METABARCODING OF COYOTE SCAT TO ASSESS DIET IN SOUTH CAROLINA, USA

Authors:
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[1]Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia
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Abstract:
Coyotes *(Canis latrans)* are generalist omnivores which consume a wide range of plants and animals. With their recent expansion into the Southeast, and potential impacts on endemic game and non-game species, there is considerable interest in what coyotes consume. Coyote diets have traditionally been assessed through simple visual identification of morphometric characteristics of food items within scat. This method can only broadly categorize prey and plant species and may not document the varied diet choices of coyotes due to digestion. However, through the recently developed technique of DNA metabarcoding, we hope to more fully explore the diet of coyotes. We will use fecal samples collected during the spring of 2020 and 2021 at 3 sites across South Carolina, U.S., with the goal of 100 samples per site. We will design and optimize an array of genetic primers to detect species found within each fecal sample through DNA metabarcoding. Species of particular interest include white-tailed deer *(Odocoileus virginianus)*, wild turkeys *(Meleagris gallopavo)*, and other ground-nesting birds. Interestingly, there has been little documentation of coyote consumption of bird species and there is some concern that traditional diet analysis has failed to identify instances of predation. These data will provide a better understanding of coyotes' role in this region's food web and their place as a novel predator across the landscape.

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Notes:

TABLE 1. SOUTHEASTERN STATE DEER HARVEST SUMMARIES FOR THE 2017-2018 OR MOST RECENT AVAILABLE SEASON.

State	Land Area	Deer Habitat		Percent Forested	% Land Area Public Hunting	Harvest		
	(sq. mi)	(sq. mile)	(% Total)			Male	Female	Total
AL	51,628	46,981	91	69	5	83,246	119,793	203,039
AR	52,068	38,607	74	56	12	111,324	98,741	210,065
DE	1,954	1,592	36	15	10	6,901	7,982	14,883
FL	53,632	27,573	51	48	17	48,250	26,724	74,974
GA	57,800	38,674	67	67	6	129,284	149,119	278,403
KY	40,395	39,654	97	59	9	79,018	66,727	145,745
LA	41,406	26,562	64	52	9.5	67,648	53,152	120,800
MD	9,837	8,766	89	39	6	35,322	38,626	73,948
MO	69,561	63,910	92	31	4	166,965	123,259	290,224
MS	47,296	31,250	66	66	6	90,697	106,200	196,897
NC	48,511	36,154	75	60	6	99,966	78,178	178,144
OK	69,919	37,425	54	19	3	69,851	39,409	109,260
SC	30,207	21,920	73	63	7.5	109,208	85,778	194,986
TN	42,246	25,770	61	49	9	84,338	63,251	147,589
TX	261,914	177,272	58	40	<2	508,155	375,408	883,563
VA	39,589	37,939	96	61	11	108,985	82,962	191,947
WV	24,064	22,972	95	79	10	67,316	41,523	108,839
Average or Total	942,027	683,021	73	51	8	1,866,474	1,556,832	3,423,306

TABLE 1. CONTINUED | PAGE 2

State	Harvest Per Sq. Mi [2] of Deer Habitat	Method of Data Collection [2]	Estimated Preseason Population	Length of Season (Days) [3]			Method of Setting Seasons [4]	% Land Area Open to Dog Hunting
				Archery	Black Powder	Firearms		
AL	4.3	A,B,C,E,F	1,250,000	119 (C)	5 (A)	90 (A,C)	A,B	67
AR	5.4	A,C, F, G	1,000,000	160 (C)	12 (C)	50 (C)	A,B	70
DE	9.3	B, F, G	36,000	156 (C)	17 (A,B)	44 (A,B)	A,B,C	0
FL	2.7	E		35-38	14	74-79	A,B	20
GA	7.2	A,C,D,E, F, G	1,000,000	128-145 (C)	92 (A,C)	85 (C)	A,B,C	23
KY	3.7	D,F,G	908,291	136 (C)	2(A), 9(B)	16 (C) + 4 Jr.	A,B,C	0
LA	4.5	A,B,C	500,000	123(C)	14(A,B)	65	A,B,C	80
MD	8.4	B,C,D,F,G	207,000	101 (C)	3+9 (A), 13 (B)	13 (A), 2 (B),+ 2 Jr. day	A,B,C	0
MO	4.5	B,C,D,F,G	1,400,000	112	11	11-14 + 5 Jr.	A,B	0
MS	6.3	C, E	1,475,000	123 (C)	12 (A)	76	B,C	90
NC	4.9	A,B,C,D,F,G	1,000,000	21-83	14	18-80	A,B,C	50
OK	2.9	A,C, E, online	750,000	107 (C)	9	16	A,B	0
SC	8.9	A,B,C	730,000	16 (A)	10 (A)	70-140	C	60
TN	5.7	A (mobile and online)		40 (C)	14 (C)	60 (C)	A,B	0
TX	5.0	B	5,300,000 [5]	35	14	65-93 (B, C)	A,B	0
VA	5.1	A,B,C,D,F	1,030,000	42-77	14-36	15-50	A,B	55
WV	4.7	F	470,000	94(C)	7 (C)	25 (C)	A,B,C	0
Average or Total	5.5		17,056,291					30.3

