38th Annual Meeting of the

Southeast Deer Study Group

Integrating the North American Model of Wildlife Conservation into Deer Management

February 23-25, 2015

Little Rock, Arkansas

Hosted by the Arkansas Game and Fish Commission

Welcome

The Arkansas Game and Fish Commission welcomes you to the 38th Annual Southeast Deer Study Group Meeting in Little Rock, Arkansas.

We would like to thank the Georgia Department of Natural Resources, the University of Georgia and the Quality Deer Management Association who hosted last year's meeting, as well as the following sponsors for their generous contributions to this meeting:

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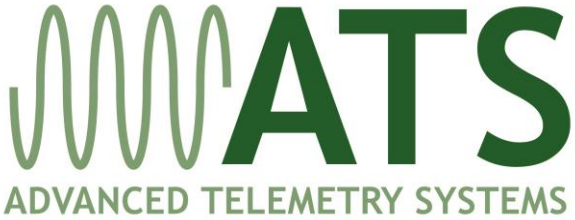

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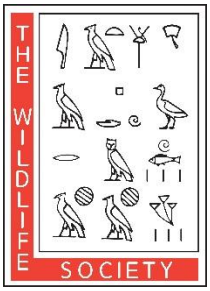

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2015 Southeast Deer Study Group Meeting

Hosted by the Arkansas Game and Fish Commission

Planning Committee

Arkansas Game and Fish Commission Deer Team

Meeting Organizer and Co-Chairman:

- Cory Gray/Ralph Meeker

Finance and Registration

- Sandra Garrett/Janet Greenwood

Display and Exhibits

- Eley Talley/Mark Hutchings/Jason Mitchell

Fundraising and Door Prizes

- Ralph Meeker/Garrick Dugger

Paper and Poster Selection

- Don White/Cory Gray/Becky McPeake

Program and Agenda

- Keith Stephens/Cory Gray

Audio and Visual

- Matt Hodges/Cory Gray

Security

- Jerry Smith/Jason Whitehead

Site Coordination

- Bubba Groves/Jeremy Brown/Mark Barbee

The Southeast Deer Study Group

The Southeast Deer Study Group was formed as a subcommittee of the Forest Game Committee of the Southeastern Section of The Wildlife Society. The Southeast Deer Study Group Meeting is hosted with the support of the directors of the Southeastern Association of Fish and Wildlife Agencies. The first meeting was held as a joint Northeast-Southeast Meeting at Fort Pickett, Virginia, on September 6-8, 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 list of the meetings, their location, and theme are listed below. 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 in our region. The Deer Subcommittee was given full committee status in November 1985 at the Southeastern Section of The Wildlife Society's annual business meeting. In 2006, Delaware was approved as a member.

TWS Professional Development

The 38th Annual Southeast Deer Study Group meeting can be counted as contact hours for Professional Development/Certification. Each hour of actual meeting time counts as one credit hour (no social time credit). For more information about professional development, visit The Wildlife Society web site, 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 process. This information is provided to foster communication and interaction among researchers, biologists and deer managers. Commercial use of any of the information presented in conjunction with the Southeast Deer Study Group Annual Meeting is prohibited without written consent of the author(s).

Participation of any vendor/donor/exhibitor with the Southeast Deer Study Group Annual Meeting does not constitute nor imply endorsement by the Southeast Deer Study Group, the SE Section of The Wildlife Society Deer Committee, the host state, or meeting participants.

Southeast Deer Study Group Meetings

Year	Location	Meeting Theme
1977	Fort Pickett, 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 & Clark to the New Millennium- The Changing Face of Deer Management
2002	Mobile, AL	Modern Deer Management- Balancing Biology, Politics, and Tradition
2003	Chattanooga, TN	Into the Future of Deer Management: Where Are We Heading?
2004	Lexington, KY	Today‘s Deer Hunting Culture: Asset or Liability?
2005	Shepherdstown, WV	The Impact of Today‘s Choices on Tomorrow‘s Deer Hunters
2006	Baton Rouge, LA	Managing Habitats, Herds, Harvest, and Hunters in the 21st Century Landscape. Will 20th Century Tools Work?
2007	Ocean City, MD	Deer and Their Influence on Ecosystems
2008	Tunica, MS	Recruitment of Deer Biologists and Hunters: Are Hook and Bullet Professionals Vanishing?
2009	Roanoke, VA	Herds Without Hunters: The Future of Deer Management?
2010	San Antonio, TX	QDM to IDM: The Next Step or the Last Straw?
2011	Oklahoma City, OK	All Dressed Up With No Place to Go: The Issue of Access.
2012	Sandestin, FL	Shifting Paradigms: Are Predators Changing the Dynamics of Managing Deer in the Southeast?
2013	Greenville, SC	Challenges in Deer Research and Management in 2013
2014	Athens, GA	The Politics of Deer Management – Balancing Public Interest and Science
2015	Little Rock, AR	Integrating the North American Model of Wildlife Conservation into Deer Management

Members of the Deer Committee: Southeastern Section of the Wildlife Society

STATE	NAME	EMPLOYER
Alabama	Chris Cook	**Alabama Department of Conservation & Natural Resources**
Arkansas	Cory Gray Ralph Meeker	**Arkansas Game & Fish Commission** **Arkansas Game & Fish Commission**
Delaware	Joe Rogerson	**Delaware Division of Fish & Wildlife**
Florida	Cory R. Morea Steve M. Shea	**Florida Fish and Wildlife Conservation Commission**
Georgia	Charlie Killmaster John Bowers	**Georgia Department of Natural Resources**
	Karl V. Miller	**University of Georgia**
Kentucky	Gabe Jenkins	**Kentucky Department of Fish & Wildlife Resources**
Louisiana	Scott Durham Johnathan Bordelon	**Louisiana Department of Wildlife & Fisheries**
Maryland	Brian Eyler George Timko	**Maryland Department of Natural Resources**
Mississippi	Lann Wilf	**Mississippi Department of Wildlife, Fisheries, & Parks**
	Steve Demarais (Chair)	**Mississippi State University**
Missouri	Emily Flinn Jason Sumners	**Missouri Department of Conservation**
North Carolina	David Sawyer Evin Stanford	**North Carolina Wildlife Resources Commission**
Oklahoma	Erik Bartholomew	**Oklahoma Department of Wildlife & Conservation**
South Carolina	Charles Ruth	**South Carolina Department of Natural Resources**
Tennessee	Chuck Yoest Ben Layton	**Tennessee Wildlife Resource Agency**
	Craig Harper	**University of Tennessee**
Texas	Alan Cain	**Texas Parks & Wildlife Department**
	Bob Zaiglin	**Southwest Texas Junior College**
Virginia	Matt Knox Nelson Lafon	**Virginia Department of Game & Inland Fisheries**
West Virginia	Jim Crum	**West Virginia Division of Natural Resources**
QDMA	Kip Adams	**Quality Deer Management Association**

Southeast Deer Study Group Awards

Career Achievement Award

1996 – Richard F. Harlow
1997 – Larry Marchinton
1998 – Harry Jacobson
1999 – David C. Guynn, Jr.
2000 – Joe Hamilton
2002 – Robert L. Downing
2004 – Charles DeYoung
2005 – Kent E. Kammermeyer
2006 – William E. "Bill" Armstrong
2007 – Jack Gwynn
2008 – (none)
2009 – David E. Samuel
2010 – Bob K. Carroll
2011 – Quality Deer Management Association
2012 – Robert E. Zaiglin
2013 – (none)
2014 – Mark O. Bara

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 – Bradley Cohen (University of Georgia)

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)

Schedule of Events
Monday, February 23, 2015

12:00pm - 6:00pm	Registration	Little Rock Marriott
12:00pm - 6:00pm	Poster & Vendor Set-up	Statehouse Convention Center
3:00pm	Deer Committee Meeting	Little Rock Marriott - Salon A
6:00pm - 9:00pm	Welcome Social	Little Rock Marriott - Salons B&C

Tuesday, February 24, 2015

7:00am - 12:00pm	Registration	Little Rock Marriott
7:00am - 8:00am	Poster Set-up	Statehouse Convention Center
7:00am - 8:00am	Vendor Set-up	Statehouse Convention Center
8:00am - 5:00pm	Poster & Vendor Session	Statehouse Convention Center
8:00am - 10:00am	Technical Session I	Statehouse Convention Center
10:00am - 10:20am	Break	Statehouse Convention Center
10:20am - 11:50am	Technical Session II	Statehouse Convention Center
11:50am - 1:30pm	Lunch (on your own)	
1:30pm - 3:20pm	Technical Session III	Statehouse Convention Center
3:20pm - 3:40pm	Break	Statehouse Convention Center
3:40pm - 4:50pm	Technical Session IV	Statehouse Convention Center
4:50pm - 7:00pm	Dinner (on your own)	
7:00pm - 10:00pm	Professional/Student Mixer	Little Rock Marriott - Salons B&C

Wednesday, February 25, 2015

8:00am - 5:00pm	Poster & Vendor Session	Statehouse Convention Center
8:00am - 9:50am	Technical Session V	Statehouse Convention Center
9:50am - 10:10am	Break	Statehouse Convention Center
10:10am - 12:00pm	Technical Session VI	Statehouse Convention Center
12:00pm - 1:30pm	Lunch (on your own)	
1:30pm - 3:20pm	Technical Session VII	Statehouse Convention Center
3:20pm - 3:40pm	Break	Statehouse Convention Center
3:40pm - 5:10pm	Technical Session VIII	Statehouse Convention Center
5:30pm	Business Meeting	Little Rock Marriott - Arkansas Ballroom
6:15pm - 7:00pm	Social	Little Rock Marriott - Salon A
7:00pm	Awards Banquet	Little Rock Marriott - Salons B&C

Tuesday, February 24, 2015
Technical Session I
Statehouse Convention Center
Moderator: Cory Gray – Arkansas Game and Fish Commission

8:00 **Introductions**

8:10 **Welcome**
Ford Overton – Commissioner, Arkansas Game and Fish Commission

8:30 **North American Model of Wildlife Conservation–Past**
Jim Miller

9:00 **North American Model of Wildlife Conservation–Present**
Brad Carner

9:30 **North American Model of Wildlife Conservation–Future**
Don White, Jr.

10:00 **Break**

Technical Session II
Statehouse Convention Center
Moderator: Don White, Jr. – University of Arkansas Agricultural Experiment Station

10:20 **Announcements**

10:30 ***The Large Ungulate Dinner Table: Who's Competing with Deer for Forages in South Texas?**
Stacy L. Hines, Timothy E. Fulbright, J. Alfonso Ortega-S., David G. Hewitt, Thomas W. Boutton, and Alfonso Ortega-S., Jr.

10:50 ***Comparison of White Oak and Sawtooth Oak Acorn Production and Attractiveness**
Daniel L. Morina, Marcus A. Lashley, M. Colter Chitwood, Michael T. Biggerstaff, Christopher S. DePerno, and Christopher E. Moorman

11:10 ***Effects of White-tailed Deer Densities and Supplemental Feeding on Woody Shrub Canopy Cover and Volume**
Lindsey M. Phillips, Timothy E. Fulbright, David G. Hewitt, Charles A. DeYoung, Lindsay D. Roberts, Kim N. Echols, and Don A. Draeger

11:30 ***Poor Soils and Density-mediated Body Weight in Deer: Forage Quality or Quantity?**
Marcus A. Lashley, M. Colter Chitwood, Craig A. Harper, Chris E. Moorman, and Chris S. DePerno

11:50 **Lunch on your own**

*Student Presenter

Technical Session III
Statehouse Convention Center
Moderator: Becky McPeake – University of Arkansas Division of Agriculture Cooperative Extension Service

1:30 **Announcements**

1:40 ***White-tailed Deer Population Dynamics and Adult Female Survival in the Presence of a Novel Predator**
M. Colter Chitwood, Marcus A. Lashley, John C. Kilgo, Christopher E. Moorman, and Christopher S. DePerno

2:00 ***Survival and Cause-specific Mortality of White-Tailed Deer Fawns in Urban and Rural Areas**
Chad R. Williamson, Timothy C. Carter, and Chad M. Stewart

2:20 ***Generational and Regional Compensation of Antler Size and Body Weight of White-Tailed Deer in Mississippi**
Eric S. Michel, Steve Demarais, Bronson Strickland, Guiming Wang and Chad Dacus

2:40 ***Geographic Variation in the Morphology of Unmanaged White-tailed Deer in South Texas**
Kory R. Gann, David G. Hewitt, Alfonso Ortega-S, Jr, Timothy E. Fulbright, Alfonso Ortega-S, Randy W. DeYoung, Tyler A. Campbell, and Thomas W. Boutton

3:00 ***Density and Fawning Season Effects on Home Range Size and Overlap of Female White-tailed Deer**
John H. Clark, David G. Hewitt, Timothy E. Fulbright, Charles A. DeYoung, Kim Echols, Andrew N. Tri, and Don Draeger

3:20 **Break**

*Student Presenter

Technical Session IV
Statehouse Convention Center
Moderator: Emily Flynn – Missouri Department of Conservation

3:40 **Announcements**

3:50 ***Estimating Dispersal and Excursion Movement Rates of White-tailed Deer Using Demographic and Landscape Variables**
Matthew T. Springer, Clayton K. Nielsen, and Eric M. Schauber

4:10 ***Seasonal and Rut-related Variations in Space Use and Movements of Mature Male White-tailed Deer in Louisiana**
Taylor N. Simoneaux, Michael J. Chamberlain, Karl V. Miller, Bradley S. Cohen, Elizabeth Cooney, and Becky Shuman

4:30 ***How Does Loss of Social Group Impact Behavior of Remnant White-tailed Deer?**
Marie I. Tosa, Eric M. Schauber, and Clayton K. Nielsen

4:50 ***Is There Any Benefit to Fertilizing White Oaks for Mast and Forage?**
Jordan S. Nanney, Jarred M. Brooke, and Craig A. Harper

7:00 **Professional/Student Mixer – Little Rock Marriott (Salons B&C)**

*Student Presenter

Wednesday, February 25, 2015
Technical Session V
Statehouse Convention Center
Moderator: Charles Ruth – South Carolina Department of Natural Resources

8:00 **Announcements**

8:10 ***Temporal and Age-group Variation in Antlered White-tailed Deer Harvest Rates**
Andrew S. Norton, Dan Storm, Ryan Walrath, Mike Watt, and Tim Van Deelen

8:30 ***Estimation of Deer Damage to Soybean Production in Mississippi: A Spatial and Temporal Context**
Gathel C. Hinton, Bronson Strickland, Steve Demarais, and Tom Eubank

8:50 ***An Evaluation of Methods to Estimate Deer Abundance**
Jacob M. Haus, Jacob L. Bowman, and Brian Eyler

9:10 ***Using a Double Observer Approach to Distance Sampling During Aerial Surveys for White-tailed Deer**
Mary K. Annala, Andrew N. Tri, David G. Hewitt, Randy W. DeYoung, Charles A. DeYoung, and Tyler A. Campbell

9:30 ***Using GPS Telemetry to Assess Deer-vehicle Collision Risk**
James H. Stickles, Bradley S. Cohen, David A. Osborn, Robert J. Warren, and Karl V. Miller

9:50 **Break**

*Student Presenter

Technical Session VI
Statehouse Convention Center
Moderator: Greg Humphreys – Deltic Timber Corporation

10:10 **Announcements**

10:20 ***White-tailed Deer Ear Tag Retention**
Emily H. Belser, John Lewis, Mickey Hellickson, and David G. Hewitt

10:40 **White-tailed Deer Disease Update**
John R. Fischer

11:00 **White-tailed Deer in Chicot County, Arkansas: Had Them; Lost Them; But Getting Them Back**
Mike Staten, M. Cory Gray, and Bubba Groves

11:20 **Adoption of Native Food Plots by Hunters and Landowners: Will It Work?**
Rebecca J. McPeake

11:40 **Impacts of Selective Harvest Criteria on Cohort Antler Size and Management Objectives in Georgia's Piedmont**
William D. Gulsby, Charlie H. Killmaster, John W. Bowers, James A. Martin, and Karl V. Miller

12:00 **Lunch on your own**

*Student Presenter

Technical Session VII
Statehouse Convention Center
Moderator: Scott Durham – Louisiana Department of Wildlife and Fisheries

1:30 **Announcements**

1:40 **The Use of Antler Regulations on Wildlife Management Areas in Mississippi**
Chad M. Dacus and Chris McDonald

2:00 **Ten Year Trends in Antlered Buck and Antlerless Harvests**
Kip Adams, Matt Ross, and Brian Murphy

2:20 **Public Involvement in Wisconsin Deer Management**
Bret R. Owsley and Bob Nack

2:40 **Predator Exclusion as a Management Option for Increasing White-tailed Deer Recruitment**
Mike Conner, Michael J. Cherry, Brandon T. Rutledge, Charlie H. Killmaster, Gail Morris, and Lora Smith

3:00 **Male Reproductive Success in White-tailed Deer and Importance of Body Size**
Chad H. Newbolt, Steve Ditchkoff, Todd Steury, Tim Neuman, Peter Acker, and Stephanie Hoffman

3:20 **Break**

Technical Session VIII
Statehouse Convention Center
Moderator: Ralph Meeker – Arkansas Game and Fish Commission

3:40 **Announcements**

3:50 **Dietary Energy Influence in Growth and Development of White-tailed Deer**
Ryan L. Reitz, Don B. Frels, Jr., Justin A. Foster, David G. Hewitt, and Randy W. DeYoung

4:10 **Does Soil Fertility Influence Intraspecific Plant Nutritional Quality for White-tailed Deer?**
Craig A. Harper, Marcus A. Lashley, R. Dwayne Elmore, M. Colter Chitwood, Jarred M. Brooke, Jordan S. Nanney, Dana J. Morin, Chris E. Moorman, and Chris S. DePerno

4:30 **Relationships Between White-tailed Deer Density, Harvest, and Landscape Metrics in Tennessee**
Heidi L. Adams, Robert E. Kissell, Jr., Daryl Ratajczak, R. Gray Anderson, Edward L. Warr, Roger D. Applegate, Lynn Barrett, Tabitha Lavacot, and David A. Graves

4:50 **Supplemental Feed and Density Effects on Deer Habitat Selection in South Texas**
Kim N. Echols, Timothy E. Fulbright, David G. Hewitt, Charles A. DeYoung, David B. Wester, and Don A. Draeger

5:30 **Business meeting – Little Rock Marriott (Arkansas Ballroom)**

6:15 **Pre-banquet social – Little Rock Marriott (Salon A)**

7:00 **Banquet – Little Rock Marriott (Salons B&C)**

Poster Session
Statehouse Convention Center

***Do Deer Benefit From Raccoon Eyes?**
Summer D. Higdon, Marcus A. Lashley, M. Colter Chitwood, Christopher S. DePerno, and Christopher E. Moorman

***Comparison of Four Baits for Attracting White-tailed Deer During the Rut in Southern Illinois**
Wilson L. Fogler, Matthew T. Springer, and Clayton K. Nielsen

Immobilization of Wild White-tailed Deer with Butorphanol-Azaperone-Medetomidine
Caleb A. Haymes, Joseph McDermott, Gabriel Jenkins, Will Bowling, Kristina Brunjes, John Hast, and John J. Cox

***Laying the Foundation: Advancing the Use of Stable Isotopes in White-tailed Deer Ecology and Management**
Stacy L. Hines, Timothy E. Fulbright, J. Alfonso Ortega-S., David G. Hewitt; Thomas W. Boutton, and Alfonso Ortega-S., Jr.

Cause Specific Mortality of White-tailed Deer (*Odocoileus virginianus*) Neonates in Southeastern Kentucky
Joseph R. McDermott, Caleb Haymes, Gabriel Jenkins, Will Bowling, Kristina Brunjes, John Hast, and John J. Cox

***Use of Capsaicin as a Deer Depredation Deterrent on Soybeans**
Jonathan M. Meats, Matthew T. Springer, and Clayton K. Nielsen

Deer densities and supplemental feed have minimal effect on forb communities in South Texas
Lindsay D. Roberts, Timothy E. Fulbright, David B. Wester, David G. Hewitt, Charles A. DeYoung, Kim N. Echols, and Don A. Draeger

Are Feral Hogs Predating White-tailed Deer Fawns in Southeast Arkansas?
Don White, Jr., Christopher L. Watt, Robert R. Floyd, and Cory Gray

*Student Presenter

Tuesday, 8:30 AM

North American Model of Wildlife Conservation – Past

Jim Miller – Mississippi State University

ABSTRACT: The North American Model of Wildlife Conservation (the Model) is based on the cornerstone of the Public Trust Doctrine. This doctrine establishes that some natural resources, like wildlife, are too valuable to be owned by an individual, are considered universally important to the lives of its citizens, and therefore, are owned by the public to be managed for the benefit of the public. The Model has been evolving for almost 200 years with its various components being developed somewhat independently over time. However, there are numerous interrelationships, clearly defined by the 7 principles comprising the Model, (Geist et al. 2001). White-tailed deer (*Odecoileus virginanus*), like many other wildlife species, have benefitted immeasurably from the application of the Model. Emerging from the days of overexploitation, market hunting, and habitat destruction, white-tailed deer population estimates in North America now exceed 35 million. However, changing demographics and land use, concerns about overabundance in urban/suburban areas, population declines in other areas, and how to deal with changing public perceptions about wildlife resources challenges state and federal land and wildlife agencies to develop and implement new strategies necessary to ensure continued wildlife management for public benefit. Discussion of some of the major components developed and implemented that led to the current management situation, including elimination of market hunting and exploitation, laws regulating take and allocation of wildlife, development of the American Game Policy, and the evolving mandate to public conservation agencies to employ scientifically trained personnel to effect scientific management and restoration of public trust wildlife resources, will set the stage for further discussion and deliberation of the Model's evolution.

Contact: jmiller@ext.msstate.edu

Notes:

Tuesday, 9:00 AM

North American Model of Wildlife Conservation – Present

Brad Carner – Arkansas Game and Fish Commission

ABSTRACT: As the retrospective concept of the North American Model of Wildlife Conservation (the Model) was formalized over a decade ago, conservationists have sought to apply the foundational principles of the Model within a dynamic landscape faced with diverse challenges. In some respects, challenges facing the wildlife conservation community today such as the commercialization and privatization of wildlife are very similar to those which our conservation heroes tackled before us. However, there exist other unique, emerging challenges such as the effective management of overabundant species which demand the immediate attention and collaboration amongst the entire conservation community and the general public. In many cases, the conservation of public trust wildlife resources is experiencing an ever growing, multi-pronged divide between the general public, hunters and the wildlife conservation profession. A current state wildlife agency perspective will be presented outlining examples where the principles of the Model have been intentionally applied and upheld in recent years as well as detailing other examples where wildlife conservation challenges and conflicts remain unresolved. This detailed look at current conservation challenges and developing trends will provide the basis for a predictive look into the future.

Contact: Bradley.Carner@agfc.ar.gov

Notes:

Tuesday, 9:30 AM

North American Model of Wildlife Conservation – Future

Don White, Jr. – University of Arkansas Agricultural Experiment Station

ABSTRACT: The North American Model of Wildlife Conservation was spurred into being by the collapse of charismatic species of direct importance to the public. Memory of that dark phase in the continent's history has had a long reach in conservation circles. Today, however, white-tailed deer and many other once-vulnerable species are thriving and have reached numbers that affront both public sensibilities and ecosystem structure. The societal trends we now face leave little doubt that the Model is experiencing perhaps its greatest period of challenge. While we can take strength from the Model's history, we should not underestimate the treats to its future. In this presentation, I will discuss 6 issues that challenge the future of the Model: the human-nature divide, wildlife as vermin, changes in public perceptions, commercialization and privatization, funding for conservation, and Model immutability. Failure to recognize these challenges and respond to them by engaging in public discourse at all levels of society, place the Model at risk of losing its relevance and influence in guiding wildlife conservation and management in North America.

Contact: whited@uamont.edu

Notes:

Tuesday, 10:30 AM

The Large Ungulate Dinner Table: Who's Competing with Deer for Forages in South Texas?