TABLE 1. CONTINUED | PAGE 3

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	191,054	Stable	$27.75	$320.30	Hunter Log or Electronic Proof of Registration	Mandatory	DMAP
AR	239,629	Down	$10.50 – 25	$55 – 350	License Tag	Mandatory if not checked immediately upon harvest	DMAP
DE	19,499	Stable	$39.50	$199.50	Physical Tag	Mandatory	2 Antlered, Unlimited Antlerless
FL	91,432	Down	$22	$156.50	None	None	Yes
GA	203,254	Stable	$40	$325	License Tag	Mandatory	WMAs
KY	279,917	Down	$62	$335	License Tag/ Hunter Log	Mandatory	Yes
LA	136,000	Down	$29-50	$300-352	Physical Tag	Mandatory	DMAP
MD	54,000	Down	$36.50	$130	Physical Tag or Electronic Proof of Registration	Mandatory	Antlered only
MO	485,700	Down	$17	$225	License Tag	Mandatory	Antlerless only
MS	137,983	Down	$25-$45	$300-$375	None	None	DMAP & FMAP
NC	229,219	Down	$36	$160	License Tag	Mandatory	DMAP & CDMAP
OK	186,173	Stable	$25	$300	License Tag	Mandatory	DMAP
SC	145,234	Stable	$25	$235-375	Physical Tag	Mandatory	Yes & DMAP
TN	198,795	Stable	$68-166	$306	None	Mandatory	Select WMAs
TX	808,464	Stable	$25	$315	License Tag	Mandatory	MLDP tags
VA	185,000	Down	$46-82	$197-259	License Tag	Mandatory	Unlimited on private lands, antlerless only
WV	219,808	Down	$35	$196	Physical Tag	Mandatory	Yes
Average or Total	3,811,161						

TABLE 1. CONTINUED | PAGE 4

State	Mandatory Orange	Crossbows Permitted	Deer Related Accidents						Highway Kill [7]
			Firearms		Stands		Other		
			Injuries	Fatalities	Injuries	Fatalities	Injuries	Fatalities	
AL	Yes	Yes	2	3	12	3	0	0	33,851 (C)
AR	Yes	Yes	6	1	9	1	1	0	24,196 (C)
DE	Yes	Yes	0	0	1	0	0	0	5,816 (C)
FL	WMAs only	Yes	5	0	2	0	0	0	29,132 (C)
GA	Yes	Yes	NA	NA	NA	NA	NA	NA	50,000 (C)
KY	Yes	Season & Handicap	NA	NA	NA	NA	NA	NA	NA (A)
LA	Yes	Yes	6	2	1	0	1	0	10,098 (C)
MD	Yes	Yes	1	0	9	0	0	0	33,000 (C)
MO	Yes	Yes	8	3	NA	NA	0	0	42,485 (C)
MS	Yes	Yes	7	1	11	2	2	0	26,594 (C)
NC	Yes	Yes	5	0	5	2	0	0	76,679 (C)
OK	Yes	Yes	3	0	3	0	0	0	12,605 (C)
SC	WMAs only	Yes	9	1	5	0	0	0	2,923 (A)
TN	Yes	Yes	4	0	2	0	0	0	31,408 (C)
TX	WMAs only	Yes	1	1	1	0	1	0	60,857 (C)
VA	Yes	Yes	10	1	14	1	NA	NA	~63,000 (C)
WV	Yes	Yes	5	2	2	1	0	2	23,700 (C)
Average or Total			4.8	1.0	5.5	0.7	0.4	0.1	526,344