Stacy L. Hines - Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University - Kingsville; Timothy E. Fulbright - Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville; J. Alfonso Ortega-S. - Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville; David G. Hewitt - Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Science, Texas A&M University-Kingsville; Thomas W. Boutton - Department of Ecosystem Science and Management, Texas A&M University-College Station; Alfonso Ortega-S., Jr. - East Wildlife Foundation

ABSTACT: Stable isotope analyses can be applied to investigate niche partitioning among species. This information can reveal potential for interspecific competition for forage resources. Our objective was to determine if cattle (Bos spp.) and nilgai (Boselaphus tragocamelus) diets overlap with white-tailed deer (Odocoileus virginianus) diets during peak growing seasons and a non-growing season in south Texas. During autumn, spring, and winter 2012-2014, we randomly collected 20 fresh fecal samples for each species across six 6,177-acre study sites on East Wildlife Foundation ranches in south Texas ranging from the coast to western south Texas. Total grazing niche for a community of sympatric herbivores is defined as variation within and between species, hence we analyzed carbon (δ13C) and nitrogen (δ15N) isotope signatures using F-tests with grazing niche overlap indicated if $P > 0.05$. Preliminary analyses of the δ13C of herbivore fecal samples from autumn 2012 indicated a species*study site interaction ($P < 0.001$); therefore, we analyzed each site separately. The δ13C fecal isotope signature suggested there was no diet overlap among cattle and nilgai at 3 sites where nilgai were present, or between cattle and deer at 5 of the 6 sites ($P < 0.006$). However, deer and nilgai diets overlapped at all 3 sites and deer and cattle diets overlapped at one site ($P > 0.126$). Preliminary results from autumn 2012 suggest (1) nilgai compete with deer; (2) nilgai and cattle do not compete; and (3) cattle and deer only compete when little grazeable forage is available.

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Tuesday, 10:50 AM

Comparison of White Oak and Sawtooth Oak Acorn Production and Attractiveness

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ABSTRACT: Production and attractiveness of acorns are used as justifications to promote sawtooth oaks in the Southeast. However, given the widespread misconceptions that have led to the introduction and subsequent establishment of invasive species in the Southeast, data are needed to substantiate claims before sawtooth promotion continues. For 2 years we followed acorn production of 30 white oaks and 30 sawtooth oaks in openings with no competition. Also, we baited camera traps with acorns from each species to test their attractiveness to white-tailed deer. Sawtooths (10% variation) were more consistent acorn producers across years than white oaks (87% variation). However, average production was similar between sawtooths (205 acorns/yd2 canopy) and white oaks (192 acorns/yd2 canopy), with whites outproducing sawtooths by nearly 2 times in their best year. Sawtooths had a 2-week shorter production period with the peak being 4 weeks earlier than white oaks. At baited camera traps, deer took 6 times longer to approach sawtooths than white oaks and randomly walked by unbaited sites 60 hours sooner than sites baited with sawtooth acorns. When presented with both options, deer consumed all white oak acorns before consuming any sawtooth acorns. The only advantage of sawtooths was consistent production from year to year, which is a benefit also provided by native red oaks. Therefore, when planting oaks to manage foods for deer, managers should focus on native species from each subgenus to promote consistent and attractive food sources available to deer during the time they are adapted to consume them.

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Tuesday, 11:10 AM

Effects of White-tailed Deer Densities and Supplemental Feeding on Woody Shrub Canopy Cover and Volume

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ABSTRACT: The maximum white-tailed deer (Odocoileus virginianus) population that southwestern Texas can support without negative vegetation impacts is unknown. Our objective was to determine the impacts of different deer densities on shrub species. In March 2013, 4 200-acre enclosures were established on each of 2 ranches, with target densities of 0, 20, 40, and 60 deer/200-acres. Enclosures received supplemental feed. During summer 2012-2014, we used the line intercept method to estimate canopy cover of shrub species on 20 transects in each enclosure. We compared percent canopy cover of highly palatable, unpalatable, and moderately palatable shrubs. In summer 2013-2014, we measured height and canopy volumes of pairs of guayacan (Guaiacum agustifolium), blackbrush acacia (Acacia rigidula), and granjeno (Celtis pallida) that were unprotected or protected from browsing. Blackbrush acacia and granjeno were split into 2 height classes (<4.92 ft tall and >4.92 ft tall). Data were analyzed using repeated measures for mixed models. There was no effect ($P>0.148$) of deer density on percent canopy cover of highly palatable, unpalatable, and moderately palatable shrubs, as well as no effect ($P>0.062$) on canopy volume of blackbrush acacia and granjeno <4.92 ft tall, and guayacan canopy volume. Unprotected blackbrush acacia >4.92 ft tall had larger canopies ($P<0.041$) 6.56 ft above the ground and higher. Unprotected granjeno >4.92 ft tall showed this trend, but was not statistically significant ($P>0.769$). Based on our results, it appears that deer browsing may result in compensatory growth of blackbrush acacia and granjeno, increasing canopy area out of the reach of deer.

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Tuesday, 11:30 AM

Poor Soils and Density-mediated Body Weight in Deer: Forage Quality or Quantity?

Marcus A. Lashley - North Carolina State University; M. Colter Chitwood - North Carolina State University; Craig A. Harper - University of Tennessee–Knoxville; Christopher S. DePerno - North Carolina State University; Christopher E. Moorman - North Carolina State University

ABSTRACT: There are 2 competing hypotheses regarding the role of poor soil fertility in white-tailed deer nutrition: either poor quality soils limit forages from being high quality (hypothesis 1) or soil fertility limits the amount of high quality forages produced (hypothesis 2). Under hypothesis 1, traits of deer are not density-mediated because there are no high-quality forages to compete over. In hypothesis 2, traits are density-mediated, and therefore, respond to reduced competition. In a region ranking poorer in soil fertility than 80% of the United States, we evaluated whether nutrient concentrations among 5 vascular plant classes (72 species) and site-specific selected and non-selected forages could meet the nutritional requirements of lactating females when forage intake is not limited. Also, we compared body weight of yearling males at a high density (35-45 deer/mi2) and low density (8-13 deer/mi2) because previous studies concluded the site was too poor for body weight to be density-mediated. Deer selected plant species from each forage class that would meet their nutritional requirements (i.e., assuming adequate forage intake) but also selected for different nutrients across forage classes. Phosphorus was limited in most forages, but deer selected forages that met P requirements 10 times more than expected. Yearling male body weight was greater when deer density was low than high. Because intraspecific forage quality is not limited in poor soils, management strategies that increase forage per animal are a viable option to promote desirable deer morphometrics in poor soil regions.

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Tuesday, 1:40 PM

White-tailed Deer Population Dynamics and Adult Female Survival in the Presence of a Novel Predator

M. Colter Chitwood - North Carolina State University; Marcus A. Lashley - North Carolina State University; John C. Kilgo - USDA Forest Service, Southern Research Station; Christopher E. Moorman - North Carolina State University; Christopher S. DePerno - North Carolina State University

ABSTRACT: Recent localized declines in white-tailed deer (Odocoileus virginianus) populations in the southeastern U.S. have been linked to increasing predation pressure from coyotes (Canis latrans). However, no study has used field-based vital rates to conduct sensitivity analyses or model deer population trajectories under potential management strategies. We used low, medium, and high values of fawn survival, adult female survival, and fecundity data collected from Fort Bragg Military Installation, NC, to demonstrate the current population trajectory for deer ($\lambda = 0.905$; low $\lambda = 0.788$, high $\lambda = 1.003$). We determined adult female survival was the most sensitive and elastic vital rate. Further, for three potential management scenarios, we projected the population for 10 years using estimated vital rates. Reducing adult female harvest ($\lambda = 0.935$; low $\lambda = 0.875$, high $\lambda = 1.002$) and coyote removal ($\lambda = 0.995$; low $\lambda = 0.898$, high $\lambda = 1.081$) reduced the current population decline, while combining both approaches ($\lambda = 1.024$; low $\lambda = 0.898$, high $\lambda = 1.141$) resulted in population increases. Our data indicate that for low-density deer populations with heavy predation pressure on neonates, protecting adult females from harvest may not be a magic bullet. Coyote removal might be a necessary strategy due to the possibility of increasing fawn survival, which appears to be the most important vital rate in our study. However, managers may have to start with reductions in adult female harvest because coyote removal would have to be consistently effective, making it an impractical management approach alone.

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Tuesday, 2:00 PM

Survival and Cause-specific Mortality of White-Tailed Deer Fawns in Urban and Rural Areas

Chad R. Williamson - Ball State University; Timothy C. Carter - Ball State University; Chad M. Stewart - Indiana Department of Natural Resources

ABSTRACT: Urban populations of white-tailed deer (Odocoileus virginianus) are increasing in many areas throughout their range. Expansion of urban development and residential suburbs provide white-tailed deer with suitable habitat that is conducive to rapid increases in population growth along with increased risk of deer-vehicle collisions, personal property damage, and elevated incidences of zoonotic diseases. Assessment of fawn survival and cause-specific mortality is important for understanding the population dynamics in these areas. Comparisons between populations of fawn white-tailed deer in urban, suburban, exurban, and rural areas may provide additional insight about the factors that affect these populations. We captured and radio-collared 119 fawns (66 urban, 9 suburban, 8 exurban, 36 rural) in 2013 and 2014. Fawn survival was monitored during the first 6 months of life using radio-telemetry. Primary cause of mortality was vehicle collisions in urban areas, and coyote predation in suburban, exurban, and rural areas. We found that probability of survival increased as density of homes at birth sites increased. This information may help explain the population density differences in urban and rural areas, and help determine which management strategies may be the most effective.

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Tuesday, 2:20 PM

Generational and Regional Compensation of Antler Size and Body Weight of White-Tailed Deer in Mississippi

Eric S. Michel - Mississippi State University; Steve Demarais - Mississippi State University; Bronson Strickland - Mississippi State University; Guiming Wang - Mississippi State University; Chad Dacus - Mississippi Department of Wildlife, Fisheries and Parks

ABSTRACT: Antler size of harvested mature male white-tailed deer (Odocoileus virginianus) varies by 25 inches across Mississippi. Biologists hypothesized habitat quality as the cause, but the potential for subspecies-linked genetic effects or founder effects from restocking had not been eliminated. We captured pregnant females from the Delta (highest soil quality, largest deer), Thin Loess (medium soil quality, medium-sized deer) and Lower Coastal Plain (LCP; lowest quality soil, smallest deer) soil regions. We fed a 20% crude protein diet ad libitum to eliminate nutritional differences found in source habitats. Deer bred with individuals from their respective regions and produced two generations of offspring. Full compensation of antler size occurred after two generations of improved nutrition as there were no longer regional differences ($t \leq 0.40$, d.f. = 99, $P \geq 0.691$). Body size increased throughout the second generation for all regions, when 3-year old bucks weighed 25 lbs more in the Delta, 17 lbs more in the Thin Loess, and 35 lbs more in the LCP, compared to wild deer. We conclude that regional variation in antler and body size displayed by wild deer is an epigenetic effect caused by differences in nutritional quality and not subspecies-linked genetics. Thus, phenotype of deer throughout Mississippi is largely attributed to nutrition and not genetics. Optimum diets must be available to pregnant mothers and remain available throughout the life of the fawn, and into the next generation. Managers must realize there is no "quick fix" to improving antler and body size of white-tailed deer.

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Tuesday, 2:40 PM

Geographic Variation in the Morphology of Unmanaged White-tailed Deer in South Texas

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ABSTRACT: Rangelands in South Texas follow an east–west gradient of precipitation and soil properties that leads to a diverse landscape across the South Texas Plains. This diversity of biotic and abiotic variables can have major impacts on the morphology of white-tailed deer. To examine these impacts across southern Texas, we captured 2,775 white-tailed deer in autumn, from 2011–2014, on 4 East Wildlife Foundation properties that range in location from the Gulf Coast to 100 miles inland, and where deer are not managed. Average body mass of both females and males varied among ranches by age class ($P < 0.01$). Body mass of middle aged and mature deer exhibit a moderate east–west gradation with females and males on the western-most ranch having 12% and 17–22% greater mass, respectively, than deer on the coast. Body mass of younger deer did not show this same trend suggesting that initial growth rates are similar, but growth ceases at an earlier age along the coast. Antler size of males showed a similar trend to body mass and varied among ranches by age class ($P = 0.09$), with middle aged and mature males on the western-most property having a 9−17% greater Gross Boone and Crockett score than males on the coast. The east–west patterns in deer morphology are not consistent across all 4 properties, suggesting that deer morphology is influenced more by soil properties than by a precipitation gradient. These results will benefit deer management by illustrating, even at a regional scale, the impacts of abiotic habitat components on the morphology of white-tailed deer.

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Tuesday, 3:00 PM

Density and Fawning Season Effects on Home Range Size and Overlap of Female White-tailed Deer

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ABSTRACT: Female white-tailed deer may spatially isolate themselves during fawning by decreasing their home range (HR) size up to 2 weeks prior to parturition although this behavior was not observed in southern Texas. To better understand how deer density affects changes in HR size and overlap during fawning, we fitted 35 does with GPS collars in 200-acre enclosures on 2 South Texas ranches. Each ranch had one high density (60 deer) and one low density (20 deer) enclosure. Collars recorded locations every 30 min. and were deployed for 27 weeks beginning 29 March 2014. We generated 50% LoCoH nonparametric kernel HRs. Weeks 2-7 were averaged for each deer. When an animal's HR dropped below the associated 95% CL during the fawning range for at least 2 consecutive weeks the first week was estimated to be the week of parturition. HR size varied weekly ($P<0.001$) and was larger before 28 June than after. Averaging across weeks, HRs were 43% larger ($P<0.001$) in low than high density. At parturition low density HRs averaged 52% larger. We also created utilization distribution overlap indices to determine how HR overlap changes over time. Preliminary analyses suggested HR overlap decreases at parturition such that less-dominant animals could be forced to rely on smaller and lower quality habitat patches as previous literature has indicated. Decreased HRs could result in a lowered nutritional plane resulting in lowered fawn survival and growth rates, which could negatively impact mature body size.

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Tuesday, 3:50 PM

Estimating Dispersal and Excursion Movement Rates of White-tailed Deer Using Demographic and Landscape Variables

Matthew T. Springer - Cooperative Wildlife Research Laboratory, Department of Forestry, Southern Illinois University Carbondale; Clayton K. Nielsen - Cooperative Wildlife Research Laboratory, Center for Ecology, Department of Forestry, Southern Illinois University Carbondale; Eric M. Schauber - Cooperative Wildlife Research Laboratory, Center for Ecology, Department of Zoology, Southern Illinois University Carbondale

ABSTRACT: Understanding the rates and underlying processes which govern how individuals move across the landscape are vital for the development of wildlife population and disease models. We placed GPS collars on 61juvenile white-tailed deer (Odocoileus virginianus) from 2011-2014 to estimate external home range movement rates and influences in the agricultural east-central Illinois. We calculated size and percentage of agricultural and forest cover within natal home ranges of deer. Any locations that resulted in a movement path > 1 km outside of natal home ranges were categorized into dispersal or excursion movement behaviors. Using the known-fates model framework, we organized the data into 14-day intervals for both dispersal and excursion movements, and treated the movement event as a mortality. Using program R package RMark, we modeled dispersal and excursion movement behaviors separately to determine potential impacts of demographic, temporal, and the aforementioned home range variables on the occurrence rates of these behaviors. Our most parsimonious dispersal model was an additive model for season and sex. The top excursion model included additive impacts of season, sex, and year. We found higher dispersal rates in males than females, with increased rates in fall. Excursion rates were higher for males; however we found an increased rate for females in fall corresponding to rutting activity. Our analysis shows that demographic and temporal variables have greater influences on dispersal and excursion movement rates than home range variables for white-tailed deer in east-central Illinois.

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Tuesday, 4:10 PM

Seasonal and Rut-related Variations in Space Use and Movements of Mature Male White-tailed Deer in Louisiana

Taylor N. Simoneaux - University of Georgia; Michael J. Chamberlain - University of Georgia; Karl V. Miller - University of Georgia; Bradley S. Cohen - University of Georgia

ABSTRACT: Shifts in white-tailed deer harvest have increased the proportion of mature males in many deer herds, and movement studies are lacking on this increasingly large demographic. We fitted 14 adult (≥ 2.5 years old) male deer with GPS collars on the Tensas River National Wildlife Refuge in Louisiana. We calculated yearly and seasonal 95% home ranges (HR) and 50% core areas (CA) as well as weekly HR and CA during the hunting season. We then used seasonal HRs to identify and describe long-distance (>1 mile), short-duration (≥ 13 hours, <7 days) excursions outside of the home range in the non-breeding seasons. Despite having average HR similar in size to male white-tailed deer in other studies, we saw large individual variation in HR size annually (range = 421 – 6615 ac), seasonally (range = 208 – 3506 ac), and weekly (range = 17 – 655 ac). Beyond individual variation, we also saw temporal variation in average weekly HR size (range = 119 – 324 ac) and CA size (range = 12 – 37 ac). Three individuals engaged in spring and summer excursions lasting from 13 to 52 hours. Mature bucks in our study showed extensive variation in their space-holding behaviors, including some holding multiple centroid HRs and engaging in spring and summer excursions. Further, some bucks held similar weekly HR/CAs while other bucks shifted their HR/CAs on a week-by-week basis during the hunting season. These findings may explain the occasional 'disappearance and reappearance' of bucks on small landholdings and highlight the individual variation in space use, and perhaps rutting strategies, among bucks.

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Tuesday, 4:30 PM

How Does Loss of Social Group Impact Behavior of Remnant White-tailed Deer?

Marie I. Tosa - Cooperative Wildlife Research Laboratory, Southern Illinois University Carbondale; Eric M. Schauber - Cooperative Wildlife Research Laboratory, Center for Ecology, Department of Zoology, Southern Illinois University Carbondale; Clayton K. Nielsen - Cooperative Wildlife Research Laboratory, Center for Ecology, Department of Forestry, Southern Illinois University Carbondale

ABSTRACT: Disease transmission rates, which can aid in understanding disease ecology, can be altered if social structure is disrupted by within-group disease outbreaks or by lethal management. Specifically, if remnant animals increase contact with neighboring groups after their own groups are depopulated, transmission rates may increase even as density decreases. To test whether this phenomenon could apply to white-tailed deer (Odocoileus virginianus), we constructed proximity logger (PL) and global positioning system (GPS) collars to monitor 48 adult female and juvenile deer in southern Illinois during winter-spring of 2011-2014. From 8 groups, we removed all members but 1 GPS-collared animal ("remnant") during March of 2012-2014, leaving control groups (n=38) intact. Using a Before-After-Impact-Control design, we compared remnant to control animal behavior. We examined changes in indirect contact using volume of intersection (VOI) and changes in weekly direct contact rates recorded by PLs. We found that remnant adult females behaved similar to control animals in home range fidelity (VOI=0.63±0.03 vs. 0.62±0.02; p=0.76), home range shifts toward neighboring groups (VOI=0.04±0.03 vs. 0.04±0.01; p=0.90), and intergroup contact rates ($F_{1,84}=1.26$, p=0.21). Remnant juveniles had similar intergroup contact rates with control animals ($F_{1,116}=0.02$, p=0.89), but remnant juveniles had less home range fidelity (VOI=0.67±0.02 vs. 0.48±0.05; p=0.03), and greater space use shifts toward neighboring groups (VOI=0.15±0.06 vs. 0.04±0.01; p=0.13). Our results suggest that juveniles may increase indirect disease transmission with neighboring groups. This pattern may be problematic for diseases such as chronic wasting disease and bovine tuberculosis, which are more likely to leave remnant juveniles after group depopulation.

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Tuesday, 4:50 PM

Is There Any Benefit to Fertilizing White Oaks for Mast and Forage?

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ABSTRACT: The popular media commonly recommends fertilizing oak trees for increased acorn production. However, there are no published data to substantiate the claim. We measured production from 120 white oaks at Chuck Swan State Forest in east Tennessee, 2006-14. We recorded 3 years of good acorn production, 1 fair year, and 5 poor years. We grouped trees into production classes: 11% of the trees were excellent producers, 28% good producers, 21% fair producers, and 40% poor producers. We implemented fertilization, crown release, and fertilization with crown release treatments with controls in proportion to production class in 2011. We fertilized trees each March according to soil test. There were virtually no acorns produced in 2011. In a fair acorn production (avg 16 acorns/yd2) year (2012), there was no difference between fertilized trees and control trees, but trees with crown release produced more acorns than trees without crown release. In a bumper acorn (avg 112 acorns/yd2) year (2014), there was no difference in production between any treatment or control. We measured forage selected by white-tailed deer around 9 randomly selected trees per treatment and control during summer 2014. Forage availability (dry weight) was similar between control (188 lb/ac) and fertilized (143 lb/ac) trees, but greater beneath trees with crown release alone (313 lb/ac). Forage availability beneath trees with fertilization and crown release (250 lb/ac) was similar to all treatments. Our data suggest fertilizing white oaks in the woods is a waste of time and money with no impact on acorn or forage production.

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Wednesday, 8:10 AM

Temporal and Age-group Variation in Antlered White-tailed Deer Harvest Rates

Andrew S. Norton - University of Wisconsin-Madison; Dan Storm - Wisconsin Department of Natural Resources; Ryan Walrath - Wisconsin Department of Natural Resources; Mike Watt - Wisconsin Department of Natural Resources; Tim Van Deelen - University of Wisconsin-Madison

ABSTRACT: Antlered white-tailed deer (Odocoileus virginianus) harvest rates are an important parameter for estimating deer abundance using harvest based population models. Performance of these models is closely related to variation in harvest rates among years and age groups. Furthermore, differences in exploitation rates related to weapons restrictions and hunting season structure has important implications for management considerations. Although some variation is likely explained using hunter effort, extra variation could be related to a variety of environmental, social, or management conditions. We monitored 433 antlered white-tailed deer during the hunting season from 2011 to 2014 across two study areas representing a contrast in ecological conditions, as well as land ownership and hunting traditions. During the 4 years of our study, some notable regulation changes took place that also had potential to influence harvest rates. We estimated cause-specific hazards using joint binomial and multinomial regression models to evaluate trends in harvest rates within and among hunting seasons. On average, annual harvest rates were 40% and ranged from around 25% to over 50%. These varied within the hunting season, and were highest during the traditional 9-day firearm season, despite bow hunting during the rut which included the use of crossbows in 2014. We used information from these estimates to augment parameters in population models, and to provide useful inference when considering potential impacts of various management strategies.

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Wednesday, 8:30 AM

Estimation of Deer Damage to Soybean Production in Mississippi: A Spatial and Temporal Context

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Abstract: Soybeans (Glycine max (L.) Merr.) are one of Mississippi's most productive agricultural crops. With a production value of over $1 billion and approximately 2 million acres planted annually, optimizing their production is critical. White-tailed deer (Odocoileus virginiaus) damage soybeans every year due to the plant's high palatability, digestibility and nutritional content. However, deer are equally important to Mississippi with an estimated economic value of $1.03 billion. Many soybean producers fear white-tailed deer are affecting their profits, but no study in Mississippi has quantified the damage. The objective of our study was to estimate the amount of damage (browsing and loss of yield) caused by deer within soybean fields and compare damage to the number of deer using each field. Five fields were sampled in eastern Mississippi during the 2012 and 2013 field seasons. Deer-proof exclosures were constructed in each field and plant growth and damage data were collected throughout the field for the entirety of the growing season. Simultaneously, we counted the number of deer using each field with a FLIR device. Overall, deer caused a significant reduction of soybean height, but this did not result in substantial losses of soybean yield. We propose that in many cases the perception of deer damage likely exceeds actual economic damage because soybean plants respond favorably to moderate browsing. Soybean producers should consider reducing effort spent on repelling deer throughout the growing season and focus on protecting soybeans only during the early growth stages when soybean plants are most vulnerable.