TABLE 1. CONTINUED | PAGE 5

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 (20 WMAs)	~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"	?	?	?	?
FL	2/day [8]	1 or 2/day [8]	2/day [8]	A	----------	40.5% Combined	----------	$10-12
GA	12	10	2	A (One buck must be 4-points on 1 side) B (9 counties are more restricted)	11	2	44	$5-25
KY	None	Varies	1	None	----------	37% Combined	----------	$5-40
LA	6 statewide/3 in 2 of 10 deer areas	3, 1 either-sex	2, 1 either-sex	No	19	24	37	$5-40
MD	Varies	2 in Region A, 35 in Region B	2 with 1 bonus in Region B	3-pt restriction on two bucks	35	30 (C)	43	$5-35
MO	Varies	Varies	2; 1 with firearm	Yes, 37 counties	19	-	41	?
MS	8/5	5/2	3	C	41	34	57	?
NC	6[8]	4[8]	2	NA	----------	50% Combined	----------	?
OK	6	Up to 6	2	No	29	18	42	$10-20

State	Limits [8]			Antler Restrictions [9]	% Hunting Success [10]			Avg. Leasing Fees/Acre
	Season	Antlerless	Antlered		Archery	Muzzleloader	Firearms	
SC	8+	3+	5	A (on 2 of buck bag limit) C (16 WMAs)	28	21	64	$8–20
TN	None	Varies	2 statewide	C (on select WMAs)	?	?	?	?
TX	5	Up to 5	Up to 3	Yes, 117 counties	----------	62.5% Combined	----------	$7-30
VA	6 (east) & 5 (west)	6	3 (east) & 2 (west)	On 2 WMAs + 5 counties	~30	~37	~51	UNK
WV	10	Up to 8	Up to 3	5 WMAs & 2 State Forests	32	11	39	$3-10

TABLE 1. CONTINUED | PAGE 6

State	Private Lands Programs				Trailing wounded deer with dogs legal?	Supplemental feeding legal?	Baiting legal?
	Type[11]	Min. Acreage Requirements	Fee	No. of Cooperators			
AL	A	None	None	~100	Yes	Yes	Yes
AR	A	500	None	615	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	113, 320, 4	No	Yes	Yes, Private
FL	A, C	640; 5000	None	1,309; 28	Yes	Yes	Yes, Private
GA	DMAP	250-1500	$200-1,000	~50	Yes	Yes	Yes
KY	B	None	None	500	Yes	Yes (except March – May)	Yes, Private
LA	A	40	Yes	757	Yes	Yes	Yes, Private
MD	None				Yes	Yes	Yes, Private Only.
MO	B	5	None	174,994	Yes	Yes (except CWD zone)	No

State	Private Lands Programs				Trailing wounded deer with dogs legal?	Supplemental feeding legal?	Baiting legal?
	Type[11]	Min. Acreage Requirements	Fee	No. of Cooperators			
MS	A, D	Variable	None	415	Yes	Yes	Private land only
NC	A	Regional; 1,000/500	$50	50	Yes	Yes	Yes, Private
OK	A	1,000	$200-400	150	Yes	Yes	Yes, Private
SC	A	None	$50	1,443- 3.1 mil ac	Yes	Yes	Yes, Private
TN	None				With officer approval	Yes	No
TX	A	None	None	7,156 properties under a wildlife management plan – 137 wildlife cooperatives (4,500 + members) 31.3 mil ac	Most of Texas	Yes	Yes
VA	DCAP, DMAP, DPOP	None	None	938/731/12	Yes (weapon allowed)	No (Sept 1 – first Sat in Jan)	No
WV	None				No	Yes[12]	Yes[12]

[1] Total harvest includes deer of unknown gender.

[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.

[6] Asterisk if estimate includes landowner exempted hunters.

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

[8] AL – 3 antlered bucks per season - one must have at least 4 points on one antler. One county requires all bucks to have at least 3 points on one antler. 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.

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

[12] Except for year round ban in CWD area and public land from September 1 through December 31.

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

NOTES

NOTES

THANK YOU TO OUR CONFERENCE CONTRIBUTORS AND DONORS

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