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Wednesday, 8:50 AM

An Evaluation of Methods to Estimate Deer Abundance

Jacob M. Haus - University of Delaware; Jacob L. Bowman - Department of Entomology and Wildlife Ecology, University of Delaware; Brian Eyler - Maryland Department of Natural Resources

ABSTRACT: The North American model states that all management decisions must incorporate appropriate scientific justification. The enumeration of deer populations is an important objective for many managers; however no consensus regarding the most appropriate scientific methodology exists. We estimated the density of an open population of white-tailed deer on a concurrent spatial and temporal scale during 3 separate 14 day periods (August 2012, February 2013, August 2013) using 4 methods. The use of multiple methods allows for a comparison of point estimates, measures of precision, detection probability, and cost that may expose the limitations of a given method. We obtained estimates from spotlight and FLIR surveys using road based distance sampling, as well as estimates from camera surveys using both the Jacobson method and an N-mixture model of abundance. Spotlight surveys were affordable but required substantial effort to achieve the precision necessary for management decisions. FLIR surveys had greater detection probabilities relative to spotlight surveys and required less effort to achieve sufficient precision. Jacobson camera surveys appeared to overestimate deer density and provided no measures of precision. The N-mixture models provided sufficient precision and generated point estimate and detection probabilities similar to FLIR surveys. Camera surveys had a higher cost than road based surveys. We recommend road based distance sampling using FLIR technology to estimate deer density; however managers should understand the limitations and biases associated with any density estimate before incorporating the results into a management program.

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Wednesday, 9:10 AM

Using a Double Observer Approach to Distance Sampling During Aerial Surveys For White-tailed Deer

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ABSTRACT: Distance sampling during aerial surveys is an efficient technique for obtaining deer population estimates, but estimates are consistently biased low. When distance sampling is conducted in conjunction with a double observer technique, the undercount can potentially be corrected. In 2013 and 2014, 2 sets of surveys were completed and 1 survey is currently in progress on four properties in southern Texas to evaluate the feasibility and effectiveness of the double observer technique. This approach was achieved by recording data on white-tailed deer (Odocoileus virginianus) separately for observers in the front and rear of the aircraft. The four properties surveyed total over 200,000 acres and survey intensity among properties was 16 − 36% with 762 observations for the first set of surveys and 30 − 59% with 1765 observations for the second set. Data were analyzed using Program Distance 6.2. Detection probabilities at distance 0 were 90 and 96%, proportions of deer seen within the surveyed region were 70 and 80%, and coefficients of variation were 8 and 5% for the first and second surveys, respectively. There was no significant difference between population estimates produced by each round of surveys. Spatially explicit observations allow construction of deer density maps to provide insight into distribution of deer at a landscape level. Our results suggest the double observer distance sampling approach will benefit management and research on rangelands by providing more accurate population data and spatially explicit estimates of population density.

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Wednesday, 9:30 AM

Using GPS Telemetry to Assess Deer-vehicle Collision Risk

James H. Stickles - University of Georgia; Bradley S. Cohen - University of Georgia; David A. Osborn - University of Georgia; Robert J. Warren - University of Georgia; Karl V. Miller - University of Georgia

ABSTRACT: Prior studies have used spatial and temporal incidence of deer-vehicle collisions (DVC) to assess and warn motorists of DVC risk. However, little work has investigated deer movement ecology relative to roadways to assess DVC risk. We instrumented 32 white-tailed deer (Odocoileus virginianus; 20 males, 12 females) with GPS collars along a 4.8 mile stretch of Interstate 20 (I-20) in central Georgia. We monitored movement rates, road crossings, and right-of-way (ROW) usage by collecting hourly locations and compared these data temporally with hourly DVCs and traffic for spring (April – June), summer (July – September), fall (October – December), and winter (January – March). Deer movements and DVCs were crepuscular during all seasons; however road crossings and ROW use were mostly nocturnal with 44% of road crossings occurring between 0000 and 0559 hours and 37% of locations within the ROW occurring between 2100-0259 hours when mean daily traffic was lowest. Approximately 28% and 34% of the deer accounted for >90% and 98% of road crossings and ROW usage respectively. Three collared females selected the I-20 ROW as parturition sites. The temporal pattern of road crossings explained >61% of the variation in DVC risk per individual driver (hourly DVCs/hourly traffic) for all seasons. Our results indicated that DVC risk for individual motorists was high throughout the entire nocturnal period, not just during the crepuscular period as would be suggested solely by the incidence of DVCs without considering traffic volume. Motorist education programs should focus on increasing driver vigilance and reducing vehicle speed during nocturnal periods, especially during the fall. Targeted removal of deer along roadways and ROW habitat modifications may provide opportunities to reduce DVC risk by minimizing road crossings and ROW use by deer.

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Notes:

*Student Presenter

Wednesday, 10:20 AM

White-tailed Deer Ear Tag Retention

Emily H. Belser - Caesar Kleberg Wildlife Research Institute – Texas A&M-Kingsville; John Lewis - Lipscomb University; Mickey Hellickson - Orion Wildlife Management; David Hewitt - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville

ABSTRACT: Both free range and captive white-tailed deer (Odocoileus virginianus) have been marked with visible, plastic ear tags for a wide variety of applications. Research projects use ear tags in free range deer for assessing individual deer behavior, population estimation, and other applications. Captive white-tailed deer are often tagged, such as deer in research pens or breeding facilities. Deer are also marked as part of various management actions. Because of this large scale use of ear tags in white-tailed deer, our goal was to analyze retention of visible, plastic ear tags. We used two data sets to analyze ear tag retention - one from deer in a free-range setting and one from a captive setting. The first data set was from 544 marked, free range white-tailed deer on five ranches in South Texas. Each deer was captured using a helicopter/net gun, marked with a plastic, 3x4 inch, numbered ear tag, and recaptured in subsequent years. After one year of exposure for each tag, 94.9% of ear tags in the right ear remained the second year of capture. The second data set analyzed tag retention from 36 deer held in the captive deer facility at Texas A&M University-Kingsville. Each deer was marked with a plastic, 2x1.6 inch, numbered ear tag, and monitored throughout its life. After 177 total years of exposure, there was 98.9% retention. These high retention rates of plastic ear tags suggest that these ear tags are a reliable means of identification.

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Wednesday, 10:40 AM

White-tailed Deer Disease Update

John R. Fischer - Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia

ABSTRACT: Hemorrhagic disease (HD) of deer continues to occur annually in different regions of the United States, but the epidemiology of HD appears to be changing with the increasing involvement of virus types not seen historically, expanding geographic distribution, and the increasing frequency of severe outbreaks. Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy that affects several cervid species, including white-tailed deer. To date, CWD has been found in wild cervids in 19 states, Alberta, and Saskatchewan, and in captive cervids in 14 states, Alberta, Saskatchewan, and the Republic of Korea. In the last year, CWD was found in wild white-tailed deer in northeastern Iowa adjacent to Wisconsin's endemic area, and in captive white-tailed deer herds in Ohio, Pennsylvania, and Wisconsin. Since 2012, CWD has been found in captive herds that had been certified as low risk for having CWD and had shipped animals intrastate and interstates. In response to the detection of CWD in certified herds monitored up to 12 years, the United States Animal Health Association adopted a resolution requesting that USDA assemble, analyze, summarize and make available the results of epidemiological investigations of CWD in farmed and free-ranging cervid herds so this information can be used to enhance risk assessment of CWD in farmed cervids and identification of effective mitigation measures. Results of a vaccine trial were published indicating that the vaccine prolonged the survival time of in four of five treated animals from 602 to 909 days over that of untreated animals.

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Wednesday, 11:00 AM

White-tailed Deer in Chicot County, Arkansas: Had Them; Lost Them; but Getting Them Back

Mike Staten - Anderson-Tully Company; Cory Gray - Arkansas Game and Fish Commission; Bubba Groves - Arkansas Game and Fish Commission

ABSTRACT: Chicot County is located in the far southeast corner of the State of Arkansas. Soils are primarily alluvium deposited by both the Arkansas and Mississippi Rivers. A 1962 SCS Soil Survey showed that 59% of the county was cultivated, 17% pastured, and 24% forested. The ridge and swale topography normally resulted in the ridges being cultivated, while the swales were pastured or left in forest due to the wet nature of the soils. This created diverse habitats perfectly suited for white-tailed deer.

Soon after WWII, Arkansans started a unique system of "Deer Camps" throughout south Arkansas where local citizens would annually invite their city friends to deer hunt. Leases were rare, but local landowners would often agree to these situations for protection of the deer resource as well as their property. This system also created financial opportunity for local businessmen and in turn, some very unusual and entertaining deer camp stories.

By the 1970's, the soybean boom meant increased financial incentive for landowners and the forested swales were cleaned up for cultivation. Basically, only lands lying within the levee system of the Mississippi River remained forested. The deer population was not compatible with soybean agriculture and soon plummeted.

The 1985 USDA Farm Bill included Wetland Reserve and Conservation Reserve Programs where easements put less productive farmlands back into forested habitats. New habitats are allowing the deer population to return throughout the county. This is another success story of the North American Model of Wildlife Conservation.

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Wednesday, 11:20 AM

Adoption of Native Food Plots by Hunters and Landowners: Will It Work?

Rebecca J. McPeake - University of Arkansas Division of Agriculture Cooperative Extension Service, Arkansas Forest Resources Center

ABSTRACT: Commercial food plots provide supplemental food and/or cover to wildlife when adequate habitat is lacking. An example is industrial pine timberlands in south Arkansas where land is leased for white-tailed deer (Odocoileus virginianus) hunting, but hunting clubs are restricted from implementing habitat practices which compete with timber production. Many landowners rely on commercial food plots exclusively when other habitat practices could provide additional year-round benefits for deer and other wildlife. Since 2003, University of Arkansas county Extension agents and faculty have conducted over 30 field demonstration trials in 18 counties. These trials compare vegetation in plots planted with commercial seeds and control plots (natural vegetation) that have been disked, fertilized, and limed. Dry-weight analyses indicate wildlife consumed plants in all plots, with consumption in natural-vegetation plots competing favorably with commercial plots. Logically, hunters and landowners are asked "why plant seeds when you can grow weeds?" Possible obstacles for adopting "native food plots" include (1) a lack of side-by-side comparisons of crude protein and other plant characteristics in commercial vs. native plants consumed by deer (i.e., plants occurring in the same soil type, soil amendments, and environmental conditions), and (2) hunter/landowner perceptions and expectations of commercial vs. native food plots. Because of considerable mass marketing, it is doubtful the message of native food plots will be well received without additional work. Currently, food plot demonstration trials serve as a bridge for discussing habitat concepts and practices with hunters and landowners.

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Wednesday, 11:40 AM

Impacts of Selective Harvest Criteria on Cohort Antler Size and Management Objectives in Georgia's Piedmont

William D. Gulsby - University of Georgia; Charlie H. Killmaster - Georgia Department of Natural Resources; John W. Bowers - Georgia Department of Natural Resources; James A. Martin - University of Georgia; Karl V. Miller - University of Georgia

ABSTRACT: Use of antler-based, selective harvest criteria (SHC) to improve male age structure in white-tailed deer (Odocoileus virginianus) populations is popular among some public and private lands managers. Although previous research has demonstrated that SHC may inadvertently decrease antler size in older (≥2.5 years old) age classes due to disproportionate harvest of large-antlered yearling males, this effect is apparently site dependent. Thus, we compared mean cohort antler size of males ≥2.5 years old harvested under two SHC to males harvested under no SHC using a mixed model informed by hunter-harvest data collected from 2003-2013 on 11 wildlife management areas (WMA) in the Piedmont physiographic region of Georgia. We also determined the proportion of each cohort protected from harvest under each SHC using data from a subset of WMA with no SHC. On average, 2.5 and 3.5 year old males harvested under the most restrictive SHC (16 in beam length or 15 in inside spread [BS]) had larger antlers than those harvested under either a four points on one side (FOS) SHC or no SHC. However, antler size was similar among treatments for males ≥4.5 years old. Both SHC protected a large proportion (>96%) of yearling males, but the BS SHC protected a greater proportion of 2.5 and 3.5 year old males than the FOS SHC. Because both SHC protected a significant proportion of young males without leading to a decrease in cohort antler size, these criteria appear to be an effective method to increase male age structure of deer populations in the Piedmont of Georgia.

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Wednesday, 1:40 PM

The Use of Antler Regulations on Wildlife Management Areas in Mississippi

Chad M. Dacus, Mississippi Department of Wildlife, Fisheries, and Parks; Chris McDonald - Mississippi Department of Wildlife, Fisheries, and Parks

ABSTRACT: Mississippi is home to 52 public hunting Wildlife Management Areas (WMAs) spread across the state that total more than 665,000 acres. These WMAs offer opportunities to hunt a variety of wildlife species. White-tailed deer (Odocoileus virginianus) hunting is the primary activity on most WMAs. It is the responsibility of the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) to set WMA hunting regulations. In many cases, WMA regulations differ from statewide regulations. Antler regulations (ARs), in particular, vary across the state due to soil quality, hunter desires, and management objectives. Antler regulations have progressed in Mississippi since the inception of the 4-point rule in 1995. In 2003, minimum inside spread was added to the 4-point rule on ten WMAs to evaluate the effectiveness in reducing buck high-grading effects. This regulation was expanded to most WMAs in 2004. Research conducted at Mississippi State University indicated that inside spread and main beam length are the best ARs to protect young bucks. This led to the elimination of point restrictions across all WMAs in 2008. Due to annual regulation changes, evaluation of the ARs was limited during 2008 – 2011. In 2011, WMA regulations were shifted to a 3-year cycle to better evaluate their effectiveness and receive public input. As a result, ARs on WMAs in Mississippi have progressed to regional regulations with varying levels of legal bucks available for harvest.

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Notes:

Wednesday, 2:00 PM

Ten Year Trends in Antlered Buck and Antlerless Harvests

Kip P. Adams - Quality Deer Management Association; Matt Ross - Quality Deer Management Association; Brian Murphy - Quality Deer Management Association

ABSTRACT: Deer harvest trends are valuable for assessing state and regional deer management programs. We compared the 2003 and 2013 antlered buck and antlerless harvests for each state in the Midwest, Northeast and Southeast to monitor how the harvests changed during the past decade. Overall, the buck harvest declined 8 percent from 2003 to 2013, and 21 of 33 states shot fewer bucks in 2013. The Southeast (-2 percent) and Northeast (-3 percent) had similar harvests but the Midwest harvested significantly fewer bucks (-18 percent) in 2013. The overall antlerless harvest declined 12 percent from 2003 to 2013, and 21 of 34 states shot fewer antlerless deer in 2013. The Southeast (-4 percent) had similar harvests but the Northeast (-15 percent) and Midwest (-20 percent) shot far fewer antlerless deer. While the majority of states had greater antlerless harvest opportunities in 2013 than 2003, 4 of 5 top deer harvest states (Georgia, Michigan, Pennsylvania and Wisconsin) had less antlerless opportunity in 2013. These 4 states accounted for much of the reduced harvest between 2003 and 2013 and this was planned as all were actively trying to reduce deer herds at some point during the decade. Overall, things appear much better for the Northeast and Southeast than the Midwest. Harvest reductions of 20 to 50 percent are very noticeable and many Midwestern hunters are concerned. Deer management is very different today than a decade ago, and how closely legislators, wildlife agencies and hunters work together will dictate our future deer management successes.

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Wednesday, 2:20 PM

Public Involvement in Wisconsin Deer Management

Bret R. Owsley - Wisconsin Department of Natural Resources; Bob Nack - Wisconsin Department of Natural Resources

ABSTRACT: In 2013 the Wisconsin Department of Natural Resources (DNR) began to implement changes to the deer management program based on recommendations from the 2012 Deer Trustee Report (DTR). The implementation process included extensive public involvement with the formation of citizen action teams to provide recommendations to the DNR on specific items in the DTR. The DNR also created two new significant initiatives to increase public involvement in the deer management decision making process. In May 2014, DNR opened enrollment for the Deer Management Assistance Program (DMAP) to assist private landowners with deer and habitat management goals. The one-month open enrollment period resulted in 114 applications received, involving nearly 300 landowners and 44,000 acres. DNR accepted all applications that were eligible for a site visit and written management plan (n = 73) and there is a waiting list for 2015 enrollment. Additional public involvement included the development of 72 County Deer Advisory Councils (CDAC) to provide county-based deer management recommendations to the DNR. Councils are composed of individuals representing the following areas impacted by deer management decisions: Forestry, Agriculture, Tourism, Transportation, Tribal, Private land (DMAP), and Hunting. Three CDAC meetings were held in fall 2014 in each county. Following an open public comment period, CDAC's provided a 3-year population objective recommendation to the DNR for the county they represent. CDAC's continue to be involved with deer management decisions at the local level and provide valuable input to the DNR.

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Notes:

Wednesday, 2:40 PM

Predator Exclusion as a Management Option for Increasing White-tailed Deer Recruitment

Mike Conner - Joseph W. Jones Ecological Research Center; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Brandon T. Rutledge - Joseph W. Jones Ecological Research Center; Charlie H. Killmaster - Georgia Department of Natural Resources; Gail Morris - Joseph W. Jones Ecological Research Center; Lora Smith - Joseph W. Jones Ecological Research Center

ABSTRACT: Lethal control of coyotes (Canis latrans) may increase white-tailed deer (Odocoileus virginianus) recruitment, but lethal control can be difficult to implement and may be ineffective on small parcels of land. In 2003, we constructed 4, approximately 40 ha mesopredator exclosures to quantify the influence of mesopredators on select wildlife populations. Following construction, both hunter success and neonate:adult female ratios increased, suggesting that mesopredator exclusion positively impacted the deer herd in the vicinity of the exclosures. Simulation analyses indicated that predator exclosures provided an additional 20 ± 0.39 (mean ± SE; median = 17, IQR = 11 - 25) recruits/year above that expected without exclusion. Assuming a 1600 ha area, simulated neonate:adult female ratio was 0.77±0.009 (median = 0.75, IQR = 0.57 – 0.95) with exclosures and 0.41±0.008 (median = 0.39, IQR = 0.21 – 0.58) without. Difference in recruitment with and without exclosures was negatively correlated (r = -0.425) with neonate survival outside exclosures and positively correlated (r = 0.632) with white-tailed deer preference for predator exclosures during the parturition season. Predator exclosures may be particularly valuable for reducing fawn predation on small parcels of land. Finally, fear associated with predation risk can significantly impact prey population dynamics, and predator exclusion also appears capable of mitigating these impacts. Additional research that incorporates variation in exclosure size and deer density is needed to better evaluate management efficacy of predator exclosures for creating fawn refugia

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Wednesday, 3:00 PM

Male Reproductive Success in White-tailed Deer and Importance of Body size

Chad H. Newbolt - Auburn University; Steve Ditchkoff - Auburn University; Todd Steury - Auburn University; Tim Neuman - Auburn University; Peter Acker - Auburn University; Stephanie Hoffman - Auburn University

ABSTRACT: Male reproductive success (MRS) in white-tailed deer is undoubtedly influenced by physical characteristics often associated with social dominance, such as sire age, body size, and antler size; however, our understanding of the specific relationships between physical characteristics and MRS in this species is generally poor. We measured physical characteristics and collected genetic samples from 418 deer, including 262 unique individuals, and assigned paternity at the 95% level to 143 known-age individuals residing at the Auburn University Captive Facility, a 430-acre enclosure in east-central Alabama, during October 2007 – March 2014. Regression analysis indicated that the most supported model (AIC = 206.4) did not indicate a significant relationship between number of paternities and sire age (1.09; 0.79 to 1.51, 95% C.L.; P = 0.60) nor antler size ((1.01; 0.99 to 1.03, 95% C.L.; P = 0.42); however, results indicated a strong relationship between body size and number of paternities (0.64; 0.45 to 0.91, 95% C.L.; P = 0.01). Males from a wide range of available age classes, including fawns and 1.5 year olds, sired offspring during all breeding seasons, and we observed high rates of multiple paternity, with paternity attributed to two sires in 13 of 27 sets of twins and 1 of 2 triplet sets. Our results highlight the importance of body size to MRS in white-tailed deer, but also demonstrate that males lacking the advantages of larger body size frequently utilized alternative breeding strategies to successfully acquire mating opportunities.

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Notes:

Wednesday, 3:50 PM

Dietary Energy Influence in Growth and Development of White-tailed Deer

Ryan L. Reitz - Texas Parks and Wildlife Department; Don B. Frels, Jr. - Texas Parks and Wildlife Department; Justin A. Foster - Texas Parks and Wildlife Department; David G. Hewitt - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Randy W. DeYoung - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville

ABSTRACT: Dietary energy and protein are two nutritional currencies directly related to body growth and antler development in white-tailed deer (Odocoileus virginianus). Limitations correlated to environmental supply and individual demand are recognized, although deficiencies in dietary energy often surpass protein in many habitats. We studied the individual effect of dietary energy in body size and antler growth at the Donnie Harmel White-tailed Deer Research Facility located in Kerr County, Texas. Two cohorts of deer (2012–2013) were fed free choice diets of low energy (LE, < 2.2 kcal/g) and standard energy (SE, > 2.8 kcal/g) post weaning. Protein content of each diet remained at 16% with similar vitamin and mineral content. We measured weight and skeletal size (total body length, hind-foot length) of males and females 1.5 years of age (n = 178) and 2.5 years of age (n = 66). At 1.5 years, SE deer body mass was 17% greater (106.2 lbs. SE ; 89.8 lbs. LE). Total body length of SE deer at 1.5 years was comparable to LE deer at 2.5 years (53.8 and 53.3 inches respectively). Hind-foot length remained similar among treatment groups and ranged from 16.3 to 16.7 inches across ages. Gross Boone and Crockett scores of SE males were 23.2 and 26.6 inches larger than LE males at 1.5 and 2.5 years of age respectively. Dietary energy has demonstrated considerable limitations despite greater consumption rates in LE treatments (> 18%). Energy status of wild deer habitats affect deer growth rates and herd productivity, which managers should consider.

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Wednesday, 4:10 PM

Does Soil Fertility Influence Intraspecific Plant Nutritional Quality for White-tailed Deer?

Craig A. Harper - University of Tennessee; Marcus A. Lashley - North Carolina State University; R. Dwayne Elmore - Oklahoma State University; M. Colter Chitwood - North Carolina State University; Jarred M. Brooke – University of Tennessee; Jordan S. Nanney - University of Tennessee; Dana J. Morin - Virginia Tech; Chris E. Moorman - North Carolina State University; Chris S. DePerno - North Carolina State University

ABSTRACT: Previous research has suggested soil fertility influences white-tailed deer productivity and morphometrics because plant nutrition is correlated with soil nutrient availability. It is well-established that plant species composition varies in areas with different soil types, and that plant species common in areas of poor soil quality may contain less nutrition for deer than plant species common in areas of good soil quality. However, deer concentrate their foraging on certain plant species and on the most digestible portions of plants. Information on how soils influence intraspecific nutrient availability by plant species is largely lacking. We collected young and mature tissues of 7 plant species commonly selected by deer with paired soil samples at 7 sites from the NC Atlantic coast to eastern OK. Using principle components analysis, we developed components for plant and soil nutrient quality. We then compared general linear models using plant species and soil components as explanatory variables for young and mature tissue components. Model selection provided little support that soil fertility influences nutritional quality of the young plant tissues that deer selectively forage. However, there was support for a model indicating soil fertility may influence the nutritional quality of mature plant tissues, which generally serve as storage reservoirs in plants. Thus, unless young plant tissues are limited, soil quality should not limit nutrients needed for growth and development of deer. Our data suggest deer density and availability of select plants may be more influential than soil quality when managing nutritional availability for deer.

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Wednesday, 4:30 PM

Relationships Between White-tailed Deer Density, Harvest, and Landscape Metrics in Tennessee

Heidi L. Adams - School of Forestry, Louisiana Tech University; Robert E. Kissell, Jr. - Tennessee Tech University; Daryl Ratajczak - Tennessee Wildlife Resources Agency; R. Gray Anderson - Tennessee Wildlife Resources Agency; Edward L. Warr - Tennessee Wildlife Resources Agency; Roger D. Applegate - Tennessee Wildlife Resources Agency; Lynn Barrett - Tennessee Wildlife Resources Agency; Tabitha Lavacot - Tennessee Wildlife Resources Agency; David A. Graves - Arkansas Game and Fish Commission

ABSTRACT: Accurately estimating white-tailed deer (Odocoileus virginianus) population density is important to management of the species. Landscape indices are frequently used to estimate deer population density, but because of continually changing landscapes and deer densities, the relationship between deer density and specific landscape indices is unclear. Harvest is another metric often linked to landscape indices and may be used to estimate deer population density. Our objectives were to model the relationship between deer harvest, landscape metrics, and deer population density in Tennessee, USA. We used distance sampling techniques to estimate deer population density across 11 regions of the state, 2010–2011 county deer harvest data, and 6 landscape metrics along with harvest to develop 18 models to assess the relationship with deer population density via linear regression. Estimates of deer population density for 11 physiographic regions ranged from 0.007 deer/acre to 0.081 deer/acre. Probability of detection ranged from 0.325 to 0.711. Models best predicting deer population density were harvest and harvest + percent woody area. The Tennessee deer herd may have exceeded its carrying capacity in some areas because deer harvest was the variable most important in predicting deer density ($\Sigma wi = 0.700$), and was less related to landscape features. While the importance of harvest as a management tool is likely to increase as landscapes are fragmented and urbanized, specific management guidelines should be based upon deer population densities and hunter participation in each of Tennessee's physiographic regions.

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Wednesday, 4:50 PM

Supplemental Feed and Density Effects on Deer Habitat Selection in South Texas

Kim N. Echols - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Timothy E. Fulbright - Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville; David G. Hewitt - Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville; Charles A. DeYoung - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; David B. Wester - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Don A. Draeger - Comanche Ranch

ABSTRACT: Supplemental nutrition, which is a prominent management practice throughout the white-tailed deer's range, can increase deer density and in turn influence individual deer habitat selection. Our objective was to examine deer density and supplemental feed effects on deer habitat selection. Between December 2009 and 2010, GPS radio collars were deployed on 2 bucks and 2 does in each of 8 200-acre enclosures. Four enclosures had high (40 deer) and 4 had low (10 deer) deer densities with free choice pelleted feed available in 2 enclosures of each density. Deer GPS locations were plotted using ArcGIS 10 from fixes collected every 30 minutes. Grass/forb, bare ground, and mixed brush habitat types were classified using ERDAS Imagine software. We compared habitat use for locations during prime feeding times for each enclosure using randomly generated points within a given deer's seasonal MCP to pair with existing deer locations. Deer did not use habitats differently as a result of supplemental feed ($P > 0.18$) or density ($P > 0.06$), or feed X density ($P > 0.07$). Bucks habitat preferences differed during the rut, while does preferences differed during winter-spring ($P = 0.01$), late gestation ($P = 0.01$), and autumn ($P < 0.0001$). Raising deer densities impacts deer social interactions but does not appear to influence habitat choices. Preliminary results also suggest augmenting nutrition does not impact habitat choice. A more complete understanding of deer habitat choice will aid managers with land management decisions.

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Poster Session

Do Deer Benefit from Raccoon Eyes?

Summer D. Higdon - North Carolina State University; Marcus A. Lashley - North Carolina State University; M. Colter Chitwood - North Carolina State University; Christopher S. DePerno - North Carolina State University; Christopher E. Moorman - North Carolina State University

ABSTRACT: Vigilance in white-tailed deer (Odocoileus virginianus) is linked to predation risk, which creates a tradeoff between foraging and mitigating the risk of being killed. When deer overlap spatiotemporally with other prey species, interactions potentially affect their vigilance, feeding rate, and subsequent fitness. Deer should benefit from the presence of more individuals (regardless of species) according to the "many-eyes hypothesis." We used camera traps at baited sites to quantify feeding rate and the interaction between deer and raccoons (Procyon lotor) at Fort Bragg Military Installation, North Carolina. In August 2011 – 2013, we collected 51,492 and 9,504 photos of deer and raccoons, respectively; they co-occurred in 2,527 photos. Deer and raccoon feeding rates were positively correlated, indicating they were vigilant to the same risk cues and not sharing vigilance. However, on average, across all 3 years raccoons increased feeding rate 11% in the presence of deer, while deer decreased feeding rate 42% in the presence of raccoons. Thus, raccoons apparently benefit from the presence of deer by increasing feeding rate, indicating the many-eyes hypothesis provides a plausible explanation (but not because of shared vigilance). Why raccoons have such antagonistic effects on deer feeding rate is unknown but warrants further study.

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Poster Session

Comparison of four baits for attracting white-tailed deer in southern Illinois

Wilson L. Fogler - Department of Forestry, Southern Illinois University Carbondale; Matthew T. Springer - Cooperative Wildlife Research Laboratory, Center for Ecology, Department of Forestry, Southern Illinois University Carbondale; Clayton K. Nielsen - Cooperative Wildlife Research Laboratory, Center for Ecology, Department of Forestry, Southern Illinois University Carbondale

ABSTRACT: Using bait to capture and survey white-tailed deer (Odocoileus virginianus) is a commonly-used practice by wildlife biologists. Previous research for white-tailed deer has shown preferences for different bait types in different seasons. Understanding the effectiveness of different bait types for attracting deer during different seasons may help with potential biases in surveys or aid in capturing targeted sexes. During September-December 2014, we compared 4 different baits for attracting deer (2 corn/sugar based and 2 fruit based) in southern Illinois. At each sampling location, 4 bait stations were established within 50 yards of each other. Bait sites were then monitored for deer use with Cuddeback Excite cameras. To determine if there was a bait preference we ran 3 repeated measures ANOVAs on total number of deer, bucks, and does visiting each bait type by week. We recorded 1,143 pictures of deer (231 bucks, 681 does, and 231 fawns). No difference was detected in deer visits between baits for all deer ($F_{3,20} = 0.262$, $P = 0.852$), bucks ($F_{3,20} = 1.155$, $P = 0.351$), or does ($F_{3,20} = 0.511$, $P = 0.680$), thus no preference for any of the bait types tested was indicated. More research into different types of baits may be necessary to determine if other baits may be preferred at this time period.

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* Student Presenter

Poster Session

Immobilization of Wild White-tailed Deer with Butorphanol-Azaperone-Medetomidine

Caleb A. Haymes - University of Kentucky; Joseph McDermott - University of Kentucky Department of Forestry; Gabriel Jenkins - Kentucky Department of Fish and Wildlife Resources; Will Bowling - Kentucky Department of Fish and Wildlife Resources; Kristina Brunjes - Georgia Department of Natural Resources; John Hast - University of Kentucky Department of Forestry; John Cox - University of Kentucky Department of Forestry

ABSTRACT: The safe capture and handling of animals is a requirement in research protocols. Chemical immobilization agents are often needed when studying medium to large ungulates, such as white-tailed deer. For optimum field use, immobilization agents need to induce immobilization quickly, maintain a plane of induction which will not severely alter major physiological characteristics, and the drug needs to be quickly and easily reversible. The drug combination Butorphanol-Azaperone-Medetomidine (BAM-2) is a new and relatively unstudied drug combination. It's efficacy in wild white-tailed deer has only been assessed by a handful of researchers since the late 2000's. We captured 37 wild white-tailed deer using drop-nets and clover traps, and immobilized them via hand-injection with 1-1.5 cc of BAM-2 in the front shoulder or rump. We found total induction time to be 6.6 (CI: 5.7-7.6) minutes and the total reversal time to be 4.67 (CI: 3.1-6.3) minutes. Immobilized deer had the following mean values: a heart rate of 66.0 (CI: 62.4-69.5) beats per minute, blood oxygen level of 83.8 (CI: 82.00-85.6) parts per million, a temperature of 102.4F (CI: 102.1F-102.6F), and breathing rate of 25.8 (CI: 23.5-28.1). Physiological parameters were similar to previous work with BAM and within acceptable parameters suggested for white-tailed deer research. Our findings verify that BAM-2 can be used as an effective chemical immobilization agent for wild white-tailed deer

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Poster Session

Laying the Foundation: Advancing the Use of Stable Isotopes in White-tailed Deer Ecology and Management

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ABSTRACT: Stable isotope signatures of animal tissues have been used to infer diets and dietary overlap among species. Before stable isotope signatures of animal tissues can be interpreted, knowledge of fractionation rate (i.e., how the isotope signature changes from the food to tissue) and time period integrated by that tissue is essential. Hair is metabolically inactive tissue; hence, it retains the isotope signature acquired during synthesis and does not change once keratinized. The fractionation rate for white-tailed deer hair has been determined, but the growth pattern of deer pelage is unknown. The fractionation rate of deer fecal samples and time period integrated by a fecal sample are unknown. Our objectives were to determine growth pattern of white-tailed deer winter-pelage and determine the fractionation rate and time period represented by deer fecal samples to obtain information necessary for interpretation of stable isotope signatures of these tissues. Both hair and fecal samples can be collected without handling the animal and could provide insight into diets of white-tailed deer during the time periods integrated by these tissues.

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Poster Session

Cause Specific Mortality of White-tailed Deer (Odocoileus virginianus) Neonates in Southeastern Kentucky

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ABSTRACT: Neonatal survival and cause-specific mortality are important demographic parameters for modeling ungulate populations. We examined these parameters in a mountainous, mesophytic forest-dominated area in southeastern Kentucky. This population is suspected to have low white-tailed deer density and concomitant poor hunter success despite an intensive deer stocking program that occurred there in the late 20th century. We used vaginal implant transmitters and ground searches to capture and radio collar 35 white-tailed deer fawns in the spring of 2014 to determine survival and cause-specific mortality. Fawn survival through the fall archery season was estimated at 41.3% (CI: 26.1- 65.5%) using a Cox regression analysis. A log-rank test indicated no difference in survival between male and female fawns ($p = 0.98$). These data suggest an average to low fawn survival and will provide deer managers in Kentucky with a better estimate of this deer population's size at the onset of the fall hunting season. An examination of mortality event types and comparisons between two general habitat types are discussed herein.

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Poster Session

Use of Capsaicin as a Deer Depredation Deterrent on Soybeans

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ABSTRACT: White-tailed deer (Odocoileus virginianus) cause agricultural damage across their range causing the commercial production of deer deterrents. Capsaicin has been shown to have positive results within enclosures at reducing white-tailed deer browsing, but has not been tested outside of these environments. During 2014, we established 50 plots (10.76 ft^2) each in 3 soybean (Glycine max) fields in southern Illinois. We assigned 1 of 5 treatments to these plots: fenced (no deer browse), control (unfenced), and 3 concentrations of Millers Hot Sauce® (the recommended amount (0.062%), and 25 (1.55%) and 50 (3.1%) times the labeled recommendation). Plots were treated with capsaicin every 3 weeks beginning immediately after planting. We conducted weekly browse surveys to determine if browse rates by deer varied across soybean growth and time since treatments. We harvested plots by hand in October and weighed soybeans to obtain yield estimates. We ran ANOVA blocking on fields to test for differences in biomass removed between treatments, week since planting, week since treatment, and overall yield. Browse rates differed between treatments ($F_{3, 116} = 3.19$, $P=0.023$) with higher concentrations of capsaicin having lower biomass removal. As soybeans progressed in development, biomass removed decreased ($F_{11, 1420} = 76.7783$, $P < 0.001$) and time since treatment showed increases in browsing rates ($F_{2, 1420} = 17.938$, $P < 0.001$). Yield differed between all treatments ($F_{4, 146} = 10.215$, $P < 0.001$) with recommended dosage plots and control plots having the highest yields. Our findings support previous research showing increases in yield from deer browsing occurring at moderate levels.

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Poster Session

Deer densities and supplemental feed have minimal effect on forb communities in South Texas

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ABSTRACT: Forbs constitute a major portion of white-tailed deer (Odocoileus virginianus) diets when they are available. We hypothesized that palatable forbs decrease with increasing deer density; whereas, forbs less palatable to deer increase with increasing density. We estimated percent canopy cover of forbs during June 2013-2014 on 2 ranches, each with treatments of 0, 20, 40, or 60 deer in 200 acre enclosures. Supplemental feed was provided ad libitum in all enclosures. We also determined forb biomass in caged and uncaged plots within the enclosures during March and May 2014. Monthly observations were made on the presence or absence of 2 species of palatable forbs, Melampodium cinereum and Menodora heterophylla (20 individuals of each species/enclosure), during 2014. Percent cover of palatable and unpalatable forbs was similar (P = 0.1154 and P = 0.3706, respectively) among treatments. In all treatments, standing crop of palatable and unpalatable forbs was similar between plots protected from deer and unprotected plots across months (month x density x cage, P = 0.6892 and P =0.5251, for palatable and unpalatable forbs, respectively). Probability of detecting marked M. cinereum plants declined with increasing deer density (P = 0.0281); whereas, probability of detecting marked M. heterophylla plants did not change with increasing density (P =0.9015). Changes in detectability of marked M. cinereum indicate that deer foraging depletes certain forbs during the growing season; however, canopy cover and standing crop results indicate that effects of deer foraging are not sufficient to shift composition of palatable and unpalatable forbs.

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Poster Session

Are Feral Hogs Predating White-tailed Deer Fawns in Southeast Arkansas?

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ABSTRACT: Feral hogs are opportunistic omnivores. The majority of their diet consists of plant material and agricultural crops. Feral hogs also consume animals, including neonatal livestock and white-tailed deer fawns. Spatially and numerically increasing feral hog populations in Arkansas are causes for concern among deer biologists and land managers. The objective of this pilot project was to determine if we could detect white-tailed deer hair in feral hog feces (scats) collected during the deer fawning season (mid-May through mid-July 2014) in southeast Arkansas. Fresh hog scats (N=157) were collected by foot search at 4 Wildlife Management Areas in southeast Arkansas: Cutoff Creek, Bayou Meto, Trusten Holder, and Choctaw Island. Hog stomachs (N=35) were also collected during the 2014 fawning season by Arkansas Game and Fish Commission biologists as part of their state-wide feral hog trapping efforts. Scats and stomach contents were carefully examined for hair. When detected, hair was examined with a compound light microscope and identified to genus by medullary patterns and cuticular scales. Two scats contained white-tailed deer hair. Hair from Virginia opossum (Didelphus virginiana), armadillo (Dasypus novemcinctus), squirrels (Sciurus spp.), and rodents (Peromyscus spp.) were found in 1, 1, 2, and 5 scats, respectively. White-tailed deer hair contained within feral hog scats does not necessarily indicate feral hogs are predating neonatal deer fawns. Feral hogs are known to scavenge deer carcasses. Moreover, deer hair morphology cannot be used to age deer. Confining our feral hog scat sampling to the deer fawning season, however, should have increased the likelihood of detecting fawn depredation by feral hogs.

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Table 1. Southeastern state deer harvest summaries for the 2013-2014 or most recent available season.

State	Land Area (sq. mi)	Deer Habitat		Percent Forested	% Land Area Public Hunting	Harvest		
		(sq. mile)	(% Total)			Male	Female	Total
AL	51,628	48,014	93	71	5	109,334	160,626	269,960
AR	52,609	44,718	85	53	12	105,952	107,247	213,199
DE	1,954	714	36	15	10	6,705	7,558	14,263
FL	51,628	29,280	50	45	16	65,357	37,269	102,626
GA	57,800	37,181	64	64	6	141,591	269,890	411,481
KY	40,395	39,654	97	59	9	77,721	66,688	144,409
LA	41,406	26,562	64	52	4	93,072	73,128	166,200
MD	9,837	8,766	89	41	4	40,109	53,053	93,162
MO	69,561	63,910	92	31	4	135,816	116,108	251,924
MS	47,296	31,250	66	66	6	111,644	152,061	263,705
NC	48,794	38,017	78	60	6	117,281	120,904	238,185
OK	69,919	37,425	54	19	3	52,197	35,812	88,009
SC	30,207	21,920	73	63	7.5	124,482	101,324	225,806
TN	42,246	25,770	61	49	9	94,561	73,900	168,461
TX	261,914	152,730	58	40	<2	330,535	295,042	625,577
VA	39,589	35,642	90	59	8	126,698	117,624	244,440[1]
WV	24,064	22,972	95	79	9	81,924	68,050	150,877[1]
Avg or Total	940,847	664,525	73.2	50.9	7	1,814,979	1,856,284	3,672,284

Table 1. Continued, page 2

State	Harvest/sq. mi. Deer Habitat	Method of Data Collection[2]	Estimated Pre-season Population	Length of Season (Days)[3]			Method of Setting Seasons[4]	% Land Area Open to Dog Hunting
				Archery	Black Powder	Firearms		
AL	5.6	A,B,C,I	1,500,000	119 (C)	5 (A)	81 (A,C)	A,B	70
AR	4.8	A,C, F, G	1,000,000	166 (C)	12 (C)	49 (C)	A,B	70
DE	9.18	B, F, G	36,000	131 (C)	14 (A,B)	35 (A,B)	A,B,C	0
FL	3.5	E		30	13	77	A,B	20
GA	11.1	A,C,D,E, G	1,000,000	115-146 (C)	80-95 (A,C)	73-88 (C)	A,B,C	23
KY	3.6	D,F,G	821,731	136 (C)	3(A), 9(B)	10-16 (C) + 4 Jr	A,B,C	0
LA	6.2	A,B,C	500,000	123(C)	14(A,B)	65	A,B,C	80
MD	10.6	B,C,D,F,G	227,000	96 (C)	3+9 (A), 13 (B)	13 (A), 2 (B), + 2 Jr. day	A,B,C	0
MO	3.9	B,C,D,F,G	1,400,000	98	11	25	A,B	0
MS	8.7	C, E	1,700,000	123 (C)	12 (A)	71	C	90
NC	6.3	A,B,C,D,F, G	1,165,000	21-63	12	18-70	A,B,C	50
OK	2.4	A,C, E, online	550,000	107 (C)	9	16	A,B	0
SC	10.7	A,B,C	750,000	16 (A)	10 (A)	70-140	C	60
TN	6.5	A,D, mobile App	600,000	103(C)	62(C)	48(C)	A,B	0
TX	4.1	B,C	3.4-3.8 million [5]	35	14	65-94 (B, C)	A,B	0
VA	6.9	A,B,C,D,F	~973,000	42-77	14-36	15-50	A,B	55
WV	6.6	A	595,000	81 (C)	6 (C)	21 (C)	A,B,C	0
Avg. or Total	6.51		16.2-16.6 million					30.47

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	197,098	Stable	$25.75	$296.40	Hunter Log	Mandatory	N/A
AR	262,919	Stable	$10.50 – 25	$50 – 300	License Tag	Mandatory	Female/Mgt buck
DE	21,239	Stable	$25	$130+	Physical Tag	Mandatory	2 Antlered, Unlimited Antlerless
FL	113,570	Down	$17	$152	None	None	No
GA	301,993	Stable	$19-$43	$295-$373	License Tag	Mandatory	WMAs
KY	312,792	Up	$50	$190	License Tag/ Hunter Log	Mandatory	Yes
LA	191,300	Stable	$29-50	$300-352	Physical Tag	Mandatory	DMAP
MD	56,000	Stable	$36.50	$130	Physical Tag	Mandatory	Antlered only
MO	513,113	Stable	$17	$225	License Tag	Mandatory	Antlerless only
MS	147,046	Up	$18.85-33.85	$303.85-382.70	None	None	Antlerless, DMAP & FMAP
NC	258,400	Up	$25	$120	License Tag	Mandatory	Antlerless Only
OK	372,945	Stable	$25	$280	License Tag	Mandatory	DMAP
SC	147,273	Stable	$25	$225	None	None	Yes & DMAP
TN	200,000	Stable	$56	$251	Physical/ Digital Log	Mandatory	WMA's, Some Counties
TX	700,494	Stable	$25	$315	License Tag	Mandatory	MLDP permits
VA	226,000	Down	$46-82	$197-259	License Tag	Mandatory	Unlimited on private lands, antlerless only
WV	221,500	Stable	$35	$196	Physical Tag	Mandatory	Yes
Total	4,243,682						

Table 1. Continued, page 4

			Deer Related Accidents						
			Firearms		Stands		Other		
State	Mandatory Orange	Crossbows Permitted	Injuries	Fatalities	Inj.	Fat.	Inj.	Fat.	Highway Kill[7]
AL	Yes	Yes	4	1	13	1	0	0	30,051 (B)
AR	Yes	Yes	3	0	9	2	0	0	20,487 (C)
DE	Yes	Yes	0	0	0	0	0	0	4,803 (B)
FL	WMAs only	Yes	2	1	1	0	0	0	14,000
GA	Yes	Yes	7	1	37	1	0	1	50,000 (C)
KY	Yes	Season & Handicap	7	0	5	1	8	0	2,985 (A)
LA	Yes	Yes							9,256 (C)
MD	Yes	Yes	1	0	3	1	1	0	33,946 (C)
MO	Yes	Yes, Firearms	5	1	5	1	1	1	34,550 (C)
MS	Yes	Yes, Firearms, Primitive Weapons	16	1	21	2	0	0	23,403 (C)
NC	Yes	Yes	9	1	12	1	2	0	64,815 (C)
OK	Yes	Yes	0	0	0	0	0	0	11,444 (C)
SC	WMAs only	Yes	6	1	9	3	0	0	2,207 (A)
TN	Yes	Yes	0	0	1	1			28,000 (C)
TX	WMAs only	Yes	7	1	1	1	0	0	46,648 (C)
VA	Yes	Yes	20 combined	2 combined					59,420 (C)
WV	Yes	Yes (Disabled)	7	0	3	1	2	1	15,707 (A)
Total									451,722

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	B,C (1 County, 8 WMAs)	~15	~20	~45	$6-18
AR	6	3-6	2	A,C	?	?	?	$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]	C	----------	36% Combined	----------	$10-12
GA	12	10	2	A (One buck must be 4-points on 1 side) B (9 counties are more restricted)	31	22	53	$5-20
KY	None	Varies	1	C (10 WMAs)	----------	34% Combined	----------	$15-25
LA	6	3	2 with a choice on the 3rd	No	20	19	40	$5-30
MD	Varies	3 with 1 bonus in Region B	3 with 1 bonus in Region B	No	39	30 (C)	43	$5-35
MO	Varies	Varies	3; 1 with firearm	Yes, 63 counties	20	-	33	?
MS	8	5	3	C	41	41	56	?
NC	6[8]	6[8]	2/4 [8]	NA	----------	51% Combined	----------	?
OK	6	Up to 6	2	No	34	13	43	$5-10
SC	15+	10+	5+	C (10 WMAs)	29	30	66	$8–20
TN		Varies	3 statewide	None	----------	45% Combined	----------	$5-10
TX	5	Up to 5	Up to 3	C	----------	58% Combined	----------	$7-20
VA	6 (east) & 5 (west)	6	3 (east)& 2 (west)	On 2 WMAs + 7 Counties	~36	~40	51	?
WV	10	Up to 8	Up to 3	6 WMAs	35	16	55	$1-6
Avg.					30	25.7	49.5	

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	106	Yes	Yes	No
AR	A	None	None	800	Yes	Yes	Yes, Private
DE	DDAP SDDAP	None	None	120 221	No	Yes	Yes, Private
FL	A, C	640; 5000	None	1,609; 11	Yes	Yes	Yes
GA	None				Yes	Yes	No-North Zone Yes-South Zone
KY	B	None	None	275	Yes	Yes (except March – May)	Yes, Private
LA	A	40	Yes	742	Yes	Yes	Yes, Private
MD	None				Yes	Yes	Yes, Private Only. None W CWD
MO	B	5	None	150,000	Yes	Yes (except CWD zone)	No
MS	A,D	Variable	None	538	Yes	Yes	No
NC	A	Regional; 1,000/500	$50	62	Yes	Yes	Yes
OK	A	1,000	$200-400	133	No	Yes	Yes
SC	A	None	$50	1,639	Yes	Yes	Yes, Private
TN	None				With officer	Yes	No
TX	A,B,C	None	None	7,879 29.5 mil ac.	Most of Texas	Yes	Yes
VA	DCAP DMAP DPOP	None	None	765 825 11	Yes (no weapon)	No (Sept 1 – first Sat in Jan)	No
WV	None				No	Yes[12]	Yes[12]

Table 1. Footnotes, page 7

[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. 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 the 7-day antlerless deer season.
MD – Unlimited antlerless archery bag limit in Region B. Statewide antlerless bag limit of 1 buck per weapon (bow, muzzleloader, firearm). One bonus buck can be taken in Region B after buying bonus stamp and harvesting two antlerless deer.
MO – No daily or annual limit of antlerless deer but number that can be harvested in each county varies.
NC – Up to 2 buck in areas in the western, northwestern, and central deer seasons. Up to 4 bucks in areas in the eastern deer season. Unlimited bonus antlerless tags are available.

[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 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.

